

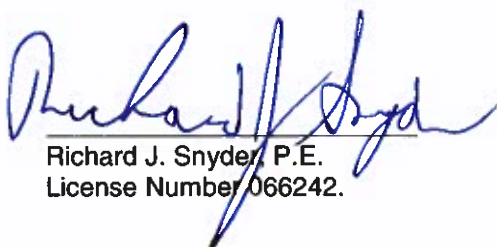


Alternatives Analysis Report Mud Creek Drainage System Areas of Concern

BCP Site No. C633016
Special Metals Corporation
New Hartford, New York



I, Richard J. Snyder, certify that I am currently a New York State registered Profession Engineer and that this report entitled "Alternatives Analysis Report Mud Creek Drainage System Areas of Concern (BCP site No. C633016) New Hartford, New York" (Report) was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).


Richard J. Snyder, P.E.
License Number 066242.



June 13, 2018
Date



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1. Introduction

This Alternatives Analysis Report (AAR) has been prepared for Special Metals Corporation (SMC) by GHD. This report evaluates potential remedial actions to address the Areas of Concern (AOCs) associated with the Mud Creek Drainage System on and adjacent to the SMC facility in New Hartford, New York. This AAR evaluates possible remedial alternatives to identify the most appropriate action for the Mud Creek Drainage Systems that is protective of human health and the environment. This work is being performed under the Brownfield Cleanup Program (BCP, Site No C633016).

This AAR addresses the following AOCs related to the Mud Creek Drainage System:

1. The Sediment and Flood Plain/Wetland Soil in the Mud Creek Corridor
2. The Former Landfill
3. The North Drainage Ditches
4. The South Drainage Ditches
5. The On-Site Storm Sewer System
6. The Storm Sewer Treatment System

In 2015, ARCADIS submitted the "Remedial Investigation Report" to the New York State Department of Environmental Conservation (NYSDEC). The Remedial Investigation Report provided a summary of all the investigations performed at the SMC Site including the Mud Creek Corridor. Follow up investigations were performed along Mud Creek by GHD and reported upon in the document entitled "Sample Collection Results – Mud Creek Interim Remedial Measure – January 2017". Additional documentation regarding Mud Creek has been submitted by GHD to the NYSDEC on behalf of SMC in the following reports:

- "Assessment of Nickel and Chromium Concentrations" March 1, 2017
- "Regulatory Analysis Mud Creek Clean Up Criteria" April 4, 2017
- "Vegetative Index of Biotic Integrity" October 18, 2017
- "Results of Leaching Procedures to Determine Solubility of Chromium and Nickel" December 19, 2017
- "Results of Worm Bioaccumulation Study" January 2, 2018
- "Derivation of Proposed Site-Specific Cleanup Targets for Nickel and Chromium" January 2, 2018

The NYSDEC has not approved these reports but they are referenced for analytical and / or observational data content.

In addition, GHD has also collected additional samples from the on—Site ditches to supplement the understanding of the chemicals present therein. The data from this program were submitted to the



NYSDEC in the report entitled "Sample Collection Results – On-Site Ditches for Interim Remedial Measure" May 5, 2017.

PCBs, nickel, and chromium have been identified as the primary Chemicals of Concern (COCs) in the Mud Creek Drainage System.

As a result of discussions with the NYSDEC and New York State Department of Health (NYSDOH), it is evident that some of the remedial measures that need to be implemented will involve some form of excavation and off-site disposal of impacted material at a permitted facility with appropriate restoration of the disturbed areas. Consequently, this AAR focusses on alternatives involving removal actions.

The selected alternatives and remedial actions will be effective in addressing the COCs present in Mud Creek at and adjacent to the Site including the associated drainage system, and will be protective of human health and the environment.

2. Site Background

The SMC New Hartford facility (the Facility) is located at 4317 Middle Settlement Road, New Hartford, Oneida County, New York (Figure 2.1). Steel manufacturing operation at this location commenced after 1958.

The facility is zoned industrial, is secured by a chain-link perimeter fence with access controlled through a security gate and guard at the plant entrance. The Brownfields Cleanup Program (BCP) site includes several manufacturing buildings (Main Plant, Rolling Plant & Pilot Plant), an office building connected to the Main Plant, parking lots, access roads, and adjacent areas. Historic operations of the Facility included melting, hot rolling, and cold finishing of metal alloys for industrial use.

Currently, SMC produces high-nickel alloys in all standard mill forms, from large ingots and billets to plate, sheet, strip, tubing, bar, and wire, the latter of which includes core and filler wires for welding products. The melting process is performed in vacuum induction, vacuum arc, and electro slag furnaces.

In 2009, SMC entered into a Brownfields Cleanup Agreement with NYSDEC. In 2017, a modification of the agreement expanded the defined BCP boundaries to 76.8 acres within the larger 119-acre tax parcel.

Figure 2.2 shows all of the AOCs covered under this AAR.

2.1 Storm Water Systems

The Facility is serviced by a storm water sewer network and surface water ditches that collect and convey storm water from the Facility to Mud Creek. A network of catch basins, manholes, and piping collect and convey storm water from the eastern half of the Site by gravity to a below-grade oil/water separator (OWS). The OWS is located immediately upstream from and east of the existing storm water treatment plant. The OWS consists of a primary chamber (i.e., separator) with twin



outlet riser pipes configured to allow water to pass through to the secondary chamber. From the secondary chamber of the OWS, water is pumped to the on-Site storm water treatment system to undergo treatment consisting of solids and carbon filtration media. Treated storm water is discharged per SMC's State Pollutant Discharge Elimination System (SPDES) permit number NY 000 7129 to Mud Creek via Outfall 1. The location of the drainage swales and outfalls are depicted on Figure 2.2.

Including Outfall 1, there are currently four active outfalls at the Site; Outfalls 1, 3, 4, and 5, that are monitored as part of the SPDES permit. Storm water catch basins located between the western parking lot and the Rolling Plant convey storm water to the drainage swale on the east side of the former Pilot Plant Building, which proceeds to the south until discharge via Outfall 3. The drainage swale located just north of the Rolling Plant conveys surface water runoff to the west where it discharges via Outfall 4. The northern drainage ditch originates near the Demolition Debris Landfill Area and runs to the north and east and eventually discharges to Mud Creek.

Mud Creek begins to the southwest of the Site in a state-regulated wetland (State ID UW-13) and generally flows in an easterly direction. The On-Site portion of Mud Creek ranges from 2 to 15 feet across, with depths ranging from a few inches to more than 6 feet. The NYSDEC classification for Mud Creek (waters index number H-240-219-4) is Class C(T). The creek channel is characterized by a series of meanders, riffles, runs, and pools. The riparian areas adjacent to Mud Creek in the On-Site Areas are well vegetated, and include a mix of Successional Old Field and Successional Shrubland/Northern Hardwoods cover types. These areas are characterized by mixed age hardwoods and softwoods, shrubs, and herbaceous vegetation.

The Off-Site Area of Mud Creek extends from Middle Settlement Road to approximately 2,500 feet downstream. The Off-Site Areas consist of residential, commercial, industrial, and undeveloped properties. The creek channel downstream of Middle Settlement Road is characterized by generally straight runs followed by a series of meanders. These meanders begin approximately 1,500 feet downstream of Middle Settlement Road. The creek substrate at locations downstream of Middle Settlement Road consists primarily of gravels, cobbles, and coarse sands, with generally approximately 10 percent or less silts and clays. The stream cross-section ranges from approximately 3 to 12 feet, and depths are generally less than 1 foot. Flow velocities in this stretch of Mud Creek range from approximately 0.02 feet per second to 1.51 feet per second. The riparian areas adjacent to Mud Creek in the Off-Site Areas are characterized as being the same as those in the on-Site portion.

2.2 Previous Investigations and Remedial Actions

Samples of the sediment and flood plain soil from along Mud Creek have been collected over the past several years with major sampling events occurring in conjunction with the 2007 Site Investigation, the 2013 Remedial Investigation, and additional sampling by GHD in 2017. The results of the samples collected show that the primary COCs in the Creek sediment and wetland/flood plain soil that require to be addressed are PCBs, Nickel, and Chromium. Figures 2.3 through 2.8 respectively show the concentrations of these compounds in the various reaches of the Creek. Some additional sampling will be completed as part of an investigation of the portion of Mud Creek further downstream of the samples that have already been collected and included in this assessment of site conditions. That investigation will take place as part of the remediation of the



Mud Creek corridor. There will also be a considerable number of confirmation samples collected as part of the Mud Creek remediation that will provide further definition of site conditions.

Samples of the soils in the on-site ditches have been collected in conjunction with the 2007 Site Investigation, the 2013 Remedial Investigation, and the March 2017 GHD sampling event. The results of the March 2017 sampling event were submitted to the NYSDEC in the document entitled "Sampling Results Summary – On-Site Ditches for Interim Remedial Measure" (May 5, 2017). The sampling results for PCBs, nickel, and chromium are presented in Figures 2.9, 2.11, and 2.13 respectively. Cross sections showing the data are presented in Figures 2.10, 2.12, and 2.14. Historical data collected from the on-site ditches are presented in Figure 2.15. Following these sampling events, a remedial plan for the north on-site ditches was prepared and submitted to the NYSDEC in the report entitled "On-Site Ditch Remediation Interim Remedial Measure Work Plan" (August 30, 2017). NYSDEC approved this Work Plan on October 2 and remedial work commenced on October 11, 2017. The Work Plan was amended on October 25 to include one additional area of remediation (Area 4) which also was remediated under the North On-Site Ditch Interim Remedial Measure. The North On-Site Ditch remediation was completed in January 2018 and the "On Site Ditch Remediation – Interim Remedial Measure – Final Construction Completion Report" was submitted to the NYSDEC on February 28, 2018. Figure 2.16 shows the North On-Site Ditch areas that were remediated.

Figure 2.17 presents the data from soil samples collected in the vicinity of the South On-Site Ditches.

A document entitled "Work Plan for Storm Water Sewer Cleaning" was submitted to the NYSDEC on July 7, 2017 (updated July 28) describing the procedures that will be used to clean the on-Site storm water sewer system. That Work Plan was approved by the NYSDEC on July 21, 2017 and implemented in May / June 2018.

In addition to implementing these planned IRMs, SMC is continually enhancing its Best Management Practices for the handling of on-Site materials to best control the potential for future releases of Site related material.

3. Alternatives Analysis Protocols

This AAR has been prepared in a manner consistent with appropriate NYSDEC technical and administrative documents.

3.1 Applicable or Relevant and Appropriate Requirements

Applicable or relevant and appropriate Standards, Criteria, and Guidelines (SCGs) are used to develop remedial action objectives (RAOs) and to scope and formulate remedial action technologies and alternatives. The SCGs are categorized as:

1. Chemical-specific requirements that define acceptable exposure levels and may therefore, be used in establishing preliminary remediation goals.



2. Location-specific requirements that may set restrictions on activities with specific locations, such as flood plains or wetlands.
3. Action-specific requirements that may set controls or restrictions for particular treatment and disposal activities related to the management of wastes including hazardous waste.

Potential SCGs are described in the following subsections.

3.1.1 Chemical-Specific SCGs

Chemical-specific SCGs define health- or risk-based concentration limits in various environmental media for hazardous substances and contaminants. Concentration limits provide protective cleanup levels or may be used as a basis for estimating appropriate cleanup levels for the COCs in the designated media. Chemical-specific SCGs may be used to determine treatment system discharge requirements or disposal restrictions for remedial activities and/or to assess the effectiveness or suitability of a remedial alternative. Chemical-specific SCGs are generally promulgated standards or other criteria. Applicable or relevant and appropriate guidance values may be appropriate where a promulgated standard for a particular substance is not available.

Potential chemical-specific SCGs that may apply at the Site are presented in Table 3.1.

3.1.2 Action-Specific SCGs

Action-specific SCGs are determined by the particular remedial activities that are selected for the Site cleanup. Action-specific requirements establish controls or restrictions on the design, implementation, and performance of remedial activities. Following the development of remedial alternatives, action-specific SCGs that specify performance levels, actions, technologies, or specific levels for discharged or residual chemicals provide a means for assessing the feasibility and effectiveness of the remedial activities.

The action-specific SCGs that may be applicable to potential remedial technologies are presented in Table 3.2.

3.1.3 Location-Specific SCGs

Potential location-specific SCGs are requirements that set restrictions on activities depending on the physical and environmental characteristics of the Site or its immediate surroundings.

Potential location-specific SCGs that may be applicable to potential Site remedial technologies are the New Hartford zoning ordinances and building codes, the local conservation authority and the U.S. Army Corps of Engineers requirements, as applicable, to working along and in Mud Creek and in the on-site ditches and sewers.



3.2 Remedial Action Goals and Objectives

3.2.1 Remedial Action Goals

Remedial Action Goals under the BCP are pursuant to 6 NYCRR Part 375-2.8 (NYSDEC 2006). The primary goals of any remedial action are to:

1. Restore the site to pre-disposal/pre-release conditions, to the extent feasible.
2. Eliminating or mitigating all significant threats to public health and the environment through proper application of scientific and engineering principles.
3. Removing sources of contamination to the extent feasible. "Feasible" is defined as suitable to site conditions, capable of being successfully carried out with available technology and being implementable and cost effective.

The remedy selection process will be performed in a manner consistent with the methods described in 6 NYCRR Part 375 (NYSDEC 2006) and guidance presented in DER Technical Guidance for Site Investigation and Remediation (DER-10) and any other appropriate NYSDEC technical and administrative documents.

3.2.2 Remedial Action Objectives

The RAOs that have been developed for the Site are consistent with the remedy selection process described in 6 NYCRR Part 375 (NYSDEC 2006) and guidance presented in DER Technical Guidance for Site Investigation and Remediation (DER-10) (NYSDEC 2010). The RAOs are based on the results of the completed investigations and the conclusions drawn from the RI.

RAOs for Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation exposure to contaminants volatilizing from soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater, surface water, or sediment contamination.
- Prevent impact to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

RAOs for Surface Water

RAOs for Public Health Protection

- Prevent ingestion of water impacted by contaminants.
- Prevent contact or inhalation of contaminants from impacted water bodies.
- Prevent surface water contamination which may result in fish advisories.



RAOs for Environmental Protection

- Restore surface water to ambient water quality criteria for the contaminant of concern.
- Prevent impacts to biota from ingestion/direct contact with surface water causing toxicity and impacts from bioaccumulation through the marine or aquatic food chain.

RAOs for Sediment

RAOs for Public Health Protection

- Prevent direct contact with contaminated sediments
- Prevent surface water contamination which may result in fish advisories.

RAOs for Environmental Protection

- Prevent releases of contaminants from sediments that would result in surface water levels in excess of ambient water quality criteria.
- Prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the marine or aquatic food chain.
- Restore sediments to pre-release/background conditions to the extent feasible.

4. General Response Actions and Identification of Remedial Technologies

General response actions are remedial approaches encompassing those actions that will satisfy the RAOs while taking into account the Site specific conditions and the COCs. General response actions may include treatment, containment, excavation, disposal, institutional controls, or a combination of these, if required, to address varied Site environmental conditions and to be effective in meeting all of the RAOs. The general response actions and remedial technologies evaluated for the impacted sediment and wetland/flood plain soil in and along Mud Creek and the ditches and sewers are described in the following subsections and listed in Table 4.1.

4.1 Identification of General Response Actions and Remedial Technologies

4.1.1 No Action

The No Action response is primarily used as a basis for comparison with other alternatives. Under the No Action response, no additional measures are taken to improve environmental conditions at the Site. This response does not reduce the volume, mobility, or toxicity of the hazardous constituents of the Site media.

4.1.2 Institutional Control

The institutional control response is not intended to reduce the toxicity, mobility, or volume of hazardous Site constituents, but to reduce the potential for human and wildlife exposure to those



constituents. Options may include initiation of institutional controls to restrict or limit the use of the Site or the contaminated media and/or development of protective work procedures to reduce the potential for exposure of workers and the public to Site contaminants.

4.1.3 Containment Technologies

Containment technologies for sediment and wetland/flood plain/ditch soils and landfilled materials consist of physical containment. The containment response does not reduce the volume or toxicity of the contaminants in the Site media. The purpose of this response is to reduce contaminant mobility, and in doing so, minimize exposure and reduce potential hazards at the Site. Periodic monitoring and inspection is necessary to ensure that containment is maintained.

The sediment and wetland/flood plain/ditch soil containment technology identified as potentially applicable to the Site is the use of a surface barrier (cap) to prevent exposure to contaminants in sediment and wetland/flood plain/ditch soils. A cap is also applicable to the Former Landfill and other surface-exposed COCs.

4.1.4 Collection Technologies

Collection technologies reduce the mass of contaminants present to a greater or lesser degree, dependent on the aggressiveness of the collection effort. Use of the collection technologies reduces the mobility and toxicity of Site contaminants by removal and disposition at a secure location. These technologies provide no treatment of contaminated media but may be used in conjunction with a disposal and/or treatment option to meet the Site-specific goals and objectives.

The collection technologies identified as potentially applicable to sediment and wetland/flood plain/ditch soil at the Site are excavation of impacted material and collection in sediment traps. The collection technologies identified as potentially applicable to sewer sediment involves pressurized washing to mobilize the sediment for collection at a downstream location.

4.1.5 Ex Situ Treatment Technologies

The purpose of a treatment technology is to reduce the volume, toxicity, and/or mobility of Site contaminants. Remedial treatment technologies include biological, physical, chemical, and thermal processes or some combination of those processes (e.g., physical/thermal treatment).

The treatment technologies identified as potentially applicable to excavated sediment and wetland/flood plain/ditch/landfill soils at the Site that are impacted with PCBs are thermal desorption and incineration. These technologies are not applicable to the sediment and wetland/flood plain/ditch/landfill soil impacted with metals.

4.1.5.1 Thermal Desorption

Thermal desorption is a physical treatment method for excavated sediment and wetland/flood plain/ditch/landfill soil that is impacted with PCBs. Thermal desorption results in a reduction of the volume and toxicity of the PCBs. To thermally treat the PCBs in Site sediment and wetland/flood plain/ditch/landfill soils, the material would be heated to a high temperature to volatilize water and the PCBs. The resultant vapors would then be transported in a carrier gas or by vacuum extraction



to a treatment system. Thermal desorption is not applicable to the sediment and wetland/flood plain/ditch/landfill soil impacted with metals.

Dewatering of sediment and wetland/flood plain/ditch/landfill soil may be required to achieve acceptable soil moisture content prior to treatment.

4.1.5.2 Incineration

Incineration is a potential physical/chemical treatment method for excavated sediment and wetland/flood plain/ditch/landfill soil impacted with PCBs. Organic chemical compounds present in excavated sediment and wetland/flood plain/ditch/landfill soil would be destroyed through volatilization and combustion. Off gases and combustion residuals may require treatment. Incineration is not applicable to the sediment and wetland/flood plain/ditch/landfill soil impacted with metals.

4.1.6 Disposal Technologies

Disposal technologies involve off-Site or on-Site disposal of contaminated sediment and wetland/flood plain/ditch/landfill soil or products of treatment processes. Disposal technologies do not usually involve reduction of contaminant volume or toxicity, but are primarily intended to reduce contaminant mobility by placing the material in a more secure setting. While the volume and toxicity remain the same, disposal at least reduces the on-Site volume and toxicity by transferring it to a more secure location elsewhere. On-Site disposal options include the construction of a disposal cell with disposal of the contaminated media in the cell or placement within a more secure setting on the Site. Off-Site disposal options include disposal at a permitted Transport Storage and Disposal Facility (TSDF). Off-Site disposal options also involve transportation of the waste to the TSDF.

4.1.7 Consolidation

The consolidation response is not intended to reduce the toxicity or volume of hazardous Site constituents, but to reduce the mobility and the potential for human and wildlife exposure to those constituents. Consolidation technologies involve removing impacted material from one location and placing it onto an adjacent area where it can be secured in a state at least equivalent to the condition of other similar material, but preferably within a smaller more confined area. Further reduction in mobility and potential exposure can be achieved by covering the impacted material with clean material or placing it in a subsurface setting.

4.2 Initial Screening of Remedial Technologies

Prior to developing a list of remedial alternatives potentially applicable at the Site for detailed analysis and comparison, all identified available and appropriate technologies are screened. The identified technologies described in Section 4.1 have been screened utilizing the following criteria:

1. Short- and long-term effectiveness
2. Implementability
3. Relative cost
4. Short-term risk



The initial screening of remedial technologies and process options is designed to determine their applicability to the Site and eliminate those technologies that technically cannot be implemented.

The results of the initial screening of the remedial technologies assembled to address the general response actions presented in Section 4 and listed in Table 4.1 for sediment and wetland/flood plain soil are shown on Tables 4.2 and 4.3.

In summary, the following technologies are retained for further evaluation with regard to sediment and wetland/flood plain soil:

1. No Further Action
2. Institutional Control
3. Collection / Excavation
4. Disposal

For the AOCs associated with the Mud Creek Drainage Systems on the SMC property, the alternative screenings are presented in Table 4.4.

Based on this screening, the following technologies are retained for further evaluation with regard to landfilled material:

1. No Further Action
2. Institutional Control
3. Containment
4. Consolidation
5. Collection/Excavation
6. Disposal

The following technologies are retained for further evaluation with regard to the on-site ditches:

1. No Further Action
2. Institutional Control
3. Collection/Excavation
4. Disposal

The following technologies are retained for further evaluation with regard to storm sewers:

1. No Further Action
2. Collection/Excavation
3. Removal of Sewer System

The following technologies are retained for further evaluation with regard to the storm sewer treatment system:

1. No Further Action



2. Continued Operation

4.3 Retained Remedial Alternatives

These technologies may be used individually or in combination and consequently have been assembled into the following remedial alternatives. Due to the fact that sediment has different cleanup objectives than wetland, flood plain, and ditch soil, separate sets of remedial alternatives have been developed for each medium.

A The remedial alternatives for **sediment** are as follows:

1. No Further Action.
2. Institutional Control.
3. Collection through excavation with off-site disposal of sediments exceeding proposed Site-Specific Screening Levels with consideration for frequency and significance of exceedances with in kind natural stream bed restoration.
4. Collection through excavation with off-site disposal of sediments exceeding proposed Site-Specific Screening Levels in all areas and at all depths with in kind natural stream bed restoration.
5. Collection through excavation with off-site disposal of sediments exceeding the Restricted Residential SCOs in all areas and at all depths with in kind natural stream bed restoration.
6. Collection through excavation with off-site disposal of sediments exceeding the lower of Residential Soil SCOs and Class C sediment standards in all areas and at all depths with in kind natural stream bed restoration.
7. Collection through excavation with off-site disposal of sediments exceeding the lower of Residential Soil SCOs and Class A sediment standards in all areas and at all depths with in kind natural stream bed restoration.

B The remedial alternatives for **wetland/flood plain soil** are as follows:

1. No Further Action.
2. Institutional Control.
3. Collection through excavation with off-site disposal of soil exceeding proposed Site-Specific Screening Levels with consideration for frequency and significance of exceedances with in kind ecological/wetland restoration.
4. Collection through excavation with off-site disposal of soil exceeding proposed Site-Specific Screening Levels in all areas and at all depths with in kind ecological/wetland restoration.
5. Collection through excavation with off-site disposal of soil exceeding Restricted Residential Soil SCOs in all areas and at all depths with in kind ecological/wetland restoration.



6. Collection through excavation with off-site disposal of soil exceeding Residential Soil SCOs in all areas and at all depths with in kind ecological/wetland restoration.
7. Collection through excavation with off-site disposal of soil exceeding the lower of Residential and Ecological Soil SCOs in all areas and at all depths with in kind ecological/wetland restoration.
8. Collection through excavation with off-site disposal of soil exceeding Unrestricted Soil SCOs in all areas and at all depths with in kind ecological/wetland restoration.

C The remedial alternatives for the **Former Landfill** are as follows:

1. No Further Action.
2. Site Management and Institutional Controls (Industrial Use).
3. Capping of the Former Landfill
4. Collection through excavation with off-site disposal of two hot spot locations with material exceeding Industrial SCOs with consolidation of the remainder of the landfill and capping.
5. Collection through excavation with off-site disposal of hot spot material exceeding proposed Site-Specific Screening Levels with consolidation of the remainder of the landfill and capping.
6. Collection through excavation with off-site disposal of material exceeding the Unrestricted Use SCOs and restoration of disturbed area.
7. Excavation of all impacted material with placement on a synthetic liner with an overlying cap and restoration of disturbed area.

D The remedial alternatives for **on-Site ditch soil** are as follows:

1. No Further Action.
2. Site Management and Institutional Controls (Industrial Use).
3. Capping of the ditches.
4. Collection through installation of sediment traps.
5. Collection through excavation with off-site disposal of soil exceeding Industrial SCOs and capping of disturbed areas.
6. Collection through excavation with off-site disposal of soil exceeding proposed Site-Specific Screening Levels and capping of disturbed areas.
7. Collection through excavation with off-site disposal of soil exceeding Unrestricted Soil SCOs in all areas and at all depths with capping of disturbed areas.

E The remedial alternatives for the **on-site storm sewer system** are as follows:

1. No Further Action.
2. One time cleaning with off-site disposal of waste and treatment of future water with documentation sampling.



3. Long-term periodic sewer cleaning with off-site disposal of waste and treatment of future water until untreated effluent meets surface water standards.
4. Removal of the sewer system through excavation and off-site disposal to Protection of Groundwater SCOs
5. Removal of the sewer system through excavation and off-site disposal to Unrestricted Use SCOs.

F The remedial alternatives for the **storm sewer treatment system** are as follows:

1. No Further Action – existing system is decommissioned
2. Continued operation of the treatment system under SPDES permit.
3. Incorporation of treatment system into Site Management Plan for BCP Site.

5. Detailed Analyses of Retained Remedial Alternatives

Remedial alternatives for the remedies associated with the Mud Creek Drainage Systems were developed in Section 4.3 for possible application at the Site. These alternatives are subject to a detailed analysis using the evaluation criteria outlined in NYSDEC guidance. The evaluation criteria are as follows:

1. Overall protection of human health and the environment
2. Compliance with standards, criteria, and guidance (SCGs)
3. Reduction of toxicity, mobility, or volume
4. Short-term impact and effectiveness
5. Long-term effectiveness and permanence
6. Implementability
7. Land use
8. Cost effectiveness
9. Community acceptance

The criteria of community acceptance cannot be evaluated at the feasibility study stage because it is based upon public comments regarding the Site remedy. A public comment period is commonly held following State acceptance of the remedy. Consequently, no further discussion of this criterion or State acceptance is provided in this AAR.

The current land use of the impacted AOCs are either part of the plant property or a creek with associated wetlands, flood plains, and aquatic features. There is no plan to alter the future land use of the impacted AOCs under any proposed alternative and therefore the final use of the property will remain as either an industrial complex or a creek with associated features.



The remaining seven criteria are divided into two primary groups, namely threshold criteria and balancing criteria.

The threshold criteria include compliance with applicable SCGs, and overall protection of human health and the environment. With the exception of the No Action alternative, all remedial alternatives must meet the threshold criteria to be eligible for further consideration.

The remaining six evaluation criteria are considered the balancing criteria. Each of the remedial alternatives is assessed and analyzed on a comparative basis using these evaluation criteria. Ultimately, a remedial action plan is proposed that incorporates the alternative that provides the best solution with respect to the balancing criteria.

The detailed analysis of retained alternatives has been performed in a manner consistent with the applicable regulations. The analyses are described in detail in the following subsections. Backup information for the cost estimates is presented in the Tables.

The detailed analyses have been performed in two parts. The first part (Section 6) presents the analyses for the Mud Creek Corridor which consists of the Mud Creek sediment and the wetland/flood plain soil along its banks. The second part (Section 7) presents the analyses for the other components of the Mud Creek Drainage System which includes the Former Landfill (due to its location immediately adjacent to Mud Creek), the on-Site drainage system (which has been broken down into two parts – the northern drainage system and the southern drainage system), the on-Site storm sewer system, and the storm sewer treatment system.

6. Detailed Analysis of Mud Creek Sediment and Wetland/Flood Plain Soil

6.1 Mud Creek Sediment

6.1.1 Mud Creek Sediment Alternative 1: No Action

6.1.1.1 Description

Sediment Alternative 1, No Action, provides no active remedial measures to improve environmental conditions at the Site. Natural processes would reduce COC concentrations in the sediment over the long term. No remedial actions, institutional controls, or monitoring would be conducted.

6.1.1.2 Assessment

Overall Protection of Human Health and the Environment: Because no additional remedial measures are implemented with Sediment Alternative 1, the potential future risk to human health and the environment would not be reduced beyond that which would be achieved through natural physical processes (dilution and dispersion) for the metals and through natural physical and attenuation processes (including biodegradation) for the PCBs.



Compliance with SCGs: Alternative 1 would not achieve the chemical-specific SCGs that apply to sediment. Since no remedial action would be implemented, no action-specific or location-specific SCGs apply to Alternative 1.

Reduction of Toxicity, Mobility, or Volume: Alternative 1 provides no active reduction of toxicity, mobility, or volume of the COCs. However, over the long term, the concentrations and toxicity of the COCs in sediment will be reduced by natural processes.

Short-Term Effectiveness: Alternative 1 requires no remedial actions. There would be no additional short-term risks posed to the community, the workers, or the environment as a result of the implementation of this alternative.

Long-Term Effectiveness and Permanence: Over time, through natural processes (dilution, dispersion, and biodegradation), Alternative 1 may achieve the RAOs applicable to sediment.

Implementability: Because there are no remedial actions being undertaken, the implementability criterion is not applicable.

Land Use: Because there would be no remediation performed, there would be no change to the land use within the creek corridor.

Cost: Because there are no remedial actions, institutional controls, or monitoring being undertaken, there are no costs associated with Sediment Alternative 1.

6.1.2 Mud Creek Sediment Alternative 2: Institutional Control

6.1.2.1 Description

Sediment Alternative 2, Institutional Control, consists of the implementation of institutional controls to restrict exposure to contaminated sediment in Mud Creek. Specifically,

1. Portions of the on-Site portion of Mud Creek are within the viewing area of Site security personnel and Plant personnel who are present 24 hours a day/7 days per week.
2. Safe work practices and definitions of levels of PPE for specific work activities would be developed and implemented for maintenance or construction activities conducted within and along Mud Creek, consistent with the characteristics of the COCs present.
3. An Environmental Easement would be recorded. The Environmental Easement would put third parties on notice of certain land use restrictions. The restriction or restrictive covenants would be drafted in accordance with applicable and relevant State and municipal legal codes.
4. For the off-Site portions of Mud Creek, some of the sections that have sediment concentrations that exceed various cleanup criteria may be fenced to restrict access.

6.1.2.2 Assessment

Overall Protection of Human Health and the Environment: The implementation of institutional controls would be protective of human health by preventing incidental exposure to creek sediments for those with knowledge of the Site conditions. However, those who are not aware of the Site



conditions or chose to ignore this information or trespass within the fenced restricted areas may come in contact with impacted sediment and therefore would not be protected.

The potential future risk to the environment using Alternative 2 would not be reduced beyond the attenuation that will be achieved through natural processes.

Compliance with SCGs: Alternative 2 would not achieve the chemical-specific SCGs that apply to impacted sediment. No action-specific SCGs apply to Alternative 2. The potentially applicable location-specific SCGs for this Alternative are the New Hartford ordinances and building codes and the local conservation authority's regulations.

Reduction of Toxicity, Mobility, or Volume: Alternative 2 provides no active reduction of toxicity, mobility, or volume of the COCs. However, over the long term, the concentrations and toxicity of COCs in sediment will be reduced by natural processes.

Short-Term Effectiveness: No additional short-term risk to the community or the environment would be posed as a result of the implementation of Alternative 2. Risk to workers performing work around the area would be mitigated through the implementation of safe work practices and proper PPE.

Long-Term Effectiveness and Permanence: The institutional controls established for Alternative 2 would make this Alternative effective in the long term only if they are understood, enforced, and maintained.

Implementability: Alternative 2 is partially implementable. Local property owners would be made aware of the Site conditions and hazards. However, there is no mechanism to ensure that humans, especially children, will not enter the impacted sediment areas anyway and no way to ensure that visitors would be aware of the Site conditions and their possible impacts.

Land Use: The land would continue to be used in the same manner after the Institutional Controls were in place although the owners and public would be made aware of the restrictions that have been placed on the use of the land.

Cost: The estimated cost for Sediment Alternative 2 is \$ 219,000. Details are presented in Table 6.2.

6.1.3 Mud Creek Sediment Alternative 3: Excavation/Disposal of Sediment Exceeding Proposed Site-Specific Screening Levels with Consideration for Frequency and Significance of Exceedances

6.1.3.1 Description

Alternative 3, Excavation/disposal of sediment exceeding the proposed Site-Specific Screening Levels with consideration being taken into account for those locations where the exceedances are relatively isolated compared to surrounding sample data or where the exceedances barely exceed the proposed screening levels. This alternative includes:

1. Development and approval of proposed Site-Specific Screening Levels have been an ongoing discussion with the NYSDEC. Discussions were held at meetings on September 25, 2017 and February 9, 2018 at which time presentations on the development of the proposed



Site Specific Screening Levels were made. Based on the documentation provided by GHD, the proposed Site Specific Screening Levels to be protective of human health and the environment are:

- a. PCBs 1 mg/kg
- b. Nickel 400 mg/kg
- c. Chromium 200 mg/kg

The NYSDEC has not approved these proposed Site Specific Screening Levels.

It is noted that the proposed 400 mg/kg screening level for nickel and the proposed 200 mg/kg screening level for chromium are very conservative estimates of being protective. The reason for this is that these proposed screening levels are intended for flood plain and wetland soil where the receptor base is more varied and sensitive compared to those for sediment. Further, the pore water testing that was performed during the 2017 study, was specifically designed to develop Site Specific Screening Levels for nickel and chromium in sediment. The results show that the pore water concentrations were far below concentrations that would cause an effect on aquatic life. The results of the 2017 leachability study (GHD - December 19, 2017) and the worm bioaccumulation study (GHD January 2, 2018) confirm that the nickel and chromium have minimal leachable and bioaccumulative characteristics. Consequently, the use of the proposed soil screening levels as sediment screening levels is very conservative and considerably overestimates the actual sediment areas required for remediation under this alternative.

The use of 1 ppm as the cleanup criteria for PCBs has been established at a number of New York cleanup projects including the following:

- Friedrichsohn Cooperage Sediment– Waterford
- One Point Street Sediment– Yonkers
- Reynolds Metals Company Site Sediment– Massena
- Hastings on Hudson Sediment– Westchester
- Buffalo River Sediment – Buffalo (NYSDEC promoted under the Great Lakes Legacy Act)

Alternative 3 incorporates a proposed approach that takes into account the frequency of an exceedance of the screening level along with consideration for the amount by which the concentration exceeds the screening level. In doing so, this approach assesses the concentrations of the COCs present in the environmental setting recognizing that the risks due to the presence of COCs in and along the Creek are heavily based on the level of exposure to the COCs. In the case of human and wildlife/aquatic species (and to a large degree vegetative species), the exposure is not dependent on the length of time of contact with a specific location tied to a single sampling point, but to the concentrations present in a generalized area. Therefore, evaluating the risks based on the frequency and degree of exceedance conditions in an area is the most relevant form of exposure and provides the most accurate assessment of the risks associated with the Site conditions. The typical



exposure conditions can best be simulated by looking at the overall concentrations in the risk assessment. Therefore, Alternative 3 uses the overall COC concentrations in each area as the determination of whether an exceedance exists for that area. The concept of using overall COC concentrations to determine whether an unacceptable risk exists is becoming increasingly relied upon for sediment remediation implementations based on the recognition that creatures move around during their lifetime. In particular, surface weighted averaging assessments are being increasingly used. However, the NYSDEC has not approved this methodology.

In order to determine whether an exceedance exists for any of the proposed screening levels associated with Alternative 3 for the sediment, the calculation of the typical concentration was based on the following:

- The Creek bed was split into 10 segments from the upstream to the downstream limits of the study area which run from points 1,800 feet upstream to 2,400 feet downstream of Middle Settlement Road. The segments were primarily determined based on the transect locations of the sampling that was performed for the Creek in 2012. The locations of the segments are shown on Figure 6.1.
 - All of the sampling locations at each transect were then further broken down by the depth of the samples collected. For example, all of the surface samples at each transect (including 0 to 2" samples and 0 to 6" samples) were added together and divided by the number of surface samples within that particular transect box to determine the average surficial soil COC concentrations. Plots of each transect showing the actual concentrations at each transect are provided in Appendix A.
 - A similar method was used to determine the average subsurface soil COC concentration for each box incorporating all of the samples collected more than 6" below the ground surface.
 - These typical concentrations were then compared to the proposed Site-Specific Screening Levels noted above to determine which areas had exceedances on an overall basis. Table 6.1 presents the typical concentrations that were calculated for each area, for both the surface and subsurface samples.
 - If the surface sample typical concentration did not exceed the proposed screening level, no remediation of that transect was required. If the surface sample typical concentration exceeded the proposed screening level, then the applicable segments of that transect would be excavated along with any underlying segments that also exceeded the criteria.
2. Diversion of the Creek flow during the remediation and management of all flows in and around the area in an environmentally responsible manner.
 3. Dredging or excavation of the sediment with concentrations that exceed the proposed screening levels in the delineated zones developed for Mud Creek. At present, this will involve the removal of 850 cubic yards of sediment and the following mass of COCs (in pounds and as a percentage of the total amount of each COC that exceeds 30 mg/kg for



nickel and chromium and exceeds 1 mg/kg for PCBs for all of the sediment in Mud Creek) as measured in the study area:

a.	PCBs	29 pounds	98% (81% of all the PCBs in the sediment)
b.	Nickel	1,820 pounds	70%
c.	Chromium	470 pounds	85%

The locations where the sediment will be removed under Alternative 3 are shown on Figure 6.1.

4. Transportation to, and disposal of, the excavated sediment at a permitted disposal facility, including sediment stabilization, as necessary. It is noted that sediments with PCB concentrations exceeding 50 ppm (estimated to be about 100 tons) will require disposal at a hazardous waste permitted facility.
5. Restoration of the Creek bed to a condition at least equal to the current aquatic settings using in kind natural stream bed materials that match existing materials to the extent practicable.
6. Restoration of all disturbed areas using in kind materials and to a condition at least equal to the current conditions.
7. Monitoring of restored areas and repairs, if necessary.

6.1.3.2 Assessment

Overall Protection of Human Health and the Environment: Alternative 3 would be protective of human health and wildlife by preventing potential incidental exposure to the impacted sediment that exceeds the proposed Site Specific Screening Levels (with consideration for frequency and degree of exceedance). Alternative 3 would be protective of the human health and the environment by having removed all of the areas where the impacted sediment exceeded the proposed Site Specific Screening Levels on a considered basis and securing it at permitted disposal facilities. Protection from the lesser impacted sediment that remains in place will also be provided since a large portion of the remaining lesser impacted sediment will be covered by the imported restoration material that replaces the impacted sediment that has been removed. Further protection is provided by the fact that the proposed Screening Levels used in this assessment for sediment are those that have been developed for soil, where the receptor base is more varied and sensitive. Consequently, the use of the soil Screening Levels provides an even higher level of protection than is required specifically for sediment.

Compliance with SCGs: Alternative 3 will comply with the chemical-specific SCGs that apply to sediment as allowed under Part 375-6.9 for the specific conditions at this Site. Under Part 375-6.9, it is possible to develop cleanup criteria that are based on site specific conditions rather than employing generic cleanup criteria based on generic site conditions. By removing 98% of the PCBs exceeding 1 mg/kg (and 81% of all the PCBs in the sediment) and 70% of the nickel and 85% of the chromium exceeding 30 mg/kg, this Alternative will comply with the intent of the chemical-specific SCGs, which is to minimize the exposure potential.



The potentially applicable action-specific SCGs for this Alternative are those listed in Table 3.2 under the following headings:

1. Capping
2. Excavation
3. Placement of Waste in a Land Disposal Unit
4. Surface Water Control
5. Transporting Waste Off-Site

These SCGs would be satisfied by Alternative 3.

The potentially applicable location-specific SCGs for this Alternative are the U.S. Army Corps of Engineers regulations. These would be complied with under a Nationwide Permit 38.

Reduction of Toxicity, Mobility, or Volume: Alternative 3 provides no active reduction in the toxicity or volume of the impacted sediment, but removes the impacted material from an exposed and potentially mobile environment in the Creek and places it into permitted facilities where it is more secure. Following placement of the sediment in the permitted facilities, the mobility of the chemicals is reduced. Even the mobility of the lesser impacted sediment that is left in place is reduced since a large portion of this material will be covered with imported restoration material. Over the long term, the toxicity of the COCs would be reduced by natural processes.

Short-Term Effectiveness: The excavation of the sediment would be performed using standard construction techniques. Short-term hazards to workers (including those resulting from working within a creek) would be mitigated through proper work and health and safety procedures. The short-term effectiveness of Alternative 3 would be immediate upon completion of the excavation and placement within the permitted facilities, since direct exposure of human and wildlife receptors to the impacted sediment would immediately be mitigated. Other than the potential for unintended sediment release into the downstream section of the Creek during the excavation period and potential risk due to traffic accidents during transit to the permitted disposal facilities, no additional short-term risks would be posed to the community or the environment by Alternative 3.

Long-Term Effectiveness and Permanence: The removal of the impacted sediment is a permanent remedy that eliminates the potential for exposure along Mud Creek. Even the potential for exposure to the lesser impacted sediment is reduced due to the fact that a large portion of the lesser impacted sediment will be covered with imported restoration material. The only other long-term potential for exposure is from the permitted disposal facilities, although the long-term O&M program at the selected facilities would make this Alternative effective in the long term. In addition, the incremental risk attributable to the sediment would be further reduced over the long term as a result of natural processes.

Land Use: The land would continue to be used in the same manner after the remediation was completed although the owners of the properties would be made aware, through the use of third party agreements, that their land may contain chemicals that are above some ecological or health related SCGs.



Cost: The estimated 30-year present worth cost for Sediment Alternative 3 is \$3,700,000 (which includes the applicable cost of the Wetland/Flood Plain Soil Alternative 3). The cost summary is presented in Table 6.3.

6.1.4 Mud Creek Sediment Alternative 4: Excavation/Disposal of Sediment Exceeding Proposed Site-Specific Screening Levels

6.1.4.1 Description

Alternative 4, Excavation/disposal of sediment exceeding the proposed Site-Specific Screening Levels in all areas and at all depths, includes:

1. Development and approval of proposed Site-Specific Screening Levels have been an ongoing discussion with the NYSDEC. Based on the documentation provided by GHD, the proposed Site Specific Screening Levels to be protective of human health and the environment are:
 - a. PCBs 1 mg/kg
 - b. Nickel 400 mg/kg
 - c. Chromium 200 mg/kg

The NYSDEC has not approved these proposed Site Specific Screening Levels.

It is noted that the proposed 400 mg/kg screening level for nickel and the proposed 200 mg/kg screening level for chromium are very conservative estimates of being protective. The reason for this is that these proposed screening levels are intended for flood plain and wetland soil where the receptor base is more varied and sensitive compared to those for sediment. Further, the pore water testing that was performed during the 2017 study, was specifically designed to develop Site Specific Screening Levels for nickel and chromium in sediment. The results show that the pore water concentrations were far below concentrations that would cause an effect on aquatic life. The results of the 2017 leachability study (GHD - December 19, 2017) and the worm bioaccumulation study (GHD - January 2, 2018) confirm that the nickel and chromium have minimal leachable and bioaccumulative characteristics. Consequently, the use of the proposed soil screening levels as sediment screening levels is very conservative and considerably overestimates the actual sediment areas required for remediation under this alternative.

For Alternative 4, no consideration has been given to the frequency or the degree of exceedance of the proposed screening level. A simple comparison to the proposed Site-Specific Screening Levels was used for Alternative 4.

2. Diversion of the Creek flow during the remediation and management of all flows in and around the area in an environmentally responsible manner.
3. Dredging or excavation of the sediment with concentrations that exceed these screening levels in all areas and at all depths in Mud Creek. At present, this will involve the removal of



1,330 cubic yards of sediment and the following mass of COCs as measured from points 1,800 feet upstream to 2,400 feet downstream of Middle Settlement Road:

a.	PCBs	30 pounds	100% (83% of all the PCBs in the sediment)
b.	Nickel	2,210 pounds	85%
c.	Chromium	520 pounds	93%

The locations where the sediment will be removed under Alternative 4 are shown on Figure 6.2.

4. Transportation to, and disposal of, the excavated sediment at permitted disposal facilities, including sediment stabilization, as necessary.
5. Restoration of the Creek bed to a condition at least equal to the current aquatic settings using in kind natural stream bed materials that match existing materials to the extent practicable.
6. Restoration of all disturbed areas using in kind materials and to a condition at least equal to the current conditions.
7. Monitoring of restored areas and repairs, if necessary.

6.1.4.2 Assessment

Overall Protection of Human Health and the Environment: Alternative 4 would be protective of human health and wildlife by preventing potential incidental exposure to the impacted sediment that exceeds the proposed Site Specific Screening Levels in all areas and at all depths. Alternative 4 would be protective of human health and the environment by having removed all of the areas and to all depths where the impacted sediment exceeded the proposed Site Specific Screening Levels and securing it at permitted disposal facilities. Protection from the lesser impacted sediment that remains in place will also be provided since a large portion of the remaining lesser impacted sediment will be covered by the imported restoration material that replaces the impacted sediment that will have been removed. Further protection is provided by the fact that the proposed Screening Levels used in this assessment for sediment are those that have been developed for soil, where the receptor base is more varied and sensitive. Consequently, the use of the proposed soil Screening Levels provides an even higher level of protection than is required specifically for sediment.

Compliance with SCGs: Alternative 4 will comply with the chemical-specific SCGs that apply to sediment as allowed under Part 375-6.9 for the specific conditions at this Site. Under Part 375-6.9, it is possible to develop cleanup criteria that are based on site specific conditions rather than employing generic cleanup criteria based on generic site conditions. By removing 100 percent of the PCBs exceeding 1 mg/kg (and 83 percent of all of the PCBs in the Creek sediment) and 85 percent of the nickel and 93 percent of the chromium exceeding 30 mg/kg for nickel and chromium in the sediment, this Alternative will comply with the intent of the chemical-specific SCGs, which is to minimize the exposure potential.



The potentially applicable action-specific SCGs for this Alternative are those listed in Table 3.2 under the following headings:

1. Capping
2. Excavation
3. Placement of Waste in a Land Disposal Unit
4. Surface Water Control
5. Transporting Waste Off-Site

These SCGs would be satisfied by Alternative 4.

The potentially applicable location-specific SCGs for this Alternative are the U.S. Army Corps of Engineers regulations. These would be complied with under a Nationwide Permit 38.

Reduction of Toxicity, Mobility, or Volume: Alternative 4 provides no active reduction in the toxicity or volume of the impacted sediment, but removes the most highly impacted material from an exposed and potentially mobile environment in the Creek and places it into permitted facilities where it is more secure. Following placement of the sediment in the permitted facilities, the mobility of the chemicals is reduced. Even the mobility of the lesser impacted sediment that is left in place is reduced since a large portion of this material will be covered with imported restoration material. Over the long term, the toxicity of the COCs would be reduced by natural processes.

Short-Term Effectiveness: The excavation of the sediment would be performed using standard construction techniques. Short-term hazards to workers (including those resulting from working within a creek) would be mitigated through proper work and health and safety procedures. The short-term effectiveness of Alternative 4 would be immediate upon completion of the excavation and placement within the permitted facility, since direct exposure of human and wildlife receptors to the impacted sediment would immediately be mitigated. Other than the potential for unintended sediment release into the downstream section of the Creek during the excavation period and potential risk due to traffic accidents during transit to the permitted disposal facilities, no additional short-term risks would be posed to the community or the environment by Alternative 4.

Long-Term Effectiveness and Permanence: The removal of the impacted sediment is a permanent remedy that eliminates the potential for exposure along Mud Creek. Even the potential for exposure to the lesser impacted sediment is reduced due to the fact that a large portion of the lesser impacted sediment will be covered with imported restoration material. The only other long-term potential for exposure is from the permitted disposal facilities, although the long-term O&M program at the selected facilities would make this Alternative effective in the long term. In addition, the incremental risk attributable to the sediment would be further reduced over the long term as a result of natural processes.

Land Use: The land would continue to be used in the same manner after the remediation was completed although the owners of the properties would be made aware, through the use of third party agreements, that their land may contain chemicals that are above some ecological or health related SCGs.



Cost: The estimated 30-year present worth cost for Sediment Alternative 4 is \$ 4,800,000 (which includes the applicable cost of Wetland/Flood Plain Soil Alternative 4). The cost summary is presented in Table 6.4.

6.1.5 Mud Creek Sediment Alternative 5A: Excavation/Disposal of Sediment Exceeding Restricted Residential Soil SCOs

6.1.5.1 Description

Alternative 5A, Excavation/disposal of sediment exceeding the Restricted Residential Soil SCOs in all areas and at all depths, includes:

1. The restricted residential soil SCOs are:
 - a. PCBs 1 mg/kg
 - b. Nickel 310 mg/kg
 - c. Chromium 180 mg/kg
2. Diversion of the Creek flow during the remediation and management of all flows in and around the area in an environmentally responsible manner.
3. Dredging or excavation of the sediment with concentrations that exceed these criteria in all areas and at all depths in Mud Creek. At present, this will involve the removal of 1,360 cubic yards of sediment and the following mass of COCs as measured from points 1,800 feet upstream to 2,400 feet downstream of Middle Settlement Road:
 - a. PCBs 30 pounds 100% (83% of all of the PCBs in the sediment)
 - b. Nickel 2,220 pounds 85%
 - c. Chromium 520 pounds 93%

The locations where the sediment will be removed under Alternative 5A are shown on Figure 6.3.

4. Transportation to, and disposal of, the excavated sediment at permitted disposal facilities, including sediment stabilization, as necessary.
5. Restoration of the Creek corridor to a condition at least equal to the current aquatic settings using in kind natural stream bed materials that match existing materials to the extent practicable.
6. Restoration of all disturbed areas using in kind materials and to a condition at least equal to the current conditions.
7. Monitoring of restored areas and repairs, if necessary.

6.1.5.2 Assessment

Overall Protection of Human Health and the Environment: Alternative 5A would be protective of human health and wildlife by preventing potential incidental exposure to the impacted sediment that exceeds the Restricted Residential SCOs in all areas and at all depths. Alternative 5A would be



protective of the human health and the environment by having removed all of the areas and to all depths where the impacted sediment exceeded the criteria and securing it at permitted disposal facilities. Protection from the lesser impacted sediment that remains in place will also be provided since a large portion of the remaining lesser impacted sediment will be covered by the imported restoration material that replaces the impacted sediment that will have been removed.

Compliance with SCGs: Alternative 5A will comply with all of the State-wide chemical-specific SCGs that apply to sediment. By removing 100% of the PCBs that exceed 1 mg/kg (and 83% of all of the PCBs in the Creek sediment) and 85 percent of the nickel and 93 percent of the chromium exceeding 30 mg/kg for nickel and chromium in the sediment, Alternative 5A will comply with the intent of the chemical-specific SCGs, which is to minimize the exposure potential. Leaving only the lesser impacted sediment greatly reduces the exposure potential.

The potentially applicable action-specific SCGs for this Alternative are those listed in Table 3.2 under the following headings:

1. Capping
2. Excavation
3. Placement of Waste in a Land Disposal Unit
4. Surface Water Control
5. Transporting Waste Off-Site

These SCGs would be satisfied by Alternative 5A.

The potentially applicable location-specific SCGs for this Alternative are the U.S. Army Corps of Engineers regulations. These would be complied with under a Nationwide Permit 38.

Reduction of Toxicity, Mobility, or Volume: Alternative 5A provides no active reduction in the toxicity or volume of the impacted sediment, but removes the most highly impacted material from an exposed and potentially mobile environment in the Creek and places it into permitted facilities where it is more secure. Following placement of the sediment in the permitted facilities, the mobility of the chemicals is reduced. Even the mobility of the lesser impacted sediment that is left in place is reduced since a large portion of this material will be covered with imported restoration material. Over the long term, the toxicity of the COCs would be reduced by natural processes.

Short-Term Effectiveness: The excavation of the sediment would be performed using standard construction techniques. Short-term hazards to workers (including those resulting from working within a creek) would be mitigated through proper work and health and safety procedures. The short-term effectiveness of Alternative 5A would be immediate upon completion of the excavation and placement within the permitted facility, since direct exposure of human and wildlife receptors to the impacted sediment would immediately be mitigated. Other than the potential for unintended sediment release into the downstream section of the Creek during the excavation period and potential risk due to traffic accidents during transit to the permitted disposal facilities, no additional short-term risks would be posed to the community or the environment by Alternative 5A.

Long-Term Effectiveness and Permanence: The removal of the impacted sediment is a permanent remedy that eliminates the potential for exposure along Mud Creek. Even the potential for exposure



to the lesser impacted sediment is reduced due to the fact that a large portion of the lesser impacted sediment will be covered with imported restoration material. The only other long-term potential for exposure is from the permitted disposal facilities, although the long-term O&M program at the selected facilities would make this Alternative effective in the long term. In addition, the incremental risk attributable to the sediment would be further reduced over the long term as a result of natural processes.

Land Use: The land would continue to be used in the same manner after the remediation was completed although the owners of the properties would be made aware, through the use of third party agreements, that their land may contain chemicals that are above some ecological or health related SCGs.

Cost: The estimated 30-year present worth cost for Sediment Alternative 5A is \$ 5,300,000 (which includes the applicable cost of Wetland/Flood Plain Soil Alternative 5A). The cost summary is presented in Table 6.5.

6.1.6 Mud Creek Sediment Alternative 5B: Excavation/Disposal of Sediment Exceeding the Lower of Residential Soil SCOs and Class C Criteria

6.1.6.1 Description

Alternative 5B, Excavation/disposal of sediment exceeding the lower of Residential Soil SCOs and Class C criteria in all areas and at all depths, includes:

1. Determination of whether the residential soil SCOs or Class C criteria are lower for the COCs. The applicable criteria for the COCs will be:
 - a. PCBs 1 mg/kg (residential)
 - b. Nickel 49 mg/kg (Class C)
 - c. Chromium 36 mg/kg (residential)
2. Diversion of the Creek flow during the remediation and management of all flows in and around the area in an environmentally responsible manner.
3. Dredging or excavation of the sediment with concentrations that exceed these criteria in all areas and at all depths in Mud Creek. At present, this will involve the removal of 1,730 cubic yards of sediment and the following mass of COCs as measured from points 1,800 feet upstream to 2,400 feet downstream of Middle Settlement Road:
 - a. PCBs 30 pounds 100% (83% of all of the PCBs in the sediment)
 - b. Nickel 2,270 pounds 87%
 - c. Chromium 530 pounds 95%

The locations where the sediment will be removed under Alternative 5B are shown on Figure 6.4.

4. Transportation to, and disposal of, the excavated sediment at permitted disposal facilities, including sediment stabilization, as necessary.



5. Restoration of the Creek corridor to a condition at least equal to the current aquatic settings using in kind natural stream bed materials that match existing materials to the extent practicable.
6. Restoration of all disturbed areas using in kind materials and to a condition at least equal to the current conditions.
7. Monitoring of restored areas and repairs, if necessary.

6.1.6.2 Assessment

Overall Protection of Human Health and the Environment: Alternative 5B would be protective of human health and wildlife by preventing potential incidental exposure to the impacted sediment that exceeds the lower of Residential SCOs and Class C criteria in all areas and at all depths.

Alternative 5B would be protective of the human health and the environment by having removed all of the areas and to all depths where the impacted sediment exceeded the criteria and securing it at permitted disposal facilities. Protection from the lesser impacted sediment that remains in place will also be provided since a large portion of the remaining lesser impacted sediment will be covered by the imported restoration material that replaces the impacted sediment that will have been removed.

Compliance with SCGs: Alternative 5B will comply with all of the State-wide chemical-specific SCGs that apply to sediment. By removing 100% of the PCBs that exceed mg/kg (and 83% of all of the PCBs in the Creek sediment) and 87 percent of the nickel and 95 percent of the chromium exceeding 30 mg/kg for nickel and chromium in the sediment, Alternative 5B will comply with the intent of the chemical-specific SCGs, which is to minimize the exposure potential. Leaving only the lesser impacted sediment greatly reduces the exposure potential.

The potentially applicable action-specific SCGs for this Alternative are those listed in Table 3.2 under the following headings:

1. Capping
2. Excavation
3. Placement of Waste in a Land Disposal Unit
4. Surface Water Control
5. Transporting Waste Off-Site

These SCGs would be satisfied by Alternative 5B.

The potentially applicable location-specific SCGs for this Alternative are the U.S. Army Corps of Engineers regulations. These would be complied with under a Nationwide Permit 38.

Reduction of Toxicity, Mobility, or Volume: Alternative 5B provides no active reduction in the toxicity or volume of the impacted sediment, but removes the most highly impacted material from an exposed and potentially mobile environment in the Creek and places it into permitted facilities where it is more secure. Following placement of the sediment in the permitted facilities, the mobility of the chemicals is reduced. Even the mobility of the lesser impacted sediment that is left in place is reduced since a large portion of this material will be covered with imported restoration material. Over the long term, the toxicity of the COCs would be reduced by natural processes.



Short-Term Effectiveness: The excavation of the sediment would be performed using standard construction techniques. Short-term hazards to workers (including those resulting from working within a creek) would be mitigated through proper work and health and safety procedures. The short-term effectiveness of Alternative 5B would be immediate upon completion of the excavation and placement within the permitted facility, since direct exposure of human and wildlife receptors to the impacted sediment would immediately be mitigated. Other than the potential for unintended sediment release into the downstream section of the Creek during the excavation period and potential risk due to traffic accidents during transit to the permitted disposal facilities, no additional short-term risks would be posed to the community or the environment by Alternative 5B.

Long-Term Effectiveness and Permanence: The removal of the impacted sediment is a permanent remedy that eliminates the potential for exposure along Mud Creek. Even the potential for exposure to the lesser impacted sediment is reduced due to the fact that a large portion of the lesser impacted sediment will be covered with imported restoration material. The only other long-term potential for exposure is from the permitted disposal facilities, although the long-term O&M program at the selected facilities would make this Alternative effective in the long term. In addition, the incremental risk attributable to the sediment would be further reduced over the long term as a result of natural processes.

Land Use: The land would continue to be used in the same manner after the remediation was completed and there would be no restrictions on that use.

Cost: The estimated 30-year present worth cost for Sediment Alternative 5B is \$ 5,800,000 (which includes the applicable cost of Wetland/Flood Plain Soil Alternative 5B). The cost summary is presented in Table 6.6.

6.1.7 Mud Creek Sediment Alternative 6: Excavation/Disposal of Sediment Exceeding the Lower of Residential Soil SCOs and Class A Criteria

6.1.7.1 Description

Alternative 6, Excavation/disposal of sediment exceeding the lower of Residential Soil SCOs and Class A criteria in all areas and at all depths, includes:

1. Determination of whether the Residential Soil SCOs or Class A criteria are lower for the COCs. The results show that the applicable criteria for the COCs will be:
 - a. PCBs 0.1 mg/kg (Class A)
 - b. Nickel 23 mg/kg (Class A)
 - c. Chromium 36 mg/kg (residential)
2. Diversion of the Creek flow during the remediation and management of all flows in and around the area in an environmentally responsible manner.
3. Dredging or excavation of the sediment with concentrations that exceed these criteria in all areas and at all depths in Mud Creek. At present, this will involve the removal of 2,660 cubic



yards of sediment and the following mass of COCs as measured from points 1,800 feet upstream to 2,400 feet downstream of Middle Settlement Road:

a.	PCBs	36 pounds	100% (100 percent of the PCBs in the sediment)
b.	Nickel	2,610 pounds	100%
c.	Chromium	560 pounds	100%

The locations where the sediment will be removed under Alternative 6 are shown on Figure 6.5.

4. Transportation to, and disposal of, the excavated sediment at permitted disposal facilities, including sediment stabilization, as necessary.
5. Restoration of the Creek bed to a condition at least equal to the current aquatic settings using in kind natural stream bed materials that match existing materials to the extent practicable.
6. Restoration of all disturbed areas using in kind materials and to a condition at least equal to the current conditions.
7. Monitoring of restored areas and repairs, if necessary.

6.1.7.2 Assessment

Overall Protection of Human Health and the Environment: Alternative 6 would be protective of human health and wildlife by preventing potential incidental exposure to the impacted sediment that exceeds the lower of Residential SCOs and Class A criteria in all areas and at all depths.

Alternative 6 would be protective of the human health and the environment by having removed all of the areas and to all depths where the impacted sediment exceeded the criteria and securing it at permitted disposal facilities. Protection from the lesser impacted sediment that remains in place will also be provided since a large portion of the remaining lesser impacted sediment will be covered by the imported restoration material that replaces the impacted sediment that will have been removed.

Compliance with SCGs: Alternative 6 will completely comply with the State-wide chemical-specific SCGs that apply to sediment. By removing 100 percent of the PCBs exceeding 0.1 mg/kg (and 100% of all of the PCBs in the Creek sediment) and 100 percent of the nickel and 100% of the chromium exceeding 30 mg/kg for nickel and chromium in the sediment, the Alternative will comply with the intent of the chemical-specific SCGs, which is to minimize the exposure potential.

The potentially applicable action-specific SCGs for this Alternative are those listed in Table 3.2 under the following headings:

1. Capping
2. Excavation
3. Placement of Waste in a Land Disposal Unit
4. Surface Water Control
5. Transporting Waste Off-Site

These SCGs would be satisfied by Alternative 6.



The potentially applicable location-specific SCGs for this Alternative are the U.S. Army Corps of Engineers regulations. These would be complied with under a Nationwide Permit 38.

Reduction of Toxicity, Mobility, or Volume: Alternative 6 provides no active reduction in the toxicity or volume of the impacted sediment, but removes all of the impacted material from an exposed and potentially mobile environment in the Creek and places it into permitted facilities where it is more secure. Following placement of the sediment in the permitted facilities, the mobility of the chemicals is reduced. Over the long term, the toxicity of the COCs would be reduced by natural processes.

Short-Term Effectiveness: The excavation of the sediment would be performed using standard construction techniques. Short-term hazards to workers (including those resulting from working within a creek) would be mitigated through proper work and health and safety procedures. The short-term effectiveness of Alternative 6 would be immediate upon completion of the excavation and placement within the permitted facility, since direct exposure of human and wildlife receptors to the impacted sediment would immediately be mitigated. Other than the potential for unintended sediment release into the downstream section of the Creek during the excavation period and potential risk due to traffic accidents during transit to the permitted disposal facilities, no additional short-term risks would be posed to the community or the environment by Alternative 6.

Long-Term Effectiveness and Permanence: The removal of the impacted sediment is a permanent remedy that eliminates the potential for exposure along Mud Creek. Even the potential for exposure to any remaining impacted sediment is reduced due to the fact that a large portion of such impacted sediment will be covered with imported restoration material. The only other long-term potential for exposure is from the permitted disposal facilities, although the long-term O&M program at the selected facilities would make this Alternative effective in the long term. In addition, the incremental risk attributable to the sediment would be further reduced over the long term as a result of natural processes.

Land Use: The land would continue to be used in the same manner after the remediation was completed and there would be no restrictions on that use.

Cost: The estimated 30-year present worth cost for Sediment Alternative 6 is \$ 7,300,000 (which includes the applicable cost of Wetland/Flood Plain Soil Alternative 6). The cost summary is presented in Table 6.7.

6.2 Wetland/Flood Plain Soil

6.2.1 Wetland/Flood Plain Soil Alternative 1: No Action

6.2.1.1 Description

Wetland/flood Plain Soil Alternative 1, No Action, provides no active remedial measures to improve environmental conditions at the Site. Natural processes would reduce COC concentrations in the soil over the long term. No remedial actions, institutional controls, or monitoring would be conducted.



6.2.1.2 Assessment

Overall Protection of Human Health and the Environment: Because no additional remedial measures are implemented with Soil Alternative 1, the potential future risk to human health and the environment would not be reduced beyond that which would be achieved through natural physical processes (dilution and dispersion) for the metals and through natural physical and attenuation processes (including biodegradation) for the PCBs.

Compliance with SCGs: Alternative 1 would not achieve the chemical-specific SCGs that apply to soil. Since no remedial action would be implemented, no action-specific or location-specific SCGs apply to Alternative 1.

Reduction of Toxicity, Mobility, or Volume: Alternative 1 provides no active reduction of toxicity, mobility, or volume of the COCs. However, over the long term, the concentrations and toxicity of the COCs in soil will be reduced by natural processes.

Short-Term Effectiveness: Alternative 1 requires no remedial actions. There would be no additional short-term risks posed to the community, the workers, or the environment as a result of the implementation of this alternative.

Long-Term Effectiveness and Permanence: Over time, through natural processes (dilution, dispersion, and biodegradation), Alternative 1 may achieve the RAOs applicable to soil.

Implementability: Because there are no remedial actions being undertaken, the implementability criterion is not applicable.

Land Use: Because there would be no remediation performed, there would be no change to the land use within the creek corridor.

Cost: Because there are no remedial actions, institutional controls, or monitoring being undertaken, there are no costs associated with Soil Alternative 1.

6.2.2 Wetland/Flood Plain Soil Alternative 2: Institutional Controls On Site and Off Site

6.2.2.1 Description

Soil Alternative 2, Institutional Control, consists of the implementation of institutional controls to restrict exposure to contaminated soil along Mud Creek. Specifically,

1. Segments of the on-Site portion of Mud Creek are within the viewing area of Site security personnel and Plant personnel who are present 24 hours a day/7 days per week.
2. Safe work practices and definitions of levels of PPE for specific work activities would be developed and implemented for maintenance or construction activities conducted within and along Mud Creek, consistent with the characteristics of the COCs present.
3. An Environmental Easement would be recorded which would put third parties on notice of certain land use restrictions. The restriction or restrictive covenants would be drafted in accordance with applicable and relevant State and municipal legal codes.



4. For the off-Site portions of Mud Creek, some of the sections that have soil concentrations that exceed various cleanup criteria may be fenced or barricaded/posted in some way to restrict access.

6.2.2.2 Assessment

Overall Protection of Human Health and the Environment: The implementation of institutional controls would be protective of human health by preventing incidental exposure to impacted soil along the Creek for those with knowledge of the Site conditions. However, those who are not aware of the Site conditions or chose to ignore this information or trespass within the fenced/restricted areas may come in contact with impacted soil and therefore would not be protected.

The potential future risk to the environment using Alternative 2 would not be reduced beyond the attenuation that will be achieved through natural processes.

Compliance with SCGs: Alternative 2 would not achieve the chemical-specific SCGs that apply to impacted soil. No action-specific SCGs apply to Alternative 2. The potentially applicable location-specific SCGs for this Alternative are the New Hartford ordinances and building codes and the local conservation authority's regulations.

Reduction of Toxicity, Mobility, or Volume: Alternative 2 provides no active reduction of toxicity, mobility, or volume of the COCs. However, over the long term, the concentrations and toxicity of COCs in soil will be reduced by natural processes.

Short-Term Effectiveness: No additional short-term risk to the community or the environment would be posed as a result of the implementation of Alternative 2. Risk to workers performing work around the area would be mitigated through the implementation of safe work practices and proper PPE.

Long-Term Effectiveness and Permanence: The institutional controls established for Alternative 2 would make this Alternative effective in the long term only if they are understood, enforced, and maintained.

Implementability: Alternative 2 is partially implementable. Local property owners would be made aware of the Site conditions and hazards. However, there is no mechanism to ensure that humans, especially children, will not enter the impacted soil areas anyway and no way to ensure that visitors would be aware of the Site conditions and their possible impacts. Further, it will be necessary to gain property owner's permission to install fences, establish restricted areas, etc. and such permission may not be granted, in which case, this alternative may not be implementable.

Land Use: The land would continue to be used in the same manner after the Institutional Controls were in place although the owners and public would be made aware of the restrictions that have been placed on the use of the land.

Cost: The estimated cost for Soil Alternative 2 is \$ 219,000. The cost summary is presented in Table 6.2.



6.2.3 Wetland/Flood Plain Soil Alternative 3: Excavation/Disposal of Soil Exceeding Proposed Site-Specific Screening Levels with Consideration for Frequency and Significance of Exceedance

6.2.3.1 Description

Alternative 3, Excavation/disposal of wetland/flood plain soil along Mud Creek exceeding the proposed Site-Specific Screening Levels with consideration being taken into account for those locations where the exceedances are relatively isolated compared to surrounding sample data or where the exceedances barely exceed the proposed screening levels. This alternative includes:

1. Development and approval of proposed Site-Specific Screening Levels have been an ongoing discussion with the NYSDEC. Additional supporting documentation on the applicability of the proposed Site Specific Screening Levels have been prepared including the results of a Vegetative Index of Biotic Integrity Survey, a worm study, and further leachability testing which also factor into the determination of the approvable Site-Specific Screening Levels. Based on the documentation provided by GHD, the proposed Site Specific Screening Levels protective of human health and the environment are:
 - a. PCBs 1 mg/kg
 - b. Nickel 400 mg/kg
 - c. Chromium 200 mg/kg

The NYSDEC has not approved these proposed Site Specific Screening Levels.

The use of 1 ppm as the cleanup criteria for PCBs has been established at a number of New York cleanup projects including the following:

- Friedrichsohn Cooperage Sediment – Waterford
- One Point Street Sediment – Yonkers
- Reynolds Metals Company Site Sediment – Massena
- Histing on Hudson Sediment– Westchester
- Buffalo River Sediment – Buffalo (NYSDEC promoted under the Great Lakes Legacy Act)

Alternative 3 incorporates an approach that takes into account the frequency of an exceedance of the proposed screening level along with consideration for the amount by which the concentration exceeds the proposed screening level. In doing so, this approach assesses the concentrations of the COCs present in the environmental setting recognizing that the risks due to the presence of COCs in and along the Creek are heavily based on the level of exposure to the COCs. In the case of human and wildlife species (and to a large degree vegetative species), the exposure is not dependent on the length of time of contact with a specific location tied to a single sampling point, but to the concentrations present in a generalized area. Therefore, evaluating the risks based on the frequency and degree of exceedance conditions in an area is the most relevant form of exposure and provides the most accurate assessment of the risks associated with the Site conditions. The typical conditions can best be simulated by looking at the overall concentrations in the risk



assessment. Therefore, Alternative 3 uses the overall COC concentrations in each area as the determination of whether an exceedance exists for that area. The concept of using overall COC concentrations to determine whether an unacceptable risk exists is becoming increasingly relied upon for creek remediation implementations based on the recognition that creatures move around during their lifetime. In particular, surface weighted averaging assessments are being increasingly used. However, NYSDEC has not approved this methodology.

In order to determine whether an exceedance exists for any of the proposed criteria associated with Alternative 3 for the wetland / flood plain soil, the calculation of the typical concentration was based on the following:

- The Creek flood plain was split into 10 segments from the upstream to the downstream limits of the study area which run from points 1,800 feet upstream to 2,400 feet downstream of Middle Settlement Road. The segments were primarily determined based on the transect locations of the sampling that was performed for the Creek in 2012. The locations of the segments are shown on Figure 6.1.
 - All of the sampling locations at each transect were then further broken down by the depth of the samples collected. For example, all of the surface samples within the sample box (including 0 to 2" samples and 0 to 6" samples) were added together and divided by the number of surface samples at that particular transect to determine the average surficial soil COC concentrations.
 - A similar method was used to determine the average subsurface soil COC concentration for each box incorporating all of the samples collected more than 6" below the ground surface.
 - These typical concentrations were then compared to the proposed Site-Specific Screening Levels noted above to determine which areas had exceedances on an overall basis. Table 6.1 presents the typical concentrations that were calculated for each area, for both the surface and subsurface samples.
2. Diversion of the Creek flow during the remediation and management of all flows in and around the area in an environmentally responsible manner.
3. Dredging or excavation of the soil with typical concentrations that exceed the proposed Site Specific Screening Levels developed for Mud Creek. At present, this will involve the removal of 12,880 cubic yards of soil and the following mass of COCs as measured from points 1,800 feet upstream to 2,400 feet downstream of Middle Settlement Road:
- | | | | |
|----|----------|--------------|--|
| a. | PCBs | 65 pounds | 96% (58 percent of all the PCBs in the soil) |
| b. | Nickel | 7,770 pounds | 41% |
| c. | Chromium | 1,870 pounds | 44% |

The locations where the wetland/flood plain soil will be removed under Alternative 3 are shown on Figure 6.1.



4. Transportation to, and disposal of, the excavated soil at permitted disposal facilities, including soil stabilization, as necessary.
5. Restoration of the Creek banks to a condition at least equal to the current ecological/wetland settings using in kind natural stream bank materials that match existing materials.
6. Restoration of all disturbed areas using in kind materials and to a condition at least equal to the current conditions.
7. Monitoring of restored areas and repairs, if necessary.

6.2.3.2 Assessment

Overall Protection of Human Health and the Environment: Alternative 3 would be protective of human health and wildlife by preventing potential incidental exposure to the impacted soil that exceeds the proposed Site Specific Screening Levels (with consideration for frequency and degree of exceedance). Alternative 3 would be protective of the human health and the environment by having removed all of the areas where the impacted soil exceeded the proposed Site Specific Screening Levels on a considered basis and securing it at permitted disposal facilities. Protection from the lesser impacted soil that remains in place will also be provided since a large portion of the remaining lesser impacted soil will be covered by the imported restoration material that replaces the impacted soil that will have been removed.

Compliance with SCGs: Alternative 3 will comply with the proposed chemical-specific SCGs that apply to soil as allowed under Part 375-6.9 for the specific conditions at this Site. Under Part 375-6.9, it is possible to develop cleanup criteria that are based on site specific conditions rather than employing generic cleanup criteria based on generic site conditions. By removing 96% of the PCBs exceeding 1 mg/kg (and 58% of all of the PCBs in the soil) and 41% of the nickel and 44% of the chromium exceeding 30 mg/kg in the soil, the Alternative will comply with the intent of the chemical-specific SCGs, which is to minimize the exposure potential.

The potentially applicable action-specific SCGs for this Alternative are those listed in Table 3.2 under the following headings:

1. Capping
2. Excavation
3. Placement of Waste in a Land Disposal Unit
4. Surface Water Control
5. Transporting Waste Off-Site

These SCGs would be satisfied by Alternative 3.

The potentially applicable location-specific SCGs for this Alternative are the U.S. Army Corps of Engineers regulations. These would be complied with under a Nationwide Permit 38.

Reduction of Toxicity, Mobility, or Volume: Alternative 3 provides no active reduction in the toxicity or volume of the impacted soil, but removes the most highly impacted material from an exposed and potentially mobile environment along the Creek and places it into permitted facilities where it is



more secure. Following placement of the soil in the permitted facilities, the mobility of the chemicals is reduced. Even the mobility of the lesser impacted soil that is left in place is reduced since a large portion of this material will be covered with imported restoration material. Over the long term, the toxicity of the COCs would be reduced by natural processes.

Short-Term Effectiveness: The excavation of the soil would be performed using standard construction techniques. Short-term hazards to workers (including those resulting from working along a creek) would be mitigated through proper work and health and safety procedures. The short-term effectiveness of Alternative 3 would be immediate upon completion of the excavation and placement within the permitted facilities, since direct exposure of human and wildlife receptors to the impacted soil would immediately be mitigated. Other than the potential for unintended soil release into the downstream section of the Creek during the excavation period and potential risk due to traffic accidents during transit to the permitted disposal facilities, no additional short-term risks would be posed to the community or the environment by Alternative 3.

Long-Term Effectiveness and Permanence: The removal of the impacted soil is a permanent remedy that eliminates the potential for exposure along Mud Creek. Even the potential for exposure to the lesser impacted soil is reduced due to the fact that a large portion of the lesser impacted soil will be covered with imported restoration material. The only other long-term potential for exposure is from the permitted disposal facilities, although the long-term O&M program at the selected facilities would make this Alternative effective in the long term. In addition, the incremental risk attributable to the soil would be further reduced over the long term as a result of natural processes.

Land Use: The land would continue to be used in the same manner after the remediation was completed although the owners of the properties would be made aware, through the use of third party agreements, that their land may contain chemicals that are above some ecological or health related SCGs.

Cost: The estimated 30-year present worth cost for Soil Alternative 3 is \$ 3,700,000 (which includes the applicable cost of Sediment Alternative 3). The cost summary is presented in Table 6.3.

6.2.4 Wetland/Flood Plain Soil Alternative 4: Excavation/Disposal of Soil Exceeding Proposed Site-Specific Screening Levels

6.2.4.1 Description

Alternative 4, Excavation/disposal of wetland/flood plain soil exceeding the proposed Site-Specific Screening Levels in all areas and at all depths, includes:

1. Development and approval of proposed Site-Specific Screening Levels have been an ongoing discussion with the NYSDEC. Additional supporting documentation on the applicability of the proposed Site Specific Screening Levels has been prepared including the results of a Vegetative Index of Biotic Integrity Survey, a worm study, and further leachability testing which also factor into the determination of the approvable Site-Specific Screening Levels. Based on the documentation provided by GHD, the proposed Site Specific Screening Levels protective of human health and the environment are:
 - a. PCBs 1 mg/kg



- b. Nickel 400 mg/kg
- c. Chromium 200 mg/kg

The NYSDEC has not approved these proposed Site Specific Screening Levels.

For Alternative 4, no consideration has been given to the frequency or the degree of exceedance of the proposed Screening Level. A simple comparison to the proposed Site Specific Screening Levels was used for Alternative 4.

- 2. Diversion of the Creek flow during the remediation and management of all flows in and around the area in an environmentally responsible manner
- 3. Dredging or excavation of the soil with concentrations that exceed these proposed screening levels in all areas and at all depths along Mud Creek. At present, this will involve the removal of 18,410 cubic yards of soil and the following mass of COCs as measured from points 1,800 feet upstream and 2,400 feet downstream of Middle Settlement Road:
 - a. PCBs 93 pounds 100% (82% of all the PCBs in the soil)
 - b. Nickel 10,650 pounds 56%
 - c. Chromium 2,940 pounds 0%

The locations where the wetland/flood plain soil will be removed under Alternative 4 are shown on Figure 6.2.

- 4. Transportation to, and disposal of, the excavated soil at permitted disposal facilities, including soil stabilization, as necessary.
- 5. Restoration of the Creek bank to a condition at least equal to the current ecological/wetland settings using in kind natural stream bank materials that match existing materials.
- 6. Restoration of all disturbed areas using in kind materials and to a condition at least equal to the current conditions.
- 7. Monitoring of restored areas and repairs, if necessary.

6.2.4.2 Assessment

Overall Protection of Human Health and the Environment: Alternative 4 would be protective of human health and wildlife by preventing potential incidental exposure to the impacted soil that exceeds the proposed Site Specific Screening Levels in all areas and at all depths. Alternative 4 would be protective of the human health and the environment by having removed all of the areas and to all depths where the impacted soil exceeded the proposed Site Specific Screening Levels and securing it at permitted disposal facilities. Protection from the lesser impacted soil that remains in place will also be provided since a large portion of the remaining lesser impacted soil will be covered by the imported restoration material that replaces the impacted soil that will have been removed.

Compliance with SCGs: Alternative 4 will comply with the chemical-specific SCGs that apply to sediment as allowed under Part 375-6.9 for the specific conditions at this Site. Under Part 375-6.9, it is possible to develop cleanup criteria that are based on site specific conditions rather than



employing generic cleanup criteria based on generic site conditions. By removing 100% of the PCBs exceeding 1 mg/kg (and 82% of all of the PCBs in the soils) and 56% of the nickel and 70% of the chromium exceeding 30 mg/kg in the soil, the Alternative will comply with the intent of the chemical-specific SCGs, which is to minimize the exposure potential.

The potentially applicable action-specific SCGs for this Alternative are those listed in Table 3.2 under the following headings:

1. Capping
2. Excavation
3. Placement of Waste in a Land Disposal Unit
4. Surface Water Control
5. Transporting Waste Off-Site

These SCGs would be satisfied by Alternative 4.

The potentially applicable location-specific SCGs for this Alternative are the U.S. Army Corps of Engineers regulations. These would be complied with under a Nationwide Permit 38.

Reduction of Toxicity, Mobility, or Volume: Alternative 4 provides no active reduction in the toxicity or volume of the impacted soil, but removes the most highly impacted material from an exposed and potentially mobile environment along the Creek and places it into permitted facilities where it is more secure. Following placement of the soil in the permitted facilities, the mobility of the chemicals is reduced. Even the mobility of the lesser impacted soil that is left in place is reduced since a large portion of this material will be covered with imported restoration material. Over the long term, the toxicity of the COCs would be reduced by natural processes.

Short-Term Effectiveness: The excavation of the soil would be performed using standard construction techniques. Short-term hazards to workers (including those resulting from working along a creek) would be mitigated through proper work and health and safety procedures. The short-term effectiveness of Alternative 4 would be immediate upon completion of the excavation and placement within the permitted facility, since direct exposure of human and wildlife receptors to the impacted soil would immediately be mitigated. Other than the potential for unintended soil release into the downstream section of the Creek during the excavation period and potential risk due to traffic accidents during transit to the permitted disposal facilities, no additional short-term risks would be posed to the community or the environment by Alternative 4.

Long-Term Effectiveness and Permanence: The removal of the impacted soil is a permanent remedy that eliminates the potential for exposure along Mud Creek. Even the potential for exposure to the lesser impacted soil is reduced due to the fact that a large portion of the lesser impacted soil will be covered with imported restoration material. The only other long-term potential for exposure is from the permitted disposal facilities, although the long-term O&M program at the selected facilities would make this Alternative effective in the long term. In addition, the incremental risk attributable to the soil would be further reduced over the long term as a result of natural processes.

Land Use: The land would continue to be used in the same manner after the remediation was completed although the owners of the properties would be made aware, through the use of third



party agreements, that their land may contain chemicals that are above some ecological or health based SCGs.

Cost: The estimated 30-year present worth cost for Soil Alternative 4 is \$ 4,800,000 (which includes the applicable cost of Sediment Alternative 4). The cost summary is presented in Table 6.4.

6.2.5 Wetland/Flood Plain Soil Alternative 5A: Excavation/Disposal of Soil Exceeding Restricted Residential Soil SCOs

6.2.5.1 Description

Alternative 5A, Excavation/disposal of wetland/flood plain soil exceeding the Restricted Residential Soil SCOs in all areas and at all depths, includes:

1. Confirmation that the applicable Residential Soil SCOs for the COCs will be:
 - a. PCBs 1 mg/kg (restricted residential)
 - b. Nickel 310 mg /kg (restricted residential)
 - c. Chromium 180 mg/kg (restricted residential)
2. Diversion of the Creek flow during the remediation and management of all flows in and around the area in an environmentally responsible manner
3. Dredging or excavation of the soil with concentrations that exceed these criteria in all areas and at all depths along Mud Creek. At present, this will involve the removal of 19,380 cubic yards of soil and the following mass of COCs as measured from points 1,800 feet upstream to 2,400 feet downstream of Middle Settlement Road:
 - a. PCBs 93 pounds 100% (82% of all the PCBs in the soil)
 - b. Nickel 11,300 pounds 59%
 - c. Chromium 3,010 pounds 72%

The locations where the wetland/flood plain soil will be removed under Alternative 5A are shown on Figure 6.3.

4. Transportation to, and disposal of, the excavated soil at permitted disposal facilities, including soil stabilization, as necessary.
5. Restoration of the Creek corridor to a condition at least equal to the current ecological/wetland settings using in kind natural stream bank materials that match existing materials.
6. Restoration of all disturbed areas using in kind materials and to a condition at least equal to the current conditions.
7. Monitoring of restored areas and repairs, if necessary.

6.2.5.2 Assessment

Overall Protection of Human Health and the Environment: Alternative 5A would be protective of human health and wildlife by preventing potential incidental exposure to the impacted soil that



exceeds the Restricted Residential Soil SCOs in all areas and at all depths. Alternative 5A would be protective of the human health and the environment by having removed all of the areas and to all depths where the impacted soil exceeded the criteria and securing it at permitted disposal facilities. Protection from the lesser impacted soil that remains in place will also be provided since a large portion of the remaining lesser impacted soil will be covered by the imported restoration material that replaces the impacted soil that will have been removed.

Compliance with SCGs: Alternative 5A will completely comply with all of the State-wide chemical-specific SCGs that apply to soil. By removing 100% of the PCBs exceeding 1 mg/kg (and 82% of all of the PCBs in the soil) and 59% of the nickel and 72% of the chromium exceeding 30 mg/kg in the soil, Alternative 5A will comply with the intent of the chemical-specific SCGs, which is to minimize the exposure potential.

The potentially applicable action-specific SCGs for this Alternative are those listed in Table 3.2 under the following headings:

1. Capping
2. Excavation
3. Placement of Waste in a Land Disposal Unit
4. Surface Water Control
5. Transporting Waste Off-Site

These SCGs would be satisfied by Alternative 5.

The potentially applicable location-specific SCGs for this Alternative are the U.S. Army Corps of Engineers regulations. These would be complied with under a Nationwide Permit 38.

Reduction of Toxicity, Mobility, or Volume: Alternative 5A provides no active reduction in the toxicity or volume of the impacted soil, but removes the most highly impacted material from an exposed and potentially mobile environment along the Creek and places it into permitted facilities where it is more secure. Following placement of the soil in the permitted facilities, the mobility of the chemicals is reduced. Even the mobility of the lesser impacted soil that is left in place is reduced since a large portion of this material will be covered with imported restoration material. Over the long term, the toxicity of the COCs would be reduced by natural processes.

Short-Term Effectiveness: The excavation of the soil would be performed using standard construction techniques. Short-term hazards to workers (including those resulting from working along a creek) would be mitigated through proper work and health and safety procedures. The short-term effectiveness of Alternative 5A would be immediate upon completion of the excavation and placement within the permitted facilities, since direct exposure of human and wildlife receptors to the impacted soil would immediately be mitigated. Other than the potential for unintended soil release into the downstream section of the Creek during the excavation period and potential risk due to traffic accidents during transit to the permitted disposal facilities, no additional short-term risks would be posed to the community or the environment by Alternative 5A.

Long-Term Effectiveness and Permanence: The removal of the impacted soil is a permanent remedy that eliminates the potential for exposure along Mud Creek forever. Even the potential for



exposure to the lesser impacted soil is reduced due to the fact that a large portion of the lesser impacted soil will be covered with imported restoration material. The only other long-term potential for exposure is from the permitted disposal facilities, although the long-term O&M program at the selected facilities would make this Alternative effective in the long term. In addition, the incremental risk attributable to the soil would be further reduced over the long term as a result of natural processes.

Land Use: The land would continue to be used in the same manner after the remediation was completed although the owners of the properties would be made aware, through the use of third party agreements, that their land may contain chemicals that are above some ecological or health related SCGs

Cost: The estimated 30-year present worth cost for Soil Alternative 5A is \$ 5,300,000 (which includes the applicable cost of Sediment Alternative 5). The cost summary is presented in Table 6.5.

6.2.6 Wetland/Flood Plain Soil Alternative 5B: Excavation/Disposal of Soil Exceeding Residential Soil SCOs

6.2.6.1 Description

Alternative 5B, Excavation/disposal of wetland/flood plain soil exceeding the Residential Soil SCOs in all areas and at all depths, includes:

1. Confirmation that the applicable Residential Soil SCOs for the COCs will be:
 - a. PCBs 1 mg/kg (residential)
 - b. Nickel 140 mg /kg (residential)
 - c. Chromium 36 mg/kg (residential)
2. Diversion of the Creek flow during the remediation and management of all flows in and around the area in an environmentally responsible manner
3. Dredging or excavation of the soil with concentrations that exceed these criteria in all areas and at all depths along Mud Creek. At present, this will involve the removal of 23,280 cubic yards of soil and the following mass of COCs as measured from points 1,800 feet upstream to 2,400 feet downstream of Middle Settlement Road:
 - a. PCBs 101 pounds 100% (89% of all the PCBs in the soil)
 - b. Nickel 13,060 pounds 69%
 - c. Chromium 3,220 pounds 77%

The locations where the wetland/flood plain soil will be removed under Alternative 5B are shown on Figure 6.4.

4. Transportation to, and disposal of, the excavated soil at permitted disposal facilities, including soil stabilization, as necessary.



5. Restoration of the Creek corridor to a condition at least equal to the current ecological/wetland settings using in kind natural stream bank materials that match existing materials.
6. Restoration of all disturbed areas using in kind materials and to a condition at least equal to the current conditions.
7. Monitoring of restored areas and repairs, if necessary.

6.2.6.2 Assessment

Overall Protection of Human Health and the Environment: Alternative 5B would be protective of human health and wildlife by preventing potential incidental exposure to the impacted soil that exceeds the Residential Soil SCOs in all areas and at all depths. Alternative 5B would be protective of the human health and the environment by having removed all of the areas and to all depths where the impacted soil exceeded the criteria and securing it at permitted disposal facilities. Protection from the lesser impacted soil that remains in place will also be provided since a large portion of the remaining lesser impacted soil will be covered by the imported restoration material that replaces the impacted soil that will have been removed.

Compliance with SCGs: Alternative 5B will completely comply with all of the State-wide chemical-specific SCGs that apply to soil. By removing 100% of the PCBs exceeding 1 mg/kg (and 89% of all of the PCBs in the soil) and 69% of the nickel and 77% of the chromium exceeding 30 mg/kg in the soil, Alternative 5B will comply with the intent of the chemical-specific SCGs, which is to minimize the exposure potential.

The potentially applicable action-specific SCGs for this Alternative are those listed in Table 3.2 under the following headings:

1. Capping
2. Excavation
3. Placement of Waste in a Land Disposal Unit
4. Surface Water Control
5. Transporting Waste Off-Site

These SCGs would be satisfied by Alternative 5B.

The potentially applicable location-specific SCGs for this Alternative are the U.S. Army Corps of Engineers regulations. These would be complied with under a Nationwide Permit 38.

Reduction of Toxicity, Mobility, or Volume: Alternative 5B provides no active reduction in the toxicity or volume of the impacted soil, but removes the most highly impacted material from an exposed and potentially mobile environment along the Creek and places it into permitted facilities where it is more secure. Following placement of the soil in the permitted facilities, the mobility of the chemicals is reduced. Even the mobility of the lesser impacted soil that is left in place is reduced since a large portion of this material will be covered with imported restoration material. Over the long term, the toxicity of the COCs would be reduced by natural processes.



Short-Term Effectiveness: The excavation of the soil would be performed using standard construction techniques. Short-term hazards to workers (including those resulting from working along a creek) would be mitigated through proper work and health and safety procedures. The short-term effectiveness of Alternative 5B would be immediate upon completion of the excavation and placement within the permitted facilities, since direct exposure of human and wildlife receptors to the impacted soil would immediately be mitigated. Other than the potential for unintended soil release into the downstream section of the Creek during the excavation period and potential risk due to traffic accidents during transit to the permitted disposal facilities, no additional short-term risks would be posed to the community or the environment by Alternative 5B.

Long-Term Effectiveness and Permanence: The removal of the impacted soil is a permanent remedy that eliminates the potential for exposure along Mud Creek forever. Even the potential for exposure to the lesser impacted soil is reduced due to the fact that a large portion of the lesser impacted soil will be covered with imported restoration material. The only other long-term potential for exposure is from the permitted disposal facilities, although the long-term O&M program at the selected facilities would make this Alternative effective in the long term. In addition, the incremental risk attributable to the soil would be further reduced over the long term as a result of natural processes.

Land Use: The land would continue to be used in the same manner after the remediation was completed and there would be no restrictions on that use.

Cost: The estimated 30-year present worth cost for Soil Alternative 5B is \$ 5,800,000 (which includes the applicable cost of Sediment Alternative 5B). The cost summary is presented in Table 6.6.

6.2.7 Wetland/Flood Plain Soil Alternative 6: Excavation/Disposal of Soil Exceeding the Lower of Residential and Ecological Soil SCOs

6.2.7.1 Description

Alternative 6, Excavation/disposal of wetland/flood plain soil exceeding the lower of Residential and Ecological Soil SCOs in all areas and at all depths, includes:

1. Confirmation that the applicable Residential or Ecological Soil SCOs for the COCs will be:

a.	PCBs	1 mg/kg	(residential)
b.	Nickel	30 mg/kg	(ecological)
c.	Chromium	36 mg/kg	(residential)
2. Diversion of the Creek flow during the remediation and management of all flows in and around the area in an environmentally responsible manner
3. Dredging or excavation of the soil with concentrations that exceed these criteria in all areas and at all depths in Mud Creek. At present, this will involve the removal of 33,290 cubic yards of sediment and the following mass of COCs as measured from points 1,800 feet upstream to 2,400 feet downstream of Middle Settlement Road:

a.	PCBs	112 pounds	100% (99% of all the PCBs in the soil)
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b.	Nickel	17,740 pounds	93%
c.	Chromium	3,720 pounds	89%

The locations where the wetland/flood plain soil will be removed under Alternative 6 are shown on Figure 6.5.

4. Transportation to, and disposal of, the excavated soil at permitted disposal facilities, including soil stabilization, as necessary.
5. Restoration of the Creek bank to a condition at least equal to the current ecological/wetland settings using in kind natural stream bank materials that match existing materials.
6. Restoration of all disturbed areas using in kind materials and to a condition at least equal to the current conditions.
7. Monitoring of restored areas and repairs, if necessary.

6.2.7.2 Assessment

Overall Protection of Human Health and the Environment: Alternative 6 would be protective of human health and wildlife by preventing potential incidental exposure to the impacted soil that exceeds the lower of Residential and Ecological Soil SCOs in all areas and at all depths.

Alternative 6 would be protective of the human health and the environment by having removed all of the areas and to all depths where the impacted soil exceeded the criteria and securing it at permitted disposal facilities. Protection from the lesser impacted soil that remains in place will also be provided since a large portion of the remaining lesser impacted soil will be covered by the imported restoration material that replaces the impacted soil that will have been removed.

Compliance with SCGs: Alternative 6 will completely comply with all of the State-wide chemical-specific SCGs that apply to soil. By removing 100% of the PCBs exceeding 1 mg/kg (and 99% of all of the PCBs in the soil) and 93% of the nickel and 89% of the chromium exceeding 30 mg/kg in the soil, the Alternative will comply with the intent of the chemical-specific SCGs, which is to minimize the exposure potential. Leaving only the lesser impacted soil greatly reduces the exposure potential. This risk is even further minimized by the fact that a large portion of the lesser impacted soil will be covered with imported restoration material. Expectations are that once placed into permitted disposal facilities, the chemical-specific SCGs applying to the impacted soil at the Site will be achieved.

The potentially applicable action-specific SCGs for this Alternative are those listed in Table 3.2 under the following headings:

1. Capping
2. Excavation
3. Placement of Waste in a Land Disposal Unit
4. Surface Water Control
5. Transporting Waste Off-Site

These SCGs would be satisfied by Alternative 6.



The potentially applicable location-specific SCGs for this Alternative are the U.S. Army Corps of Engineers regulations. These would be complied with under a Nationwide Permit 38.

Reduction of Toxicity, Mobility, or Volume: Alternative 6 provides no active reduction in the toxicity or volume of the impacted soil, but removes the most highly impacted material from an exposed and potentially mobile environment along the Creek and places it into permitted facilities where it is more secure. Following placement of the soil in the permitted facilities, the mobility of the chemicals is reduced. Even the mobility of the lesser impacted soil that is left in place is reduced since a large portion of this material will be covered with imported restoration material. Over the long term, the toxicity of the COCs would be reduced by natural processes.

Short-Term Effectiveness: The excavation of the soil would be performed using standard construction techniques. Short-term hazards to workers (including those resulting from working along a creek) would be mitigated through proper work and health and safety procedures. The short-term effectiveness of Alternative 6 would be immediate upon completion of the excavation and placement within the permitted facilities, since direct exposure of human and wildlife receptors to the impacted soil would immediately be mitigated. Other than the potential for unintended soil release into the downstream section of the Creek during the excavation period and potential risk due to traffic accidents during transit to the permitted disposal facilities, no additional short-term risks would be posed to the community or the environment by Alternative 6.

Long-Term Effectiveness and Permanence: The removal of the impacted soil is a permanent remedy that eliminates the potential for exposure along Mud Creek. Even the potential for exposure to the lesser impacted soil is reduced due to the fact that a large portion of the lesser impacted soil will be covered with imported restoration material. The only other long-term potential for exposure is from the permitted disposal facilities, although the long-term O&M program at the selected facility would make this Alternative effective in the long term. In addition, the incremental risk attributable to the soil would be further reduced over the long term as a result of natural processes.

Land Use: The land would continue to be used in the same manner after the remediation was completed and there would be no restrictions on that use.

Cost: The estimated 30-year present worth cost for Soil Alternative 6 is \$ 7,300,000 (which includes the applicable cost of Sediment Alternative 6). The cost summary is presented in Table 6.7.

6.2.8 Wetland/Flood Plain Soil Alternative 7 Excavation/Disposal of Soil Exceeding Unrestricted Use Soil SCOs

6.2.8.1 Description

Alternative 7, Excavation/disposal of wetland/flood plain soil exceeding the Unrestricted Use Soil SCOs in all areas and at all depths, includes:

1. Confirmation that the applicable Unrestricted Use Soil SCOs for the COCs will be:
 - a. PCBs 0.1 mg/kg (unrestricted)
 - b. Nickel 30 mg/kg (unrestricted)
 - c. Chromium 30 mg/kg (unrestricted)



2. Diversion of the Creek flow during the remediation and management of all flows in and around the area in an environmentally responsible manner
3. Dredging or excavation of the soil with concentrations that exceed these criteria in all areas and at all depths along Mud Creek. At present, this will involve the removal of 43,680 cubic yards of soil and the following mass of COCs as measured from points 1,800 feet upstream to 2,400 feet downstream of Middle Settlement Road:
 - a. PCBs 113 pounds 100% (100% of all the PCBs in the soil)
 - b. Nickel 19,030 pounds 100%
 - c. Chromium 4,210 pounds 100%

The locations where the wetland/flood plain soil will be removed under Alternative 7 are shown on Figure 6.6.

4. Transportation to, and disposal of, the excavated soil at permitted disposal facilities, including soil stabilization, as necessary
5. Restoration of the Creek corridor to a condition at least equal to the current ecological/wetland settings using in kind natural stream bank materials that match existing materials
6. Restoration of all disturbed areas using in kind materials and to a condition at least equal to the current conditions
7. Monitoring of restored areas and repairs, if necessary.

6.2.8.2 Assessment

Overall Protection of Human Health and the Environment: Alternative 7 would be protective of human health and wildlife by preventing potential incidental exposure to the impacted soil that exceeds the Unrestricted Use Soil SCOs in all areas and at all depths. Alternative 7 would be protective of the human health and the environment by having removed all of the areas and to all depths where the impacted soil exceeded the criteria and securing it at permitted disposal facilities. Protection from the lesser impacted soil that remains in place will also be provided since a large portion of the remaining lesser impacted soil will be covered by the imported restoration material that replaces the impacted soil that will have been removed.

Compliance with SCGs: Alternative 7 will completely comply with all of the State-wide chemical-specific SCGs that apply to soil. By removing 100% of the PCBs exceeding 0.1 mg/kg (and 100% of all of the PCBs in the soil) and 100% of the nickel and 100% of the chromium exceeding 30 mg/kg in the soil, Alternative 7 will comply with the intent of the chemical-specific SCGs, which is to minimize the exposure potential.

The potentially applicable action-specific SCGs for this Alternative are those listed in Table 3.2 under the following headings:

1. Capping
2. Excavation



3. Placement of Waste in a Land Disposal Unit
4. Surface Water Control
5. Transporting Waste Off-Site

These SCGs would be satisfied by Alternative 7.

The potentially applicable location-specific SCGs for this Alternative are the U.S. Army Corps of Engineers regulations. These would be complied with under a Nationwide Permit 38.

Reduction of Toxicity, Mobility, or Volume: Alternative 7 provides no active reduction in the toxicity or volume of the impacted soil, but removes the most highly impacted material from an exposed and potentially mobile environment along the Creek and places it into permitted facilities where it is more secure. Following placement of the soil in the permitted facilities, the mobility of the chemicals is reduced. Even the mobility of the lesser impacted soil that is left in place is reduced since a large portion of this material will be covered with imported restoration material. Over the long term, the toxicity of the COCs would be reduced by natural processes.

Short-Term Effectiveness: The excavation of the soil would be performed using standard construction techniques. Short-term hazards to workers (including those resulting from working along a creek) would be mitigated through proper work and health and safety procedures. The short-term effectiveness of Alternative 7 would be immediate upon completion of the excavation and placement within the permitted facilities, since direct exposure of human and wildlife receptors to the impacted soil would immediately be mitigated. Other than the potential for unintended soil release into the downstream section of the Creek during the excavation period and potential risk due to traffic accidents during transit to the permitted disposal facilities, no additional short-term risks would be posed to the community or the environment by Alternative 7.

Long-Term Effectiveness and Permanence: The removal of the impacted soil is a permanent remedy that eliminates the potential for exposure along Mud Creek. Even the potential for exposure to the lesser impacted soil is reduced due to the fact that a large portion of the lesser impacted soil will be covered with imported restoration material. The only other long-term potential for exposure is from the permitted disposal facilities, although the long-term O&M program at the selected facility would make this Alternative effective in the long term. In addition, the incremental risk attributable to the soil would be further reduced over the long term as a result of natural processes.

Land Use: The land would continue to be used in the same manner after the remediation was completed and there would be no restrictions on that use.

Cost: The estimated 30-year present worth cost for Soil Alternative 7 is \$ 9,100,000 (which includes the applicable cost of Sediment Alternative 6). The cost summary is presented in Table 6.8.

6.3 Comparative Analyses of the Sediment and Soil of Mud Creek

The purpose of the comparative analysis is to identify the relative advantages and disadvantages of each Mud Creek sediment and soil alternative evaluated in detail in the previous sections. The detailed evaluation assessed each remedial alternative independently. The comparison of remedial alternatives in this section evaluates the relative performance of each alternative with respect to the



detailed evaluation criteria: overall protection of human health and the environment; compliance with SCGs; short-term effectiveness; long-term effectiveness and permanence; reduction of toxicity, mobility, and volume; implementability; and cost.

In order to provide a complete remediation scheme for Mud Creek, it is recognized that it will be necessary to select one sediment remedy and combine it with one wetland/flood plain soil remedy. Based on their similarity, each of the remedial alternatives for the sediment has been coupled with the appropriate wetland/flood plain soil alternative to generate complete remedial alternatives. For those remedial alternatives involving removal actions, the proposed Site Specific Screening Level alternatives for the sediment and wetland/flood plain soil were combined. Similarly, the increasingly restrictive sediment and soil alternatives were appropriately combined to create the best fit of possible sediment and soil alternatives. The pairings used for the comparative analyses are as follows:

Combined Alternative	Title	Sediment Alternative Component	Soil Alternative Component
Alternative 1	No Action	1 - No Action	1 – No Action
Alternative 2	Institutional Control	2 – Institutional Control	2 – Institutional Control
Alternative 3	Site-Specific With Consideration	3 – Site-Specific – With Consideration	3 – Site-Specific – With Consideration
Alternative 4	Site-Specific - No Consideration	4 – Site Specific – No Consideration	4 – Site-Specific – No Consideration
Alternative 5A	Restricted Residential	5A – Restricted Residential	5A – Restricted Residential
Alternative 5B	Class C/Residential	5B – Residential/Class C	5B – Residential
Alternative 6	Class A/Ecological	6 – Residential/Class A	6 – Residential/Ecological
Alternative 7	Class A/Unrestricted	6 – Residential/Class A	7 – Unrestricted

The assessment of each of these combined alternatives are presented in the following section of this report.

Table 6.9 presents a ranking of each of the remedial alternatives for the sediment and soil in and along Mud Creek included in the detailed analysis presented in the Sections 6.1 and 6.2. Table 6.10 presents the comparative sediment/soil removal volumes and the associated masses of PCBs, nickel, and chromium for each alternative. Discussions of the relative advantages and disadvantages of the alternatives are presented in the following subsections. The locations of sediment/soil removal under each alternative are presented in the following Figures:

Alternative 3	Figure 6.1
Alternative 4	Figure 6.2
Alternative 5A	Figure 6.3
Alternative 5B	Figure 6.4
Alternative 6	Figure 6.5
Alternative 7	Figure 6.6



6.3.1 Overall Protection of Human Health and the Environment

The remedial alternatives are ranked as follows relative to overall protection of human health and the environment based on Part 375 criteria:

1. Alternative 5A, Excavation to Restricted Residential
2. Alternative 5B, Excavation to Class C/Residential and off-Site disposal
3. Alternative 4, Excavation to proposed Site Specific Screening Level and off-Site disposal
4. Alternative 3, Excavation to proposed Site Specific Screening Levels (with consideration for frequency and significance) and off-Site disposal
5. Alternative 6, Excavation to Class A/Ecological and off-Site disposal
6. Alternative 7, Excavation to Class A/Unrestricted and off-Site disposal
7. Alternative 2, Institutional Control
8. Alternative 1, No Further Action

Alternative 5A, - excavation to Restricted Residential criteria removes all of the material that exceeds a published criterion that is applicable to human health or the environment and therefore is the highest ranked alternative.

Alternative 5B would remove more material than Alternative 5A to be protective of residential settings. However, this remedy is primarily focussed on the removal of soil from a wetland area. Although some of the wetlands are located on private residential (and commercial) properties, the wetland portions will not be used for gardening; not only because gardens will not grow in wetlands but also because clearing a wetland for use, such as a garden, is prohibited. The consumption of products from a garden is a predominant factor affecting the residential cleanup criteria and therefore, without the garden component, the risks associated with gardens in wetlands are eliminated. Consequently, Alternative 5B offers no further protection of human health than Alternative 5A. In addition, although Alternative 5B removes more sediment from the creek, Alternative 5A has already been shown to be protective of the creek environment and therefore no substantial improvement to the creek results from implementing Alternative 5B.

Alternative 4 would remove all of the material exceeding proposed Site Specific Screening Levels including all PCBs greater than 1 ppm. Although there are several lines of evidence demonstrating that the nickel and chromium in the Mud Creek environment are of very low solubility and bioavailability, it was not possible to finalize the development of Site Specific Screening Levels. It was therefore necessary to revert to published criteria for this remedy. Nonetheless, the data show that Alternative 4 would be protective of human health and the environment and therefore scored highly in the ranking. Alternative 3 incorporates the same proposed Site Specific Screening Levels as Alternative 4 but includes consideration for frequency and significance of the concentrations present and therefore removes less material than Alternative 4 and therefore is ranked lower than Alternative 4.

Alternative 6 meets the residential/ecological criteria for protection of human health and is therefore more protective of human health than Alternatives 5A and 5B. However, Alternative 5A is already protective of human health and therefore the net improvement under Alternative 6 is not



substantive. Even though Alternative 6 is more protective of human health, it is less protective of the environment and therefore is ranked lower than Alternative 5A. The reason for this is that in order to protect the environment, Alternative 6 destroys more of the present natural habitat and removes the existing species of flora and fauna, only to replace it with a man-made version of a natural habitat with imported flora species. The net result is that there is no substantive improvement to the environment and since Alternative 5A is already protective of the environment, there is no net gain by removing more sediment and wetland/flood plain soil as occurs under Alternative 6.

With Alternative 7, even more protection of human health is provided than that created by Alternative 6, but even more natural habitat and natural species are destroyed and replaced with man-made naturalized habitat resulting in no advantage to the environment. Again, since Alternative 5A already is protective of human health and the environment, the additional human health protection offered by Alternative 7 is not substantive and is counterweighed by the destruction of more natural habitat and natural flora and fauna species, resulting in no net gain in protection.

The sediment/soil with lower level COC presence that remains in place beneath and around the excavation area following each successive removal alternative, continues to present minor exposure potential to humans and wildlife, albeit at levels that are deemed safe. The majority of the sediment/soil with safe levels of impacted COCs that will be left in place under each alternative will be covered with clean imported sediment/soil material that will eliminate the potential for exposure to humans and wildlife. Once the removed material is disposed at an off-site permitted facility, it no longer presents any additional risk to human health or the environment, as long as the disposal facility remains secure and maintained.

Alternative 2 Institutional Controls, will be protective of human health to the extent that access to the Site is restricted through the construction of fences. However, the effectiveness of the institutional controls will be limited to the extent that it is possible to enforce the restrictions of access to the Creek areas. The institutional controls offer minimal protection to the environment since the materials will still be exposed and subject to contact with animal and aquatic species and dispersal due to erosional effects.

Alternative 1 No Further Action, provides no further protection to human health or the environment, other than that a portion of the impacted area already has restricted access and the workers on the plant site are trained in health and safety in the event they have to enter the on-site areas. The plant's health and safety training covers the topic of handling and awareness of impacted soil. No other protection is provided by Alternative 1 other than that which occurs due to natural processes such as dispersion, dilution, and, in the case of PCBs, degradation (albeit at a very slow rate).

6.3.2 Compliance with SCGS

The remedial alternatives are ranked as follows relative to compliance with SCGs:

1. Alternative 7, Excavation to Class A/Unrestricted and off-Site disposal
2. Alternative 6, Excavation to Class A/Ecological and off-Site disposal
3. Alternative 5B, Excavation to Class C/Residential and off-Site disposal



4. Alternative 5A, Excavation to Restricted Residential
5. Alternative 4, Excavation to proposed Site Specific Screening Levels and off-Site disposal
6. Alternative 3, Excavation to proposed Site Specific Criteria (with consideration for frequency and significance) and off-Site disposal
7. Alternative 2, Institutional Control
8. Alternative 1, No Further Action

Alternative 7, excavation of sediment and wetland/flood plain soil to Class A and Unrestricted Use criteria with off-Site disposal is compliant with the most restrictive chemical-specific SCGs. Each of the successive Alternatives (6, 5B, 5A, 4, and 3), is also compliant with the chemical-specific SCGs for sediment and wetland/flood plain soil by removing the material to the prescribed criteria / proposed screening level from the Site. While each successive alternative (6 through 3) removes sediment to a less stringent allowable criterion, each is already protective of human health and the environment and therefore there is no substantive difference between these alternatives. Placement of the impacted material at a secure regulated facility also complies with SCGs.

Neither Alternative 1 (No Further Action) nor Alternative 2 (Institutional Control) will comply with the chemical-specific SCGs.

All sediment alternatives will comply with the applicable action- and location-specific SCGs, where such exist.

6.3.3 Reduction of Toxicity, Mobility, and Volume

The sediment and wetland/flood plain soil remedial alternatives are ranked as follows regarding reduction of toxicity, mobility, and volume:

1. Alternative 7, Excavation to Class A/Unrestricted and off-Site disposal
2. Alternative 6, Excavation to Class A/Ecological and off-Site disposal
3. Alternative 5B, Excavation to Class C/Residential and off-Site disposal
4. Alternative 5A, Excavation to Restricted Residential
5. Alternative 4, Excavation to proposed Site Specific Screening Levels and off-Site disposal
6. Alternative 3, Excavation to proposed Site Specific Screening Levels (with consideration for frequency and significance) and off-Site disposal
7. Alternative 2, Institutional Control
8. Alternative 1, No Further Action

None of the remedial alternatives change the toxicity or volume of COCs and therefore from this perspective, they are all the same. However, Alternative 7 removes the COCs that exist above the most restrictive sediment criteria (Class A) and most restrictive wetland/flood plain soil criteria (Unrestricted) from the Site environment in which they currently exist, thus providing the highest COC mass reductions for Site conditions. Alternatives 6 through 3 progressively remove the material exceeding SCOs with less stringent criteria, thereby providing somewhat less reduction in



the mass of COCs from Site conditions that will remain following the remediation with each successive alternative.

With regard to mobility, Alternatives 7 through 3 all remove the sediment/soil from the Site and place it in a permitted disposal facility, thereby providing more secure protection of this material from possible future mobility. Alternative 7 removes the highest volume of COCs from the Site and is therefore the most effective in reducing future possible mobility. Alternatives 6 through 3 progressively provide less protection against future possible mobility although all of the concentrations posing a threat to human health and the environment will have already been removed under each of these alternatives and therefore the impact due to future mobility of the remaining sediment/soil that already meets the cleanup criteria is not substantive.

Alternative 2 Institutional Control, will not actively reduce the mobility of the impacted material. However, the restricted access provided by the Institutional Control will include methods to minimize sediment disturbance in the event of future works within the Creek.

Alternative 1 No Action, will not actively reduce the mobility of the impacted material.

6.3.4 Short-Term Effectiveness

The sediment and wetland/flood plain soil remedial alternatives are ranked as follows regarding short-term effectiveness:

1. Alternative 1, No Further Action
2. Alternative 2, Institutional Control
3. Alternative 3, Excavation to proposed Site Specific Screening Levels (with consideration for frequency and significance) and off-Site disposal
4. Alternative 4, Excavation proposed Site Specific Screening Levels and off-Site disposal
5. Alternative 5A, Excavation to Restricted Residential
6. Alternative 5B, Excavation to Class C/residential and off-Site disposal
7. Alternative 6, Excavation to Class A/ecological and off-Site disposal
8. Alternative 7, Excavation to Class A/unrestricted and off-Site disposal

No risk to the community, workers, or the environment would be presented by the implementation of Alternative 1, No Further Action. There would also be no risks by the implementation of Alternative 2, Institutional Control since there would be no work in the Creek. A minimal risk may be present at the time of construction of the fence and for future repairs or replacement; however, these risks can be mitigated through proper work procedures.

A low risk to community, workers, or the environment would be presented by Alternative 3, excavation to proposed Site Specific Screening Levels (with consideration for frequency and significance) and off-Site disposal. The risks are associated with the need to work in and along the Creek and due to disturbance of the corridor along the Creek and at the various access points to the Creek. The risks associated with working along the Creek can be mitigated through proper work procedures. However, the need to remove material from along the Creek will result in damage of



the current natural habitat that exists. Removing the sediment/soil and gaining access to various areas of the Creek will result in loss of the current natural habitat. Restoration will be performed to mimic existing conditions but some things such as the existence of riffles, pools, vegetative environs, and fallen tree habitat, etc. will take years (and possibly decades) to re-establish themselves. Each successive alternative 3 through 7 requires the removal of more material to meet the more restrictive criteria and therefore will result in more disturbed areas and therefore more short-term impact.

Each successive alternative 3 through 7 also involves the off-Site transportation of material to a permitted disposal facility. With each successive alternative requiring the haulage of more material, there is an increasing potential risk due to vehicular accidents and spills. To put this in perspective, Alternative 7 would remove 46,300 cubic yards of material compared to 13,700 cubic yards for Alternative 3 (a factor of 3.4). As a result, Alternative 7 is more than three times more likely to result in a traffic accident or spill than Alternative 3. The associated reductions in fuel consumption, exhaust emissions, resources consumed (including landfill space), etc. also make Alternative 3 a considerably greener alternative than Alternative 7. The green factor is even further amplified by Alternative 3 over Alternative 7 when one considers the lesser amount of natural habitat that is destroyed and the lesser amount of flora and fauna removed under Alternative 3.

6.3.5 Long-Term Effectiveness and Permanence

The sediment and wetland/flood plain soil remedial alternatives are ranked as follows relative to long-term effectiveness and permanence:

1. Alternative 7, Excavation to Class A/Unrestricted and off-Site disposal
2. Alternative 6, Excavation to Class A/Ecological and off-Site disposal
3. Alternative 5B, Excavation to Class C /Residential and off-Site disposal
4. Alternative 5A, Excavation to Restricted Residential
5. Alternative 4, Excavation to proposed Site Specific Screening Levels and off-Site disposal
6. Alternative 3, Excavation to proposed Site Specific Screening Levels (with consideration for frequency and significance) and off-Site disposal
7. Alternative 2, Institutional Control
8. Alternative 1, No Further Action

Alternative 7, excavation of sediment to Class A criteria and excavation of wetland/flood plain soil to Unrestricted Use criteria with off-Site disposal, provides both long-term effectiveness and permanence through removal of the impacted material from the Site and securement at a permitted disposal facility.

Alternatives 6 through 3 provide both long-term effectiveness and permanence through removal of the impacted material from the Site and securement at a permitted disposal facility. Although Alternatives 6 through 3 successively remove less material than Alternative 7, all of the alternatives are protective of human health and the environment, and therefore the increased benefits of long-term effectiveness and permanence are not substantive.



Alternative 2, institutional controls, provides only long-term effectiveness to the extent that access restrictions can be enforced and maintained in place.

No long-term effectiveness or permanence is provided by Alternative 1, no further action.

6.3.6 Implementability

The sediment and wetland/flood plain soil remedial alternatives are ranked as follows for implementability:

1. Alternative 1, No Further Action
2. Alternative 2, Institutional Control
3. Alternative 3, Excavation to proposed Site Specific Screening Levels (with consideration for frequency and significance) and off-Site disposal
4. Alternative 4, Excavation to proposed Site Specific Screening Levels and off-Site disposal
5. Alternative 5A, Excavation to Restricted Residential
6. Alternative 5B, Excavation to Class C/Residential and off-Site disposal
7. Alternative 6, Excavation to Class A/Ecological and off-Site disposal
8. Alternative 7, Excavation to Class A/Unrestricted and off-Site disposal

Alternative 1 would be the most implementable since there would be no further work involved.

Alternative 2 would also be implementable since a portion of the Creek is already on the SMC property. Installation of a fence around the remaining unsecured portions of the Creek can be accomplished but requires the permission of the local property owners.

The implementability of the other alternatives is primarily dependent upon the complexity of the construction activities. Alternative 3, Excavation of Sediment exceeding proposed Site Specific Screening Levels (with consideration for frequency and significance), is the easiest of the remaining alternatives to implement since it involves the least sediment/soil removal volume and results in the least area impacted. A permit from the U.S. Army Corps of Engineers will be required for the work in the Creek and wetland.

Alternatives 4 through 7 will require the same permits as Alternative 3 for work in the Creek and wetland but involve more properties and more volume of material removal/transportation/disposal and restoration, thereby making each successive alternative slightly more complicated.

6.3.7 Land Use

Under each of the alternatives assessed, the land use before and after the remediation is completed will be the same. The portion of the creek that is on the SMC property will remain as part of the industrial complex and the portions of the creek on the properties east of Middle Settlement Road will remain commercial / residential as currently exists. The community will continue to use



these areas as they always have regardless of the alternative implemented. Based on this, the ranking of the alternatives are as follows for land use:

1. Alternative 7, Excavation to Class A/Unrestricted and off-Site disposal
2. Alternative 6, Excavation to Class A/Ecological and off-Site disposal
3. Alternative 5B, Excavation to Class C /Residential and off-Site disposal
4. Alternative 5A, Excavation to Restricted Residential
5. Alternative 4, Excavation to proposed Site Specific Screening Levels and off-Site disposal
6. Alternative 3, Excavation to proposed Site Specific Screening Levels (with consideration for frequency and significance) and off-Site disposal
7. Alternative 1, No Further Action
8. Alternative 2, Institutional Control

Alternatives 7, 6, and 5B would have no restrictions on future use and therefore are ranked the highest. Alternatives 5A, 4, and 3 would require a third party agreement with the owners of those properties where chemicals remain but no one other than the property owner would be aware of that restriction and the public would not encounter any obstruction of use, other than that which applies with property ownership and trespassing. So these alternatives are ranked slightly lower than Alternatives 7, 6, and 5B. Under Alternative 1, there would be no change to the existing use encountered by the public or property owners so it is ranked next. A fence could be put in place under Alternative 2 Institutional Control which would limit access to some properties and therefore is ranked lowest.

6.3.8 Cost

The cost associated with the implementation of the sediment and wetland/flood plain soil remedial alternatives is lowest for Alternative 1, No Further Action (\$0). The cost of Alternative 2, Institutional Control, is \$ 219,000. Alternatives 3 through 7 successively involve more sediment/soil removal, transportation, disposal, and restoration resulting in increasingly higher costs for each successive alternative. The costs for each alternative are as follows:

1.	Alternative 3	\$ 3,700,000
2.	Alternative 4	\$ 4,800,000
3.	Alternative 5A	\$ 5,300,000
4.	Alternative 5B	\$ 5,800,000
5.	Alternative 6	\$ 7,300,000
6.	Alternative 7	\$ 9,100,000

A significant factor in the cost evaluation is that the costs increase and the concentrations of the materials being removed to comply with the progressively lower SCOs decrease with each successive alternative. Consequently, there emerges a condition of significant diminishing return with the progression to the lower SCOs. To put this into perspective, the following table shows the



increase in cost that results from implementing each successive alternative. The changes in costs shown are for PCBs, which is the most significant COC being removed:

Alternatives Compared	Cost	PCB Reduction	Cost/Unit
1 to 3	\$ 3,700,000	94 pounds	\$ 39,400/pound
1 to 4	\$ 4,800,000	122 pounds	\$ 39,300/pound
1 to 5A	\$ 5,300,000	122 pounds	\$ 43,400/pound
1 to 5B	\$ 5,800,000	131 pounds	\$ 44,300/pound
1 to 6	\$ 7,300,000	142 pounds	\$ 51,400/pound
1 to 7	\$ 9,100,000	148 pounds	\$ 61,500/pound

These costs show that there is a significant increase in the cost per pound recovered from Alternatives 4 through 7 indicating significantly diminished return.

7. Detailed Analysis of Mud Creek Drainage Systems

7.1 Former Landfill

The remedial alternatives for the **Former Landfill** are as follows:

1. No Further Action.
2. Site Management and Institutional Controls (Industrial Use).
3. Capping of the Former Landfill.
4. Collection through excavation with off-site disposal of two hot spot locations with material exceeding Industrial SCOs with consolidation of the perimeter edges of the landfill (including re-establishment of a natural creek bank for those portions adjacent to Mud Creek) and capping.
5. Collection through excavation with off-site disposal of hot spot material exceeding proposed Site-Specific Screening Levels with consolidation of the perimeter edges of the landfill (including re-establishment of a natural creek bank for those portions adjacent to Mud Creek) and capping.
6. Collection through excavation with off-site disposal of material exceeding the Unrestricted Use SCOs and restoration of disturbed area.
7. Excavation of all impacted material and placement on a synthetic liner with an overlying cap and restoration of disturbed area.

A description and individual analysis of each of the alternatives for the Former Landfill are presented in Table 4.4. The detailed analysis reviews the relative strengths and weaknesses for each when compared to the threshold and primary balancing criteria. The comparison analysis is summarized in Table 7.1. A cost summary of each alternative is provided in Table 7.2. The location of the Former Landfill is shown on Figure 7.1. Figure 7.2 shows the available chemical analytical data and the limits of the soil removal alternatives. The analysis results are summarized in the following sections.



7.1.1 Overall Protection of Human Health and the Environment

Overall protection of Human Health and the Environment evaluates the risk to human health and the environment. The compliancy of each alternative to meet this threshold criteria is as follows:

- Alternative 1 provides no protection to human health and the environment (rating of poor).
- Alternative 2 uses ICs and ECs to restrict access to the Former Landfill (rating of adequate).
- Alternative 3 involves capping of the Former Landfill which results in protection from contact and erosion. Coupled with the ICs and ECs, this provides further protection by restricting access to the former landfill (rating of good).
- Alternative 4 involves removal of the hot spot soil exceeding Industrial SCOs which will help protect groundwater as well as capping to protect from contact and erosion and use of ICs and ECs to restrict access (rating of very good).
- Alternative 5 involves removal of all soil exceeding proposed Site Specific Screening Levels that are protective of human health and the environment and includes the use of capping, ICs, and ECs to provide further protection (rating of excellent).
- Alternative 6 involves removal of all exceedances above Unrestricted Use SCOs and allows for unrestricted use of the former landfill (rating of excellent).
- Alternative 7 involves excavating all of the landfilled material and placing it on a synthetic liner that will protect groundwater and a permeable cap over top to prevent contact and erosion. The inclusion of ICs and ECs to provide ongoing protection makes this an effective alternative (rating of excellent).

7.1.2 Compliance with SCGs

Compliance with SCGs refers to meeting chemical, action, and location specific SCGs. The compliancy of each alternative to meet this threshold criteria is as follows:

- Alternative 1 is only compliant with action-specific SCGs (rating of poor).
- Alternative 2 is only compliant with action and location specific SCGs (rating of adequate).
- Alternatives 3 and 7 are compliant with action and location-specific SCGs but do not reduce the chemical mass (rating of good).
- Alternatives 4 and 5 are compliant with action and location-specific SCGs and remove most of the chemical mass (rating of very good).
- Alternative 6 is compliant with action, location, and all chemical specific SCGs (rating of excellent).

7.1.3 Reduction of Toxicity, Mobility, or Volume

Compliance with reduction of toxicity, mobility, and volumes of waste refers to the permanence of the remedial action and what is being left in-place and how it is being left. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternative 1 provides no protection to the waste (rating of poor).



- Alternative 2 does not remove any further material from the Site but restricts access (rating of poor).
- Alternative 3 involves capping of the former landfill which results in reduction in mobility and reduction in toxicity due to direct contact but leaves the volume in place (rating of good).
- Alternative 4 involves removal of the two source areas exceeding Industrial SCOs as well as capping resulting in reductions in toxicity, mobility, and volume (rating of very good).
- Alternative 5 involves removal of all the source material exceeding proposed Site Specific Screening Levels as well as capping resulting in reductions in toxicity, mobility, and volume (rating of excellent).
- Alternative 6 involves removal of all source material above SCOs (rating of excellent).
- Alternative 7 involves encapsulation of the landfill material resulting in reductions in toxicity and mobility, but does not reduce volume (rating of good).

7.1.4 Short Term Effectiveness

Short term effectiveness refers to immediate risk associated with the implementation of the alternative. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternatives 1 and 2 require no risk as nothing will be done (rating of excellent).
- Alternative 3 has risk associated with working over the top of an area of impacted material (rating of very good).
- Alternative 4 has risk associated with the hotspot removal to Industrial SCOs. The risks include excavation, handling, transportation, and disposal of the removed material (rating of good).
- Alternative 5 removes more material than Alternative 4. The risks associated with excavation, handling, transportation, and disposal of impacted material increase with volume of material removed (rating of adequate).
- Alternative 6 removes the largest volume of material and therefore takes the longest time and has the most risk (rating of poor).
- Alternative 7 involves handling all of the landfill material twice and then additional construction activities to place the liner and cap (rating of poor).

7.1.5 Long Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to residual risk remaining on Site over time. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternative 1 provides no protection to long term effectiveness (rating of poor).
- Alternative 2 provides protection relying on the ICs and ECs to be maintained in the area of impacted material (rating of adequate).
- Alternative 3 provides protection to the extent that the materials are covered and relies on the ICs and ECs to be maintained (rating of good).



- Alternative 4 provides protection in that most of the chemical mass has been removed and provides further protection through capping (rating of very good).
- Alternative 5 provides protection in that all of the chemical mass exceeding proposed Site Specific Screening Levels have been removed and provide further protection through capping (rating of excellent).
- Alternative 6 removes all of the material exceeding SCOs leaving no risk (rating of excellent).
- Alternative 7 provides protection to the extent that the materials are covered and a liner has been placed beneath the material. Still relies on the ICs and ECs to be maintained (rating of good).

7.1.6 Implementability

Implementability refers to feasibility of implementing the alternative. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternatives 1 and 2 are readily implementable (rating of excellent).
- Alternative 3 is easily implementable but requires coordination with the facility (rating of very good).
- Alternative 4 is implementable but requires coordination with the facility and an off-site disposal facility (rating of good).
- Alternative 5 removes more material than Alternative 5 and therefore causes more interference with the facility (rating of adequate).
- Alternative 6 causes considerable interference to the facility (rating of poor).
- Alternative 7 causes the most interference to the facility (rating of poor).

7.1.7 Cost Effectiveness

Cost refers to the capital and operation and maintenance cost associated with the alternative. The costs are provided in Table 7.2. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternatives 1 and 2 have no capital cost (rating of excellent).
- Alternative 3 has a low capital cost (\$130,000) (rating of very good).
- Alternative 4 is more costly (\$420,000) (rating of good).
- Alternative 5 is even more costly (\$900,000) (rating of adequate).
- Alternative 6 removes considerable additional material and is considerably more costly (\$2,570,000) (rating of poor).
- Alternative 7 also involves extensive work resulting in high cost (\$1,500,000) (rating of poor).



7.1.8 Land Use

Land use refers to current and anticipated future use of the Site. Within the BCP boundary, land use will remain industrial. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternative 1 does not meet land use requirements (rating of poor).
- Alternative 2 meets Industrial Use for all surface related activities (rating of adequate).
- Alternative 3 provides better than Industrial Use for all surface related activities (rating of good).
- Alternatives 4 and 5 provide better than Industrial Use for all land usages (rating of very good).
- Alternative 6 meets unrestricted use (rating of excellent).
- Alternative 7 provides better than Industrial Use for all surface related activities (rating of good).

7.2 On-Site Ditches (North)

It is noted that an Interim Remedial Measure (IRM) has recently been completed for the Northern On-Site Ditches. That IRM involved the removal of soil areas where the nickel concentrations exceed the screening level of 400 mg/kg and the chromium concentrations exceed the screening level of 200 mg/kg. The chemical concentrations measured in the North On-Site Ditches are presented in Figures 2.9 through 2.15. In addition, the completed remediation areas in the north ditches are shown on Figure 2.16. The IRM also included the installation of two sediment traps to capture mobile sediment over the next two years to determine whether impacted sediment is being released and whether it is necessary to continue to maintain the traps. The "On Site Ditch Remediation – Interim Remedial Measure – Final Construction Completion Report" was submitted to the NYSDEC in February 2018.

The remedial alternatives for the **on-Site ditches** on the northern half of the SMC property (and the adjacent SAES property to the east) are as follows:

1. No Further Action.
2. Site Management and Institutional Controls (Industrial Use).
3. Capping of the ditches.
4. Collection through installation of sediment traps.
5. Collection through excavation with off-site disposal of soil exceeding Industrial SCOs and capping of disturbed areas. There is only a small area where Industrial SCOs are exceeded in the north on-site ditch (near sampling transect 2) and includes only about 100 cubic yards of material.
6. Collection through excavation with off-site disposal of soil exceeding proposed Site-Specific Screening Levels and capping of disturbed areas.
7. Collection through excavation with off-site disposal of soil exceeding Unrestricted Soil SCOs in all areas and at all depths with capping of disturbed areas.



A description and individual analysis of each of the alternatives for the on-Site Ditches on the northern half of the SMC facility is presented in Table 4.4. These northern ditches include the ditch that extends off the eastern SMC property boundary onto SAES property. The detailed analysis reviews the relative strengths and weaknesses for each when compared to the threshold and primary balancing criteria. The comparison analysis is summarized in Table 7.1. A cost summary of each alternative is provided in Table 7.2.

7.2.1 Overall Protection of Human Health and the Environment

Overall protection of Human Health and the Environment evaluates the risk to human health and the environment. The compliancy of each alternative to meet this threshold criteria is as follows:

- Alternative 1 provides no protection to human health and the environment (rating of poor).
- Alternative 2 uses ICs with ECs to restrict access to the north ditches (rating of adequate).
- Alternative 3 involves capping of the ditches which results in protection from contact and erosion. Coupled with the ICs and ECs, this provides further protection by restricting access to the north ditches (rating of very good).
- Alternative 4 does not involve any excavation of impacted soil but relies on the installation of sediment traps at downstream locations to intercept mobile sediment before it can enter Mud Creek. Since most of the surface soils in the ditch only contain low level Site COC concentrations and the areas with higher COC concentrations are mostly vegetated resulting in minimal erosion potential, this alternative is mostly protective (rating of good).
- Alternative 5 involves removal of all surface material above Industrial SCOs and replacement with clean imported material. This only involves the removal of about 100 cubic yards of soil. This alternative is mostly protective (rating of good).
- Alternative 6 involves removal of all surface material above proposed Site Specific Screening Levels considered protective of human health and the environment. It also removes all surface soil above the Site Specific Screening Levels that would be protective of Mud Creek (rating of excellent).
- Alternative 7 involves removal of all exceedances above the most restrictive SCOs and allows for unrestricted use of the north ditches (rating of excellent).

7.2.2 Compliance with SCGs

Compliance with SCGs refers to meeting chemical, action, and location specific SCGs. The compliancy of each alternative to meet this threshold criteria is as follows:

- Alternative 1 is only compliant with action-specific SCGs (rating of poor).
- Alternative 2 is only compliant with action and location specific SCGs (rating of adequate).
- Alternatives 3 is compliant with action and location-specific SCGs and to some extent to chemical-specific SCGs (rating of good).
- Alternative 4 is compliant with action and location-specific SCGs (rating of adequate).



- Alternative 5 is compliant with action and location specific SCGs and to some extent to chemical specific SCGs (rating of adequate).
- Alternatives 6 and 7 are compliant with action, location, and all chemical specific SCGs (rating of excellent).

7.2.3 Reduction of Toxicity, Mobility, or Volume

Compliance with reduction of toxicity, mobility, and volumes of waste refers to the permanence of the remedial action and what is being left in-place and how it is being left. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternative 1 provides no protection to the waste (rating of poor).
- Alternative 2 does not remove any further material from the Site but restricts access (rating of poor).
- Alternative 3 involves capping of the ditches which results in reduction in mobility and reduction in toxicity due to direct contact but leaves some material in place (rating of adequate).
- Alternative 4 involves installation of sediment traps to capture mobile sediment (rating of adequate).
- Alternative 5 involves removal of source material (a small volume of about 100 cubic yards) exceeding Industrial SCOs (rating of adequate).
- Alternative 6 involves removal of all source material above proposed Site Specific Screening Levels as well as capping resulting in reductions in toxicity, mobility, and volume (rating of excellent).
- Alternative 7 involves removal of all source material above SCOs (rating of excellent).

7.2.4 Short-Term Effectiveness

Short-term effectiveness refers to immediate risk associated with the implementation of the alternative. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternatives 1 and 2 require no risk as nothing will be done (rating of excellent).
- Alternative 3 has risk associated with working in the area of impacted material (rating of good).
- Alternative 4 has risk associated with normal construction activities (rating of very good).
- Alternative 5 has some risk associated with excavation, handling, transportation, and disposal of impacted material (rating of good).
- Alternative 6 has risk associated with excavation, handling, transportation, and disposal of impacted material which increases with volume of material removed (rating of adequate).
- Alternative 7 removes the largest volume of material and therefore takes the longest time and has the most risk (rating of poor).



7.2.5 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to residual risk remaining on Site over time. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternative 1 provides no protection to long term effectiveness (rating of poor).
- Alternatives 2 and 4 provide protection as long as the ICs and ECs are maintained (rating of adequate).
- Alternative 3 provides protection to the extent that the materials are covered and that ICs and ECs are maintained (rating of good).
- Alternative 5 removes the source material exceeding Industrial SCOs but leaves most material in place (rating of adequate).
- Alternative 6 removes all of the material exceeding proposed Site Specific Screening Levels that are fully protective of human health and the environment and also incorporates a cover over remaining soil (rating of excellent).
- Alternative 7 removes all of the material exceeding SCOs leaving no risk (rating of excellent).

7.2.6 Implementability

Implementability refers to feasibility of implementing the alternative. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternatives 1 and 2 are readily implementable (rating of excellent).
- Alternative 3 is easily implementable but requires coordination with the facility (rating of good).
- Alternative 4 is easily implementable but requires coordination with the facility (rating of good).
- Alternative 5 causes some interference with plant activities due to the excavation of minor amounts of material (rating of good).
- Alternative 6 causes some interference with plant activities due to the excavation of material (rating of adequate).
- Alternative 7 removes the most material and causes the most interference to the plant activities (rating of poor).

7.2.7 Cost Effectiveness

Cost refers to the capital and operation and maintenance cost associated with the alternative. The costs are presented in Table 7.2. The compliancy of each Alternative to meet this balancing criteria is as follows:

- Alternatives 1 and 2 have no capital cost (rating of excellent).
- Alternative 3 has a moderately low capital cost (\$290,000) (rating of good).
- Alternatives 4 and 5 have low capital costs (ranging from \$30,000 to \$50,000) (rating of very good).



- Alternative 6 has a higher capital cost than Alternatives 4 and 5 (\$550,000) (rating of good).
- Alternative 7 removes considerable additional material and has a capital cost more than twice as high as any other alternative (\$1,270,000) (rating of poor).

7.2.8 Land Use

Land use refers to current and anticipated future use of the Site. Within the BCP boundary, land use will remain industrial. It is noted that one segment of the north ditch crosses a neighbor's industrial property. Those portions of the property will remain under an environmental easement unless remediated to Residential SCOs. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternatives 1 and 2 do not meet land use requirements (rating of poor).
- Alternative 3 meets Residential and Ecological Use with capping (rating of very good).
- Alternative 4 meets the intent of Industrial SCOs (rating of adequate).
- Alternative 5 meets Industrial SCOs (rating of adequate).
- Alternative 6 meets proposed Site Specific Screening Levels (rating of very good).
- Alternative 7 meets Unrestricted Use (rating of excellent).

7.3 On-Site Ditches (South)

The remedial alternatives for the **on-Site ditches** on the southern half of the SMC property are as follows:

1. No Further Action.
2. Site Management and Institutional Controls (Industrial Use).
3. Capping of the ditches.
4. Collection through installation of sediment traps.
5. Collection through excavation with off-site disposal of soil exceeding Industrial SCOs and capping of disturbed areas. There are no areas in the south on-site ditches that exceed the Industrial SCOs
6. Collection through excavation with off-site disposal of soil exceeding proposed Site-Specific Screening Levels upland of the wetlands and Restricted Residential in the wetlands and capping of disturbed areas with installation of sediment traps.
7. Collection through excavation with off-site disposal of soil exceeding Unrestricted Soil SCOs in all areas and at all depths with restoration of disturbed areas.

A description and individual analysis of each of the alternatives for the South Ditches are presented in Table 4.4. The detailed analysis reviews the relative strengths and weaknesses for each when compared to the threshold and primary balancing criteria. The comparison analysis is summarized in Table 7.1. A cost summary of each alternative is provided in Table 7.2. The locations of the south ditches are shown on Figure 7.1 and the analytical data collected from the south ditches are



presented on Figures 2.9 through 2.15. In addition, analytical data from soil samples collected near the south ditches are provided in Figure 2.17.

7.3.1 Overall Protection of Human Health and the Environment

Overall protection of Human Health and the Environment evaluates the risk to human health and the environment. The compliancy of each alternative to meet this threshold criteria is as follows:

- Alternative 1 provides no protection to human health and the environment (rating of poor).
- Alternative 2 uses ICs with ECs to restrict access to the south ditches (rating of adequate).
- Alternative 3 involves capping of the ditches which results in protection from contact and erosion. Coupled with the ICs and ECs, this provides further protection by restricting access to the south ditches (rating of very good).
- Alternative 4 does not involve any excavation of impacted soil but relies on the installation of sediment traps at downstream locations to intercept mobile sediment before it can enter Mud Creek. Since most of the surface soils in the ditches only contain low level Site COC concentrations and the areas with higher COC concentrations are mostly vegetated resulting in minimal erosion potential, this alternative is mostly protective (rating of good).
- Alternative 5 would involve removal of all near-surface material above Industrial SCOs and replacement with clean imported material. However, there are no Industrial SCO exceedances in the south on-Site ditches. Nonetheless, this alternative is mostly protective (rating of good).
- Alternative 6 involves removal of all surface material above proposed Site Specific Screening Levels in areas upland of the wetland and Restricted Residential SCOs in the wetland is considered protective of human health and the environment. It also removes all surface soil above the proposed Site Specific Screening Levels that would be protective of Mud Creek and includes the installation of sediment traps to prevent future releases (rating of excellent).
- Alternative 7 involves removal of all exceedances above the most restrictive SCOs and allows for unrestricted use of the south ditches (rating of excellent).

7.3.2 Compliance with SCGs

Compliance with SCGs refers to meeting chemical, action, and location specific SCGs. The compliancy of each alternative to meet this threshold criteria is as follows:

- Alternative 1 is only compliant with action-specific SCGs (rating of poor).
- Alternative 2 is only compliant with action and location specific SCGs (rating of adequate).
- Alternative 3 is compliant with action and location-specific SCGs and to some extent to chemical-specific SCGs (rating of good).
- Alternative 4 is compliant with action and location specific SCGs (rating of adequate).
- Alternative 5 is compliant with action and location specific SCGs and to some extent to chemical specific SCGs (rating of adequate).



- Alternatives 6 and 7 are compliant with action, location, and all chemical specific SCGs (rating of excellent).

7.3.3 Reduction of Toxicity, Mobility, or Volume

Compliance with reduction of toxicity, mobility, and volumes of waste refers to the permanence of the remedial action and what is being left in-place and how it is being left. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternative 1 provides no protection to the waste (rating of poor).
- Alternative 2 does not remove any further material from the Site but restricts access (rating of poor).
- Alternative 3 involves capping of the ditches which results in reduction in mobility and reduction in toxicity due to direct contact but leaves some material in place (rating of adequate).
- Alternative 4 does involve installation of sediment traps to capture mobile sediment (rating of adequate).
- Alternative 5 would involve the removal of source material exceeding Industrial SCOs. However, there is no material exceeding the Industrial SCOs in the south on-site ditches (rating of adequate).
- Alternative 6 involves removal of all source material above proposed Site Specific Screening Levels in the areas upland of the wetland and Restricted Residential in the wetland as well as capping and sediment traps resulting in reductions in toxicity, mobility, and volume (rating of excellent).
- Alternative 7 involves removal of all source material above SCOs (rating of excellent).

7.3.4 Short Term Effectiveness

Short term effectiveness refers to immediate risk associated with the implementation of the alternative. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternatives 1, 2, and 5 require no risk as nothing will be done (rating of excellent).
- Alternative 3 has risk associated with working in the area of impacted material (rating of good).
- Alternative 4 has risk associated with normal construction activities (rating of good).
- Alternative 6 has risk associated with excavation, handling, transportation, and disposal of impacted material which increases with volume of material removed (rating of adequate).
- Alternative 7 removes the largest volume of material and therefore takes the longest time and has the most risk (rating of poor).

7.3.5 Long Term Effectiveness and Permanence

Long term effectiveness and permanence refers to residual risk remaining on Site over time. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternative 1 provides no protection to long term effectiveness (rating of poor).



- Alternative 2 provides protection as long as the ICs and ECs are maintained (rating of adequate).
- Alternative 3 provides protection to the extent that the materials are covered and that ICs and ECs are maintained (rating of good).
- Alternative 4 provides protection to the extent that the sedimentation basins operate effectively and are maintained (rating of adequate).
- Alternative 5 would remove the source material exceeding Industrial SCOs but leaves most material in place. However, there is no material exceeding the Industrial SCOs in the south on-site ditches (rating of adequate).
- Alternative 6 removes all of the material exceeding proposed Site Specific Screening Levels in the area upland of the wetland and Restricted Residential in the wetland resulting in a remedy that is fully protective of human health and the environment and also incorporates a cover over remaining soil and sediment traps (rating of excellent).
- Alternative 7 removes all of the material exceeding SCOs leaving no risk (rating of excellent).

7.3.6 Implementability

Implementability refers to feasibility of implementing the alternative. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternatives 1 and 2 are readily implementable (rating of excellent).
- Alternatives 3 and 4 are easily implementable but requires coordination with the facility (rating of good).
- Alternative 5 would cause some interference with plant activities due to the excavation, but no excavation will occur because there are no Industrial SCO exceedances in the south on-site ditches (rating of excellent).
- Alternative 6 causes some interference with plant activities due to the excavation of material (rating of adequate).
- Alternative 7 removes the most material and causes the most interference to the plant activities (rating of poor).

7.3.7 Cost Effectiveness

Cost refers to the capital and operation and maintenance cost associated with the alternative. The costs are presented in Table 7.2. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternatives 1, 2, and 5 have no capital cost (rating of excellent).
- Alternatives 3 and 4 have low capital cost (ranging from \$20,000 to \$70,000) (rating of very good).
- Alternative 6 has a capital cost three times higher than capping (\$220,000) (rating of good).



- Alternative 7 removes considerable additional material and has a capital cost eight times higher than capping (\$ 580,000) (rating of poor).

7.3.8 Land Use

Land use refers to current and anticipated future use of the Site. Within the BCP boundary, land use will remain industrial. It is noted that portions of the South Ditches cross wetland/flood plain areas to reach Mud Creek. Those portions of the property will remain as wetland/flood plain areas. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternatives 1 and 2 do not meet land use requirements (rating of poor).
- Alternative 3 meets Residential and Ecological Use with capping (rating of very good).
- Alternative 4 meets the intent of Industrial SCOs (rating of adequate).
- Alternative 5 meets Industrial SCOs (rating of adequate).
- Alternative 6 meets proposed Site Specific Screening Levels in areas upland of the wetland and Restricted Residential SCOs in the wetland (rating of very good).
- Alternative 7 meets Unrestricted Use (rating of excellent).

7.4 On-Site Storm Sewer System

The remedial alternatives for the **on-Site storm sewer system** on the SMC property are as follows:

1. No Further Action.
2. One time cleaning with off-site disposal of waste and treatment of future water with documentation sampling.
3. Long-term periodic sewer cleaning with off-site disposal of waste and treatment of future water until untreated effluent meets surface water standards.
4. Removal of the sewer system through excavation and off-site disposal to Protection of Groundwater SCOs
5. Removal of the sewer system through excavation and off-site disposal to Unrestricted Use SCOs.

A description and individual analysis of each of the alternatives for the on-Site Sewer System are presented in Table 4.4. The detailed analysis reviews the relative strengths and weaknesses for each when compared to the threshold and primary balancing criteria. The comparison analysis is summarized in Table 7.1. A cost summary of each alternative is provided in Table 7.2. The location of the on-site storm sewer system is presented in Figure 2.2.

7.4.1 Overall Protection of Human Health and the Environment

Overall protection of Human Health and the Environment evaluates the risk to human health and the environment. The compliancy of each alternative to meet this threshold criteria is as follows:

- Alternative 1 provides no additional protection to human health and the environment above that which currently exists. The current system operates without exceedance of SPDES limits and



therefore is fully protective and with ongoing ECs is expected to remain effective (rating of excellent).

- Alternative 2 involves a one time cleaning of the sewer system to remove impacted sediment accumulations with ongoing treatment of the effluent to ensure water meeting the SPDES permit is discharging from the plant and to capture mobile sediment (rating of excellent).
- Alternative 3 involves the same remedy as Alternative 2 but includes additional periodic cleaning of the sewers. There have been no exceedances of SPDES discharge limits even without sewer cleaning. Therefore, Alternative 3 is no more protective than Alternative 2 (rating of excellent).
- Alternative 4 involves removal of the sewer system and the adjacent soil to levels that meet Protection of Groundwater SCOs. In addition to the excavation, this alternative would require replacement of the sewer system with a series of surface ditches to manage water into the future. Due to the possibility of impacted surface soil entering the flow, this alternative would still require treatment of the effluent prior to discharge from the plant (rating of excellent).
- Alternative 5 involves the same remedy as Alternative 4 but includes the removal of more soil to meet Unrestricted Use SCOs during the removal of the sewer system (rating of excellent).

7.4.2 Compliance with SCGs

Compliance with SCGs refers to meeting chemical, action, and location specific SCGs. The compliancy of each alternative to meet this threshold criteria is as follows:

- Alternatives 1 through 5 are all compliant with action, location, and chemical-specific SCGs (rating of excellent).

7.4.3 Reduction of Toxicity, Mobility, or Volume

Compliance with reduction of toxicity, mobility, and volumes of waste refers to the permanence of the remedial action and what is being left in-place and how it is being left. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternative 1 provides no additional removal of accumulated sediment but any released sediment is removed at the current water treatment plant anyway (rating of very good).
- Alternatives 2 and 3 remove some additional sediment accumulation in the sewers but that material would be captured at the water treatment plant anyway (rating of very good).
- Alternatives 4 and 5 involve removal of the sewer system and replacement with a surface ditch system. These two alternatives still rely on the water treatment plant to capture impacted sediment that becomes mobile (rating of very good).

7.4.4 Short Term Effectiveness

Short term effectiveness refers to immediate risk associated with the implementation of the alternative. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternative 1 involves no risk as nothing will be done (rating of excellent).



- Alternative 2 has risk associated with working in the sewer system one time (rating of very good).
- Alternative 3 involves working in the sewer system on multiple times (rating of good).
- Alternatives 4 and 5 have risk associated with excavation, handling, transportation, and disposal of impacted material (which increases with volume of material handled) and the construction of a new surface ditch system (rating of poor).

7.4.5 Long Term Effectiveness and Permanence

Long term effectiveness and permanence refers to residual risk remaining on Site over time. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternatives 1 through 5 all have the same long-term effectiveness and rely upon the water treatment system to capture any impacted sediment that may become mobile (rating of very good).

7.4.6 Implementability

Implementability refers to feasibility of implementing the alternative. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternative 1 is readily implementable and has no impact on plant operations (rating of excellent).
- Alternative 2 can be implemented but requires coordination with the plant activities (rating of very good).
- Alternative 3 can be implemented as needed but requires coordination with the plant activities (rating of good).
- Alternatives 4 and 5 cause considerable interference with plant activities both during construction and in all following activities since the ditches must be maintained and will always be in the way of ongoing plant operations (rating of poor).

7.4.7 Cost Effectiveness

Cost refers to the capital and operation and maintenance cost associated with the alternative. The costs are presented in Table 7.2. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternative 1 has no capital cost (rating of excellent).
- Alternative 2 involves a one-time cleaning of the sewer system at a cost of \$70,000 (rating of very good).
- Alternative 3 involves multiple cleanings of the sewers on an as needed basis. If cleanings are performed every 5 years, then the cost is \$400,000 over 30 years (rating of good).
- Alternatives 4 and 5 involve high costs for the sewer removal and ditch construction (\$1,540,000 and \$1,730,000) (rating of poor).



7.4.8 Land Use

Land use refers to current and anticipated future use of the Site. Within the BCP boundary, land use will remain industrial. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternatives 1, 2, and 3 do not affect land use requirements (rating of excellent).
- Alternatives 4 and 5 affect future use of the plant by creating a ditch system which will impede all future use of the property (rating of adequate).

7.5 Storm Sewer Treatment System

The remedial alternatives for the **storm sewer treatment system** on the SMC property are as follows:

1. No Further Action – current system is decommissioned
2. Continued operation of the treatment system under SPDES permit
3. Incorporation of treatment system into Site Management Plan for BCP Site

A description and individual analysis of each of the alternatives for the Storm Sewer Treatment System is presented in Table 4.4. The detailed analysis reviews the relative strengths and weaknesses for each when compared to the threshold and primary balancing criteria. The comparison analysis is summarized in Table 7.1. A cost summary of each alternative is provided in Table 7.2. The location of the storm sewer treatment plant is shown on Figure 2.2.

7.5.1 Overall Protection of Human Health and the Environment

Overall protection of Human Health and the Environment evaluates the risk to human health and the environment. The compliancy of each alternative to meet this threshold criteria is as follows:

- Alternative 1 involves decommissioning of the existing water treatment plant. The treatment plant provides assurance that the water quality from the on-site storm sewer system meets surface water quality objectives and provides filtration to eliminate sediment discharge from the plant. Without treatment, there is no protective measure in place to capture accidental releases from the plant (rating of poor).
- Alternative 2 involves continued operation of the existing treatment system under SPDES with possible revisions to effluent limitations consistent with the selected remedy. The current system is already protective (rating of excellent).
- Alternative 3 involves continued operation of the existing treatment system under the Site Management Plan developed for the BCP. This would involve possible revisions to the effluent limitations similar to Alternative 2. The same level of protection is expected whether the system operates under Alternative 2 or 3 (rating of excellent).



7.5.2 Compliance with SCGs

Compliance with SCGs refers to meeting chemical, action, and location specific SCGs. The compliancy of each alternative to meet this threshold criteria are as follows:

- Alternative 1 will not meet the chemical specific SCGs. (rating of poor).
- Alternative 2 and 3 are compliant with action, location, and chemical-specific SCGs (rating of excellent).

7.5.3 Reduction of Toxicity, Mobility, or Volume

Compliance with reduction of toxicity, mobility, and volumes of waste refers to the permanence of the remedial action and what is being left in-place and how it is being left. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternative 1 would increase the potential mobility of Site COCs allowing them to discharge from the plant into Mud Creek (rating of poor).
- Alternatives 2 and 3 include treatment of the effluent from the storm sewer system thereby reducing the mobility of impacted water and sediment from entering Mud Creek (rating of excellent).

7.5.4 Short Term Effectiveness

Short term effectiveness refers to immediate risk associated with the implementation of the alternative. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternative 1 involves removal of the existing treatment system so risks associated with decommissioning activities will occur but should be minimized by common construction safety practices (rating of adequate).
- Alternatives 2 and 3 involve no physical work and therefore no risk is associated with implementing this alternative (rating of excellent).

7.5.5 Long Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to residual risk remaining on Site over time. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternative 1 is not effective as the treatment system will be removed under this alternative. (rating of poor).
- Alternatives 2 and 3 have the same long-term effectiveness and provide appropriate treatment of the plant's effluent (rating of excellent).

7.5.6 Implementability

Implementability refers to the feasibility of implementing the alternative. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternative 1 involves the decommissioning of the existing water treatment plant and will affect the plant's ability to continue operating (rating of poor).



- Alternatives 2 and 3 simply involve possible revision of the effluent limitations under which the treatment plant is required to operate. This may necessitate some upgrade / modification to the treatment system (rating of good.)

7.5.7 Cost Effectiveness

Cost refers to the capital and operation and maintenance cost associated with the alternative. The costs are presented in Table 7.2. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternative 1 involves the decommissioning of the existing treatment system which will cost \$240,000 (rating of poor).
- Alternatives 2 and 3 involve no currently identifiable changes to the treatment system. Therefore the expected capital cost is \$ 0. Operating costs will remain the same as currently exists (rating of excellent).

7.5.8 Land Use

Land use refers to current and anticipated future use of the Site. Within the BCP boundary, land use will remain industrial. The compliancy of each alternative to meet this balancing criteria is as follows:

- Alternative 1 will impact the plant's ability to continue to operate (rating of poor)
- Alternatives 2 and 3 do not affect land use requirements (rating of excellent)

8. Summary

Based on the alternatives analyses performed, the highest ranking alternatives for the AOCs evaluated are as follows:

Mud Creek Sediment and Wetland/Flood Plain Soil – Alternatives 4 and 5A tied for the highest ranking. Alternative 4 involves Removal to proposed Site Specific Screening Levels With Ecological / Wetland Restoration and Alternative 5A involves Removal to Restricted Residential SCOs With Ecological / Wetland Restoration.

Former Landfill – Alternative 4 – Excavation to Industrial SCOs with Capping

On-Site Ditches (North) – Alternative 6 – Collection through Excavation with Off-Site Disposal of Soil Exceeding proposed Site Specific Screening Levels and Capping of Disturbed Areas

On-Site Ditches (South) - Alternative 6 – Excavation to proposed Site Specific Screening Levels in areas upland of the wetland and to Restricted Residential SCOs in the wetland With Capping and Sediment Traps

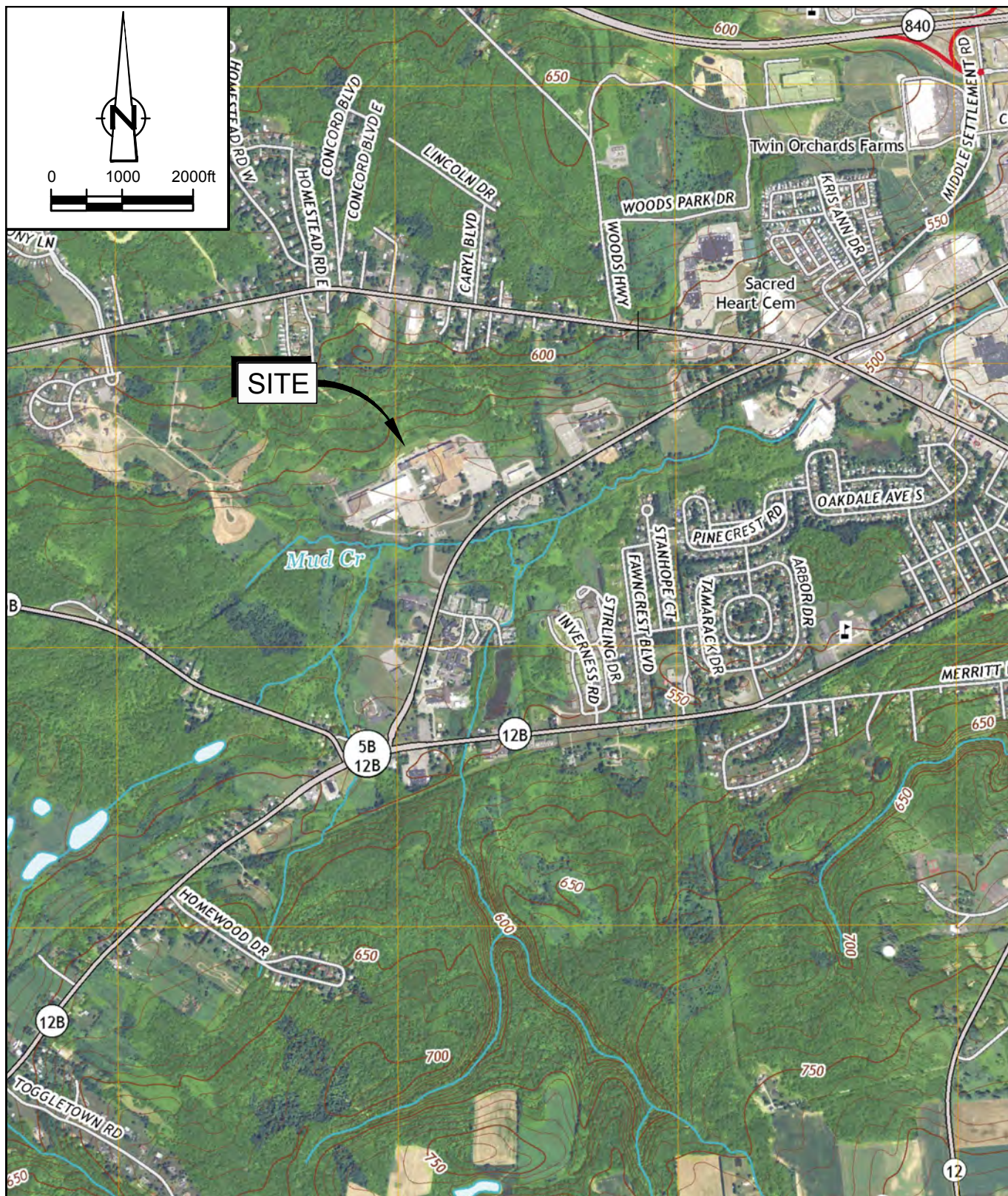
On-Site Storm Sewer System – Alternative 1 – No Further Action. Nonetheless, SMC has already implemented Alternative 2 – One Time Cleaning



Storm Sewer Water Treatment System – Alternative 2 or 3 – Continued Operation of Treatment System under SPDES or SMP with Appropriate Revisions to Effluent Limitations.

9. References

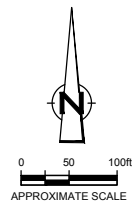
- New York State Department of Environmental Conservation "DER-10 Technical Guidance for Site Investigation and Remediation", June 18, 2010.
- 6 NYCRR Part 375, "Environmental Remediation Programs Subpart 375-6 Remedial Program Soil Cleanup Objectives."
- 6 NYCRR Part 701, "Classifications-surface Waters and Groundwaters."
- New York State Department of Environmental Conservation, "Technical Guidance for Screening of Contaminated Sediments," November 22, 1993.
- New York State Department of Environmental Conservation, "DAR-1 AGC/SGC Tables," December 22, 2003.
- Federal Remediation Technologies Roundtable, "Remediation Technologies Screening Matrix and Reference Guide," Version 4.0.
- "A Framework for Net Environmental Benefit Analysis for Remediation or Restoration of Petroleum-Contaminated Sites" by Rebecca Efroymson, Joseph Nicolette, and Glenn Suter for US Department of Energy – January 2003.
- "Sample Collection Results – Mud Creek Interim Remedial Measure" by GHD, January 10, 2017.
- "Assessment of Nickel and Chromium Concentrations" by GHD, March 1, 2017.
- "Regulatory Analysis – Mud Creek Clean Up Criteria" by GHD, April 4, 2017.
- "Vegetative Index of Biotic Integrity" by GHD, October 18, 2017.
- "Results of Leaching Procedures to Determine Solubility of Chromium and Nickel" by GHD, December 19, 2017.
- "Results of Worm Bioaccumulation Study" by GHD, January 2, 2018.



SOURCE: USGS QUADRANGLE MAP;
UTICA WEST, NEW YORK. 2013



figure 2.1
SITE LOCATION
SPECIAL METALS CORPORATION
New Hartford, New York



- LEGEND**
- STREAMS
 - DRAINAGE DITCH
 - BCP SITE BOUNDARY
 - MANHOLE
 - CATCHBASIN
 - STORM SEWER SYSTEM
 - FLOW DIRECTION
 - OUTFALL LOCATION

- NOTES:**
- BASE MAP FROM ESRI ARCADIS ONLINE SERVER - BING MAPS AERIAL (ACCESSED 4/12/2012)
 - FIGURE ADAPTED FROM ARCADIS FIGURE 2 (STORMWATER COLLECTION SYSTEM)
 - ADDITIONAL AERIAL IMAGERY DATED MAY 13, 2015 © GOOGLE EARTH. (NEW YORK CENTRAL STATE PLANE NAD83 US SURVEY FOOT).
 - BCP = BROWNFIELD CLEANUP PROGRAM.

SCALE VERIFICATION

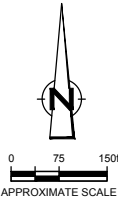
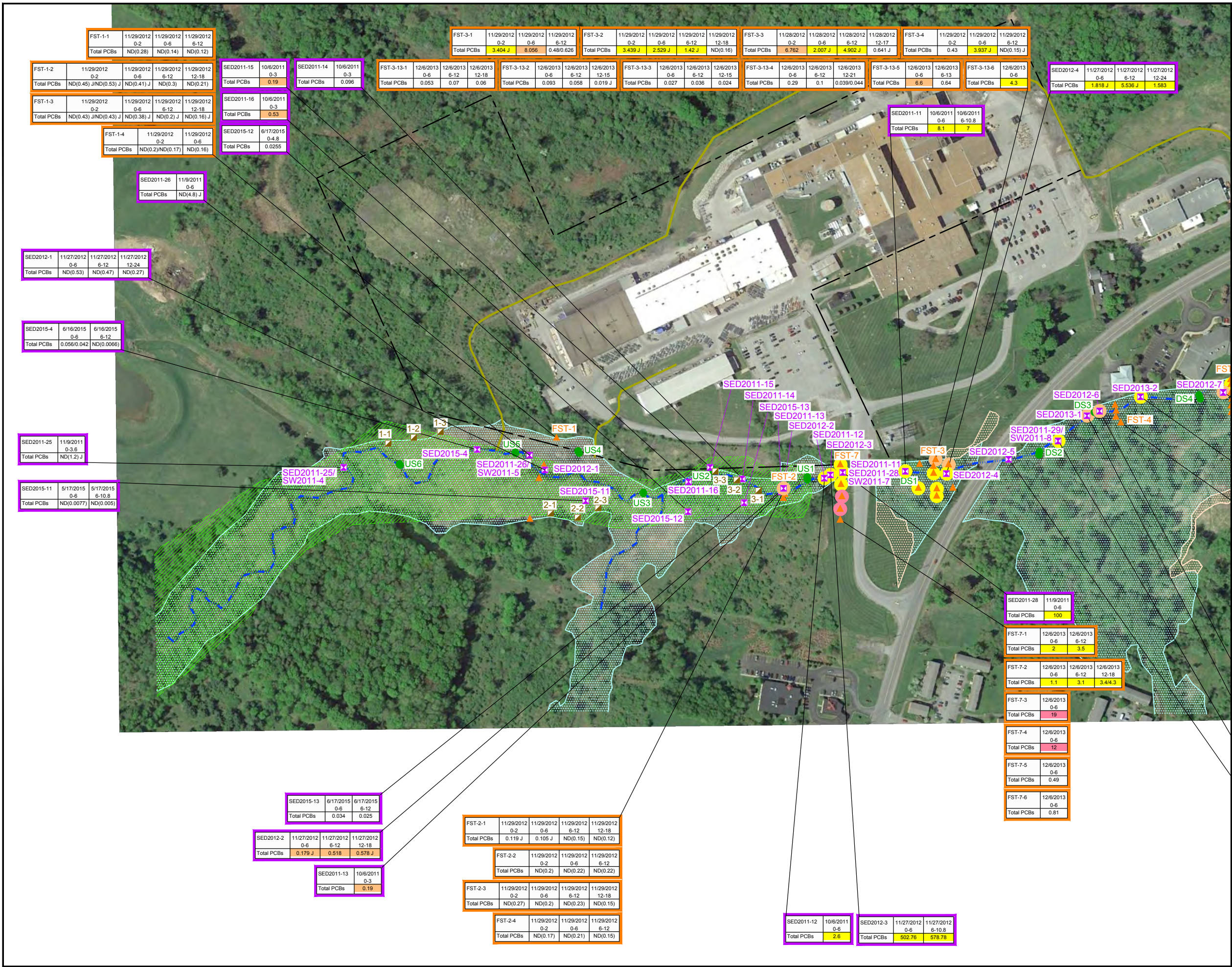
THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

AREAS OF CONCERN

Source Reference:

Project Manager: J.D.	Reviewed By: P.K.	Date: NOVEMBER 2017
Scale: 1:100	Project N°: 86188-00	Report N°: 022
		Drawing N°: figure 2.2



- LEGEND**
- STREAMS
 - DRAINAGE DITCH
 - BCP SITE BOUNDARY
 - SEDIMENT SAMPLE
 - PEEPER SEDIMENT SAMPLE LOCATION
 - FLOODPLAIN SOIL TRANSECT WITHIN WETLAND
 - FLOOD PLAIN SOIL SAMPLE LOCATION
 - STATE-REGULATED FRESHWATER WETLAND (FROM CUGIR: CORNELL UNIVERSITY GEOSPATIAL INFORMATION REPOSITORY)
 - 100-YEAR FLOOD
 - 500-YEAR FLOOD

SEDIMENT SAMPLE LOCATION

SED2013-6	12/5/2013	6-12	0.25
Total PCBs			
PARAMETER			

SEDIMENT CRITERIA (mg/kg)

< 0.1	NO EXCEEDANCE
> 0.1 TO < 1	UNRESTRICTED USE EXCEEDANCE
> 1.0	RESIDENTIAL EXCEEDANCE

FLOODPLAIN SAMPLE LOCATION

FST-6-1	11/28/2012	0-6	0.537
Total PCBs			
PARAMETER			

FLOOD PLAIN CRITERIA (mg/kg)

> 1 TO < 5	PARENT [DUPLICATE RESULT]
> 5 TO < 10	ESTIMATED
> 10 TO < 25	QUALIFIED NOT DETECTED ABOVE THE SAMPLE REPORT LIMIT
> 25.0	

- NOTES:**
- AERIAL IMAGERY DATED MAY 13, 2015 © GOOGLE EARTH.
 - (NEW YORK CENTRAL STATE PLANE NAD83 US SURVEY FOOT).
 - BCP = BROWNFIELD CLEANUP PROGRAM.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

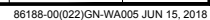
**SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK**

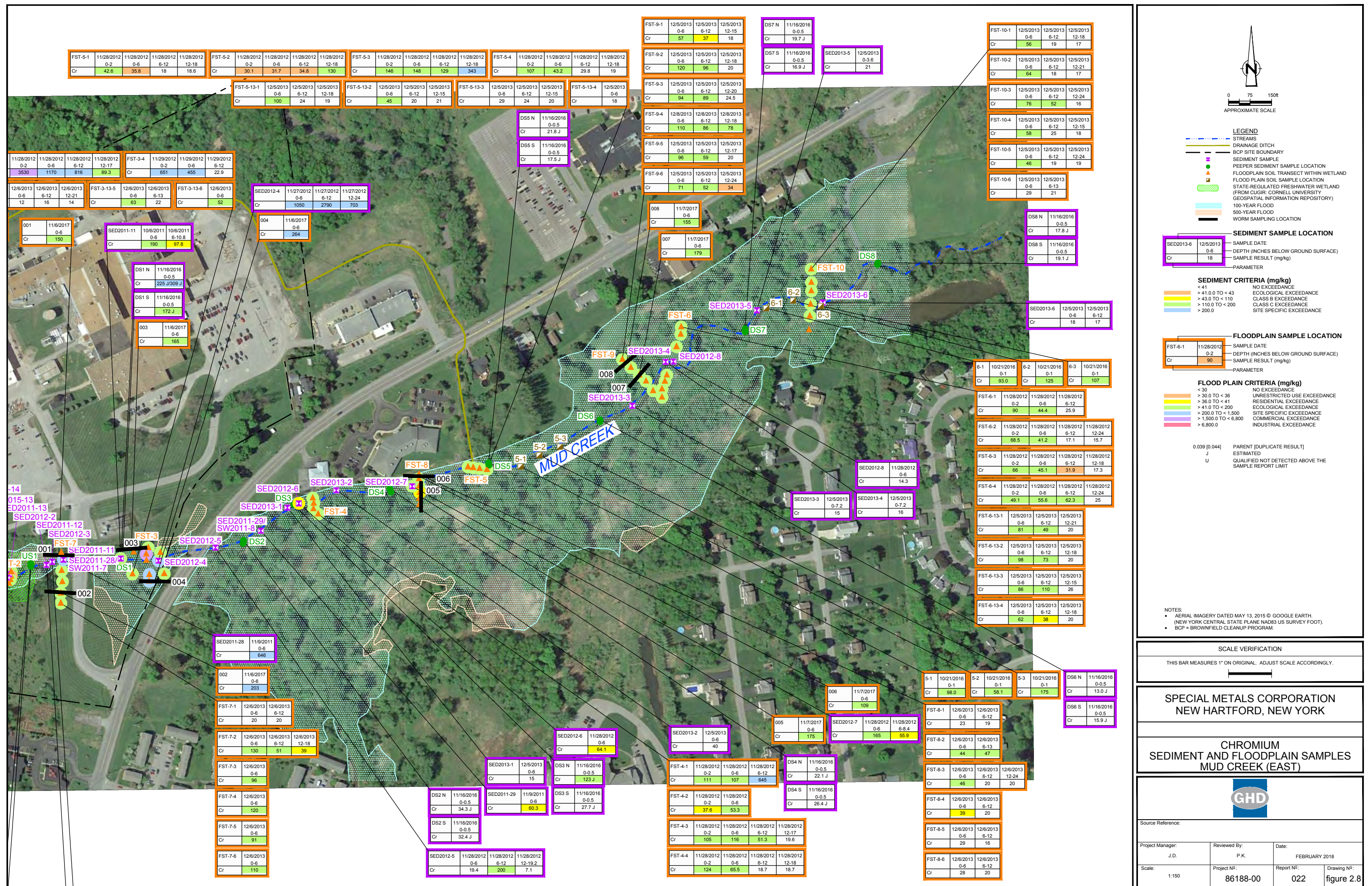
**PCBs
SEDIMENT AND FLOODPLAIN SAMPLES
MUD CREEK (WEST)**



Source Reference:

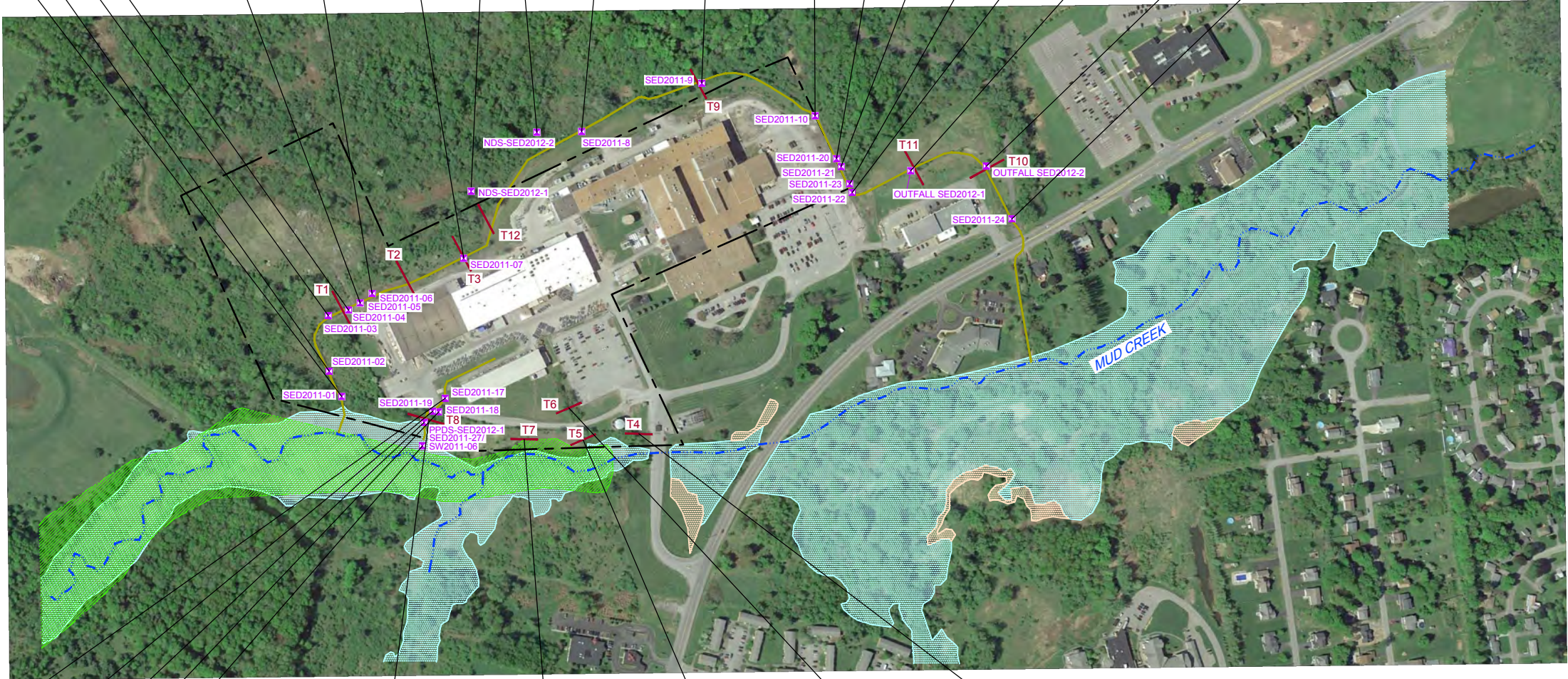
Project Manager:	Reviewed By:	Date:
J.D.	P.K.	NOVEMBER 2017
Scale:	Project N°:	Report N°:
1:150	86188-00	022
		Drawing N°:
		figure 2.3





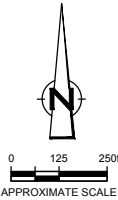
SED2011-5	10/5/2011	0-6	0.13
PCBs	6-12	12-18	0.21
SED2011-6	10/5/2011	0-6	0.27
PCBs	6-12	12-18	0.069
SED2011-7	10/5/2011	0-6	ND
PCBs	6-12	12-18	ND
NDS-SED2012-1	11/26/2012	0-6	ND
PCBs	6-12	12-18	ND
NDS-SED2012-2	11/26/2012	0-6	ND
PCBs	6-12	12-18	ND
SED2011-8	10/5/2011	0-6	0.036
PCBs	6-12	12-18	0.036
SED2011-9	10/6/2011	0-3	0.12
PCBs	6-12	12-18	0.12
SED2011-10	10/6/2011	0-6	0.26
PCBs	6-12	12-18	0.26
SED2011-20	10/7/2011	0-6	0.36
PCBs	6-12	12-18	0.36
SED2011-21	10/7/2011	0-6	0.27
PCBs	6-12	12-18	0.27
SED2011-23	10/7/2011	0-6	0.24
PCBs	6-12	12-18	0.24
SED2011-22	10/7/2011	0-6	0.33
PCBs	6-12	12-18	0.33
OUTFALL-SED2012-1	11/26/2012	0-6	0.0902
PCBs	6-12	12-18	0.0902
OUTFALL-SED2012-2	11/26/2012	0-6	0.0555
PCBs	6-12	12-18	0.0555
SED2011-24	10/7/2011	0-6	0.025/0.02
PCBs	6-12	12-18	0.025/0.02

SED2011-4	10/5/2011	0-6	0.16/0.19
PCBs	6-12	12-18	0.16/0.19
SED2011-3	10/5/2011	0-6	0.2
PCBs	6-12	12-18	0.2
SED2011-2	10/5/2011	0-6	ND
PCBs	6-12	12-18	ND
SED2011-1	10/5/2011	0-6	0.015
PCBs	6-12	12-18	0.015



SED2011-17	10/6/2011	0-6	0.031
PCBs	6-12	12-18	0.031
SED2011-19	10/6/2011	0-6	1.4
PCBs	6-12	12-18	1.4
PPDS-SED2012-1	11/26/2012	0-6	1.09
PCBs	6-12	12-18	1.09
SED2011-18	10/6/2011	0-6	0.27
PCBs	6-12	12-18	0.27
SED2011-27	11/9/2011	0-6	ND
PCBs	6-12	12-18	ND

T8-3	3/29/2017	3/29/2017	3/29/2017	0-6	6-12	12-18	0.68/0.55	0.6	0.57
PCBs	6-12	12-18	0.68/0.55	0.6	0.57				
T7-3	3/29/2017	3/29/2017	3/29/2017	0-6	6-12	12-18	0.67	ND	0.19
PCBs	6-12	12-18	0.67	ND	0.19				
T5-3	3/28/2017	3/28/2017	3/28/2017	0-6	6-12	12-18	ND	0.69/1.3	0.27
PCBs	6-12	12-18	ND	0.69/1.3	0.27				
T6-3	3/29/2017	3/29/2017	3/29/2017	0-6	6-12	12-18	0.18/ND	ND	ND
PCBs	6-12	12-18	0.18/ND	ND	ND				
T4-3	3/28/2017	3/28/2017	3/28/2017	0-6	6-12	12-18	0.63/0.85	2.7	1.5
PCBs	6-12	12-18	0.63/0.85	2.7	1.5				



LEGEND	
	STREAMS
	DRAINAGE DITCH
	BCP SITE BOUNDARY
	SEDIMENT SAMPLE
	TRANSECT LOCATION
	STATE-REGULATED FRESHWATER WETLAND (FROM CUSIR: CORNELL UNIVERSITY GEOSPATIAL INFORMATION REPOSITORY)
	100-YEAR FLOOD
	500-YEAR FLOOD
SAMPLE LOCATION	
SED2013-5	12/5/2013
PCBs	0-3.6
PCBs	0.86
PARAMETER	
0.039 [0.044]	PARENT [DUPLICATE RESULT]
J	ESTIMATED
U	QUALIFIED NOT DETECTED ABOVE THE SAMPLE REPORT LIMIT
CRITERIA (mg/kg)	
< 0.1	NO EXCEEDANCE
> 0.1 TO < 1	UNRESTRICTED USE EXCEEDANCE
> 1.0 TO < 25	RESIDENTIAL EXCEEDANCE
> 25.0	INDUSTRIAL EXCEEDANCE

NOTES:

- AERIAL IMAGERY DATED MAY 13, 2015 © GOOGLE EARTH.
- (NEW YORK CENTRAL STATE PLANE NAD83 US SURVEY FOOT).
- BCP = BROWNFIELD CLEANUP PROGRAM.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



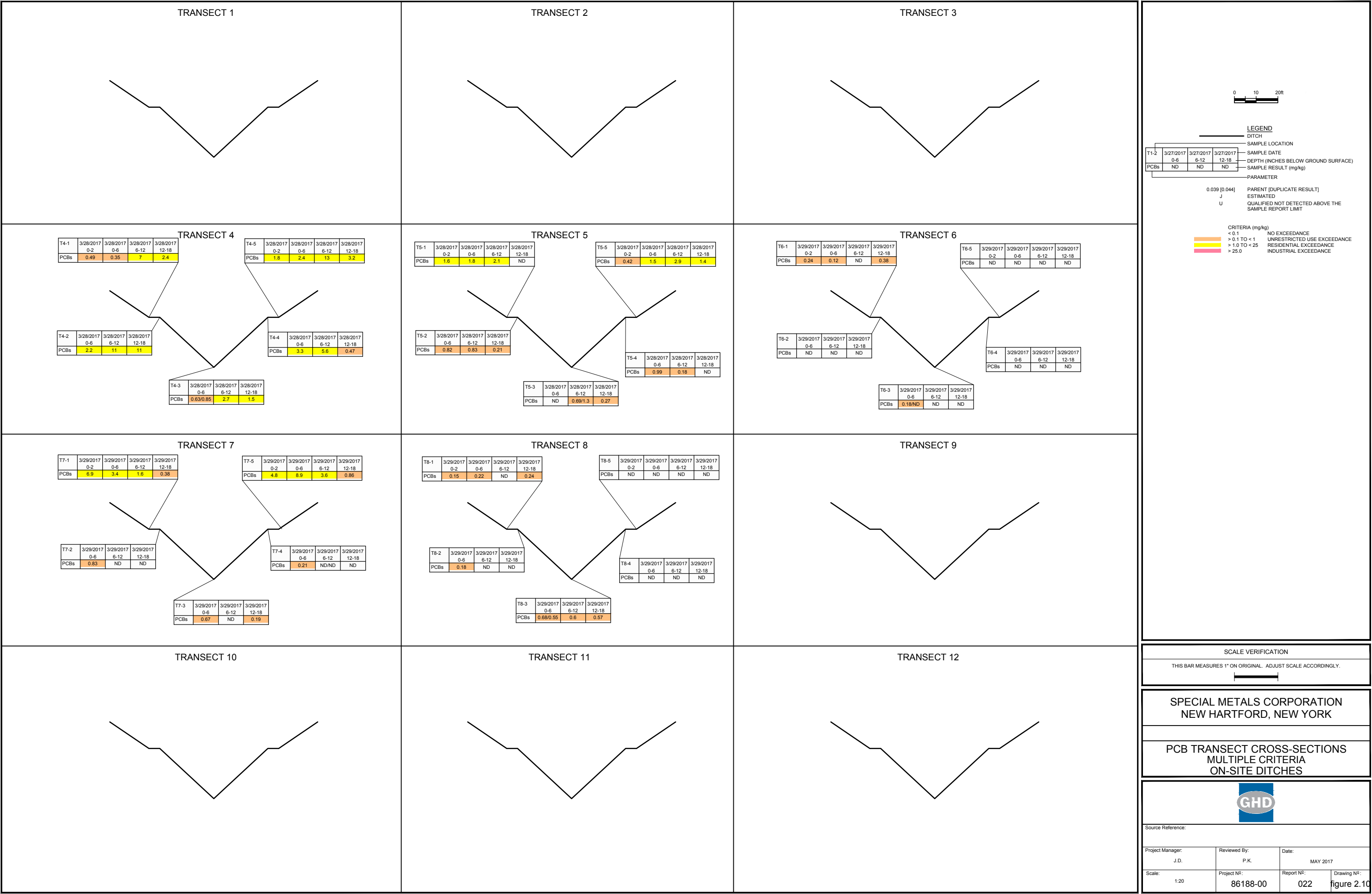
SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

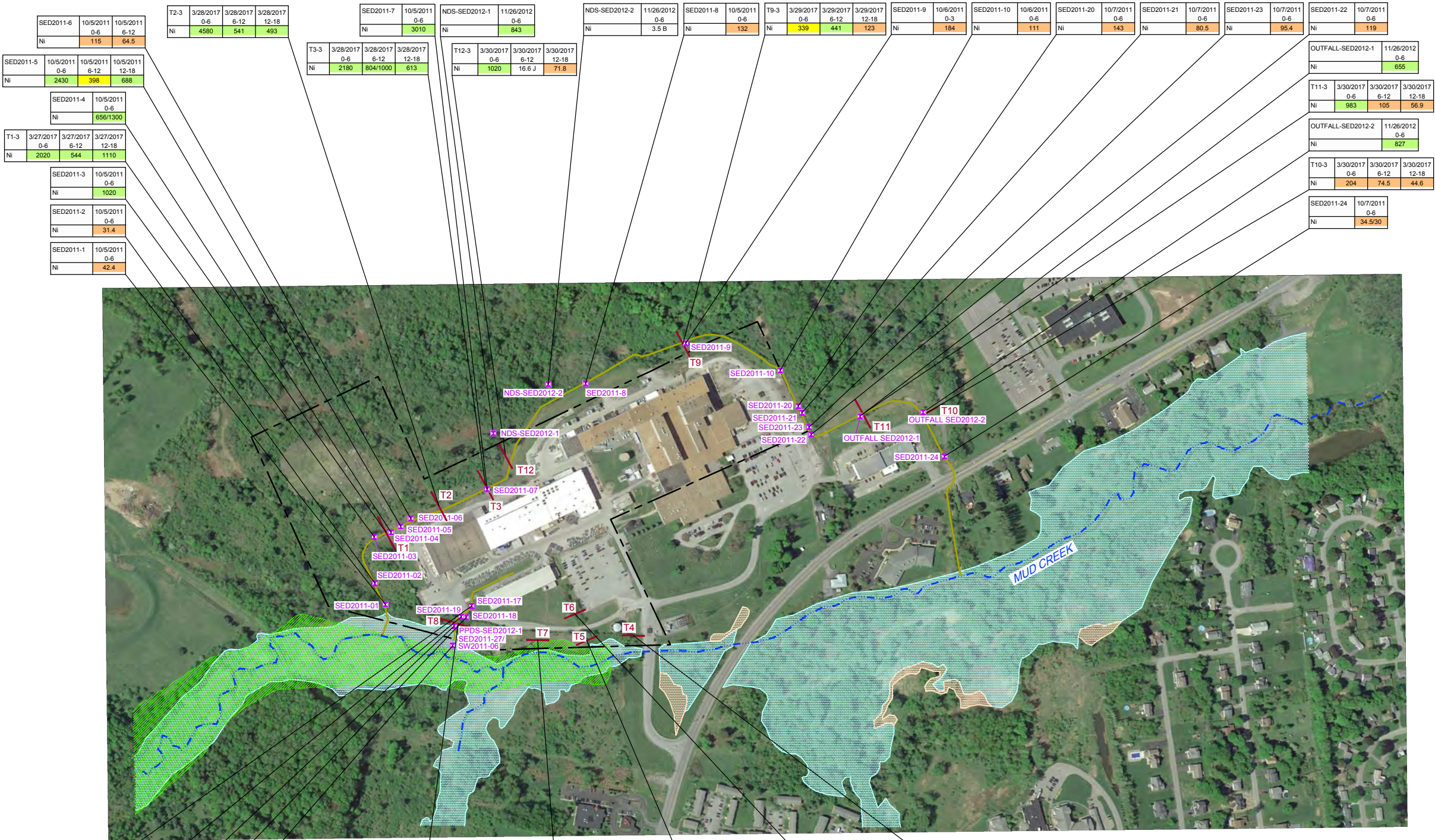
PCB SAMPLES-CENTERLINE OF DITCH
MULTIPLE CRITERIA
ON-SITE DITCHES



Source Reference:

Project Manager:	Reviewed By:	Date:
J.D.	P.K.	APRIL 2017
Scale:	Project N°:	Report N°:
1:250	86188-00	022
		Drawing N°:
		figure 2.9





SED2011-6	10/5/2011	0-6	6-12
Ni		115	64.5

SED2011-5	10/5/2011	0-6	6-12	10/5/2011	12-18
Ni		2430	335	688	

SED2011-4	10/5/2011	0-6
Ni		656/1300

T1-3	3/27/2017	0-6	6-12	12-18
Ni		2020	544	1110

SED2011-3	10/5/2011	0-6
Ni		1020

SED2011-2	10/5/2011	0-6
Ni		31.4

SED2011-1	10/5/2011	0-6
Ni		42.4

T2-3	3/28/2017	0-6	6-12	12-18
Ni		4580	541	493

SED2011-7	10/5/2011	0-6
Ni		3010

T3-3	3/28/2017	0-6	6-12	12-18
Ni		2180	804/1000	613

NDS-SED2012-1	11/26/2012	0-6
Ni		843

T12-3	3/30/2017	0-6	6-12	12-18
Ni		1020	16.6 J	71.8

NDS-SED2012-2	11/26/2012	0-6
Ni		3.5 B

SED2011-8	10/5/2011	0-6
Ni		132

T9-3	3/29/2017	0-6	6-12	12-18
Ni		339	441	123

SED2011-9	10/6/2011	0-3
Ni		184

SED2011-10	10/6/2011	0-6
Ni		111

SED2011-20	10/7/2011	0-6
Ni		143

SED2011-21	10/7/2011	0-6
Ni		80.5

SED2011-23	10/7/2011	0-6
Ni		95.4

SED2011-22	10/7/2011	0-6
Ni		119

OUTFALL-SED2012-1	11/26/2012	0-6
Ni		655

T11-3	3/30/2017	0-6	6-12	12-18
Ni		983	105	56.9

OUTFALL-SED2012-2	11/26/2012	0-6
Ni		827

T10-3	3/30/2017	0-6	6-12	12-18
Ni		204	74.5	44.6

SED2011-24	10/7/2011	0-6
Ni		34.9/30

SED2011-17	10/6/2011	0-6
Ni		125

SED2011-19	10/6/2011	0-6
Ni		686

PPDS-SED2012-1	11/26/2012	0-6
Ni		4260

SED2011-18	10/6/2011	0-6
Ni		840

SED2011-27	11/9/2011	0-6
Ni		288

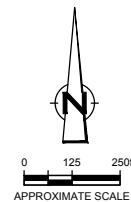
T8-3	3/29/2017	0-6	6-12	12-18
Ni		2200/2930	2480	2060

T7-3	3/29/2017	0-6	6-12	12-18
Ni		580	35.8	119

T5-3	3/28/2017	0-6	6-12	12-18
Ni		2220/4230	739	555

T6-3	3/29/2017	0-6	6-12	12-18
Ni		1200/2530	1910	795

T4-3	3/28/2017	0-6	6-12	12-18
Ni		88.1	163	290



LEGEND

- STREAMS
- DRAINAGE DITCH
- BCP SITE BOUNDARY
- SEDIMENT SAMPLE
- TRANSECT LOCATION
- STATE-REGULATED FRESHWATER WETLAND (FROM CUSIR, CORNELL UNIVERSITY GEOSPATIAL INFORMATION REPOSITORY)
- 100-YEAR FLOOD
- 500-YEAR FLOOD

SAMPLE LOCATION

SED2013-5	12/5/2013	0-3.6	48
Ni			

PARAMETER

0.039 [0.044] PARENT [DUPLICATE RESULT]
J ESTIMATED
U QUALIFIED NOT DETECTED ABOVE THE SAMPLE REPORT LIMIT

CRITERIA (mg/kg)

< 30	NO EXCEEDANCE
> 30.0 TO < 310	UNRESTRICTED / RESIDENTIAL / ECOLOGICAL EXCEEDANCE
> 310.0 TO < 400	COMMERCIAL EXCEEDANCE
> 400.0 TO < 10,000	SITE SPECIFIC EXCEEDANCE
> 10,000	INDUSTRIAL EXCEEDANCE

NOTES:

- AERIAL IMAGERY DATED MAY 13, 2015 © GOOGLE EARTH.
- (NEW YORK CENTRAL STATE PLANE NAD83 US SURVEY FOOT).
- BCP = BROWNFIELD CLEANUP PROGRAM.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

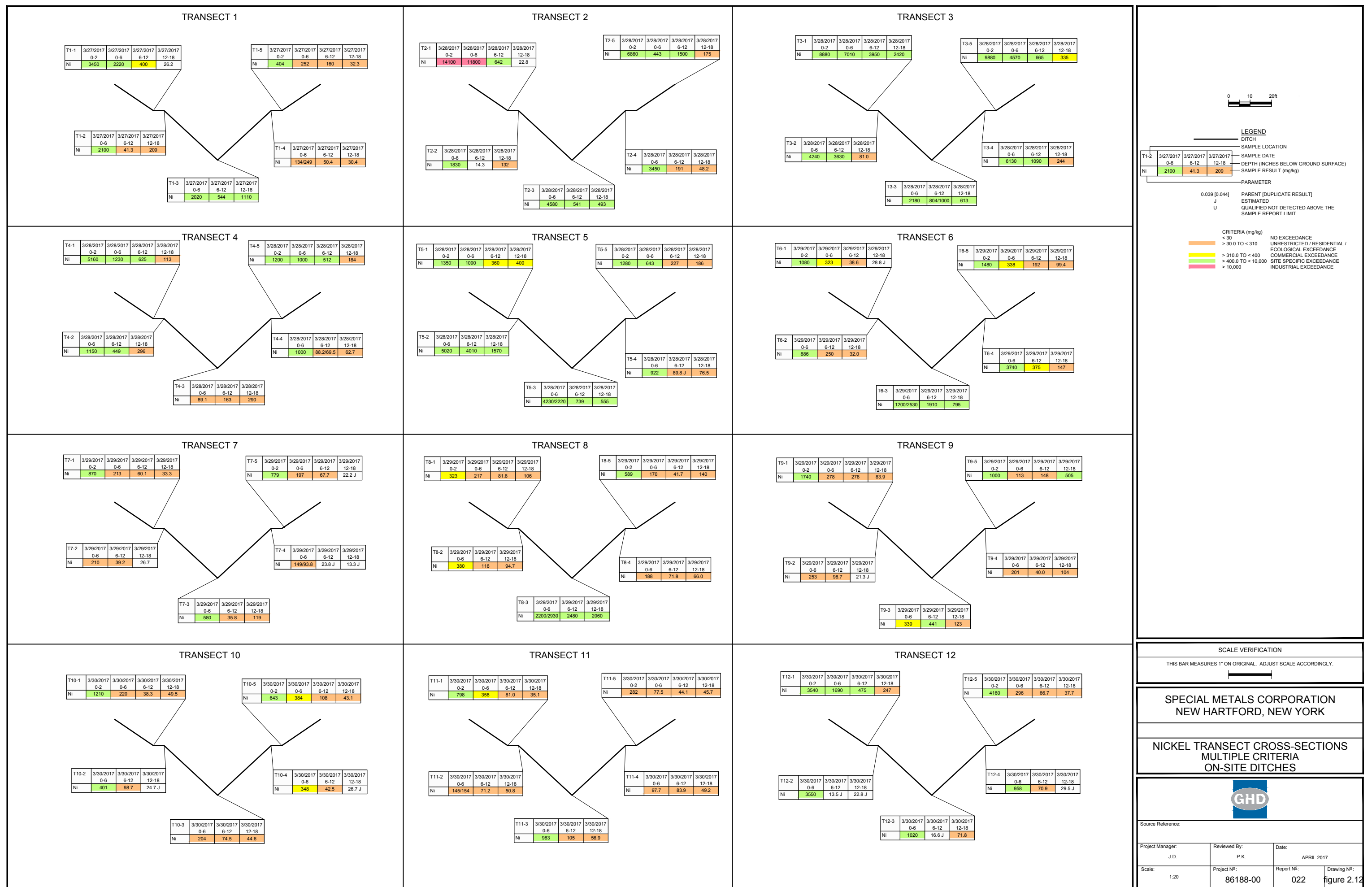
SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

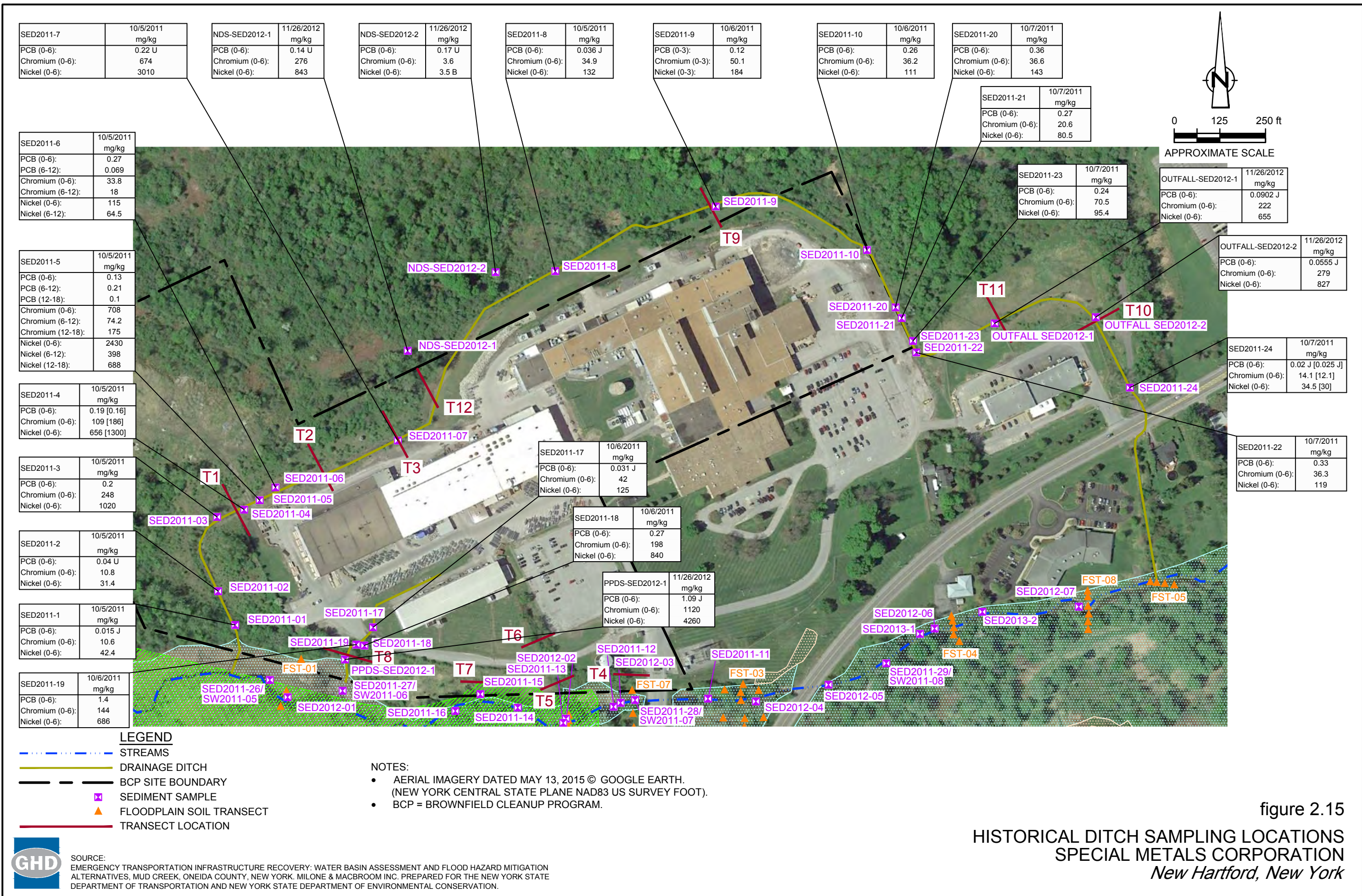
NICKEL SAMPLES-CENTERLINE OF DITCH
MULTIPLE CRITERIA
ON-SITE DITCHES



Source Reference:

Project Manager:	Reviewed By:	Date:
J.D.	P.K.	MAY 2017
Scale:	Project N°:	Report N°:
1:250	86188-00	022
		Drawing N°:
		figure 2.11





LEGEND

- STREAMS
- DRAINAGE DITCH
- BCP SITE BOUNDARY
- SEDIMENT SAMPLE
- TRANSECT LOCATION
- STATE-REGULATED FRESHWET WETLAND (FROM CUGIR: CORNELL UNIVERSITY GEOSPATIAL INFORMATION REPOSITORY)
- 100-YEAR FLOOD
- 500-YEAR FLOOD

MAP DATA:

SED2013-5	12/5/2013	DEPTH (INCHES BELOW GROUND SURFACE)	SAMPLE RESULT (mg/kg)	PARAMETER
NI		43		

CRITERIA (mg/kg)

- < 30
- > 30.0 TO < 310
- > 310.0 TO < 400
- > 400.0 TO < 10,000
- > 10,000

NO EXCEEDANCE

- UNRESTRICTED / RESIDENTIAL / ECOLOGICAL EXCEEDANCE
- COMMERCIAL EXCEEDANCE
- SITE SPECIFIC EXCEEDANCE
- INDUSTRIAL EXCEEDANCE

0.039 [0.044]

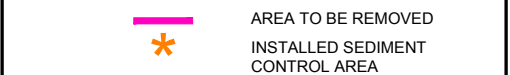
J

U

PARENT [DUPLICATE RESULT]

ESTIMATED

QUALIFIED NOT DETECTED ABOVE THE SAMPLE REPORT LIMIT



NOTES:

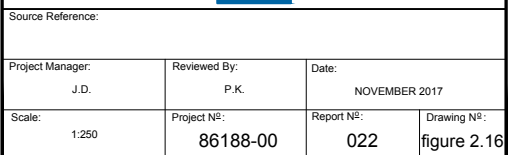
- AERIAL IMAGERY DATED MAY 13, 2015 © GOOGLE EARTH.
(NEW YORK CENTRAL STATE PLANE NAD83 US SURVEY FOOT).
- BCP = BROWNFIELD CLEANUP PROGRAM.

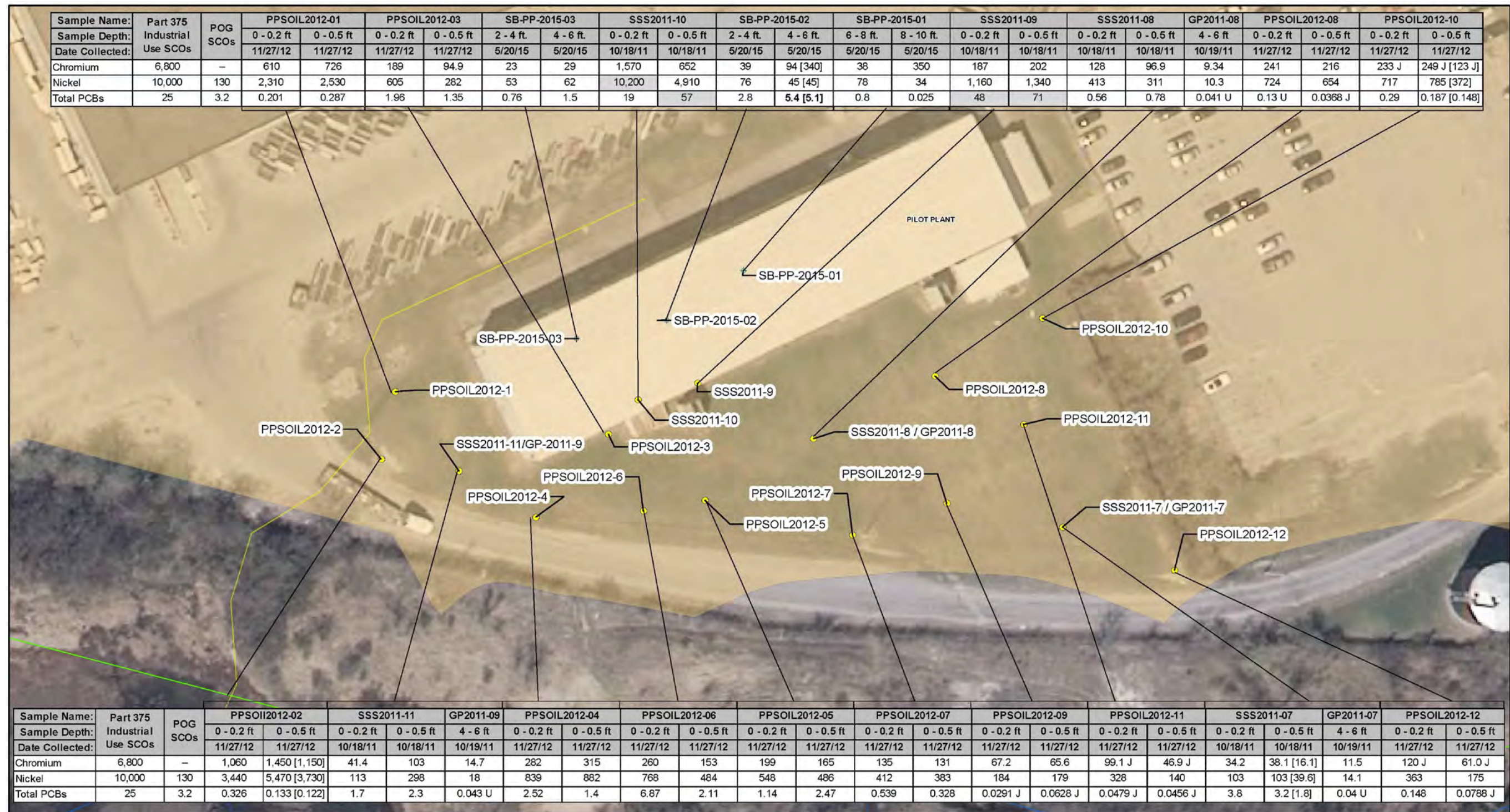
SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



NORTH ON-SITE
DITCH REMEDIATION AREAS

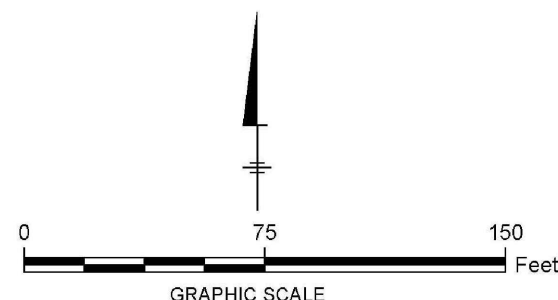




LEGEND

- SURFACE SOIL SAMPLE
- STREAMS
- DRAINAGE DITCH
- BCP SITE BOUNDARY
- ECOLOGICAL AREA

- NOTES:
- 2008 IMAGERY DOWNLOADED FROM NEW YORK STATEWIDE DIGITAL ORTHOIMAGERY PROGRAM (NYSODP).
 - BCP = BROWNFIELD CLEANUP PROGRAM
POG = PROTECTION OF GROUNDWATER
 - DATA RESULT UNITS IN MG/KG.
 - EXCEEDANCES OF PART 375 INDUSTRIAL SCO ARE SHADED
 - DATA QUALIFIERS:
B = CONSTITUENT DETECTED IN LABORATORY BLANK
J = ESTIMATED CONCENTRATION
U = COMPOUND QUANTITATION LIMIT
 - POG SCO APPLIES TO SUBSURFACE SOIL SAMPLES (>1 FT BGS)
 - EXCEEDANCES OF POG SCO ARE BOLD.

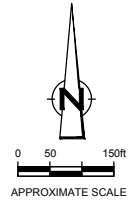
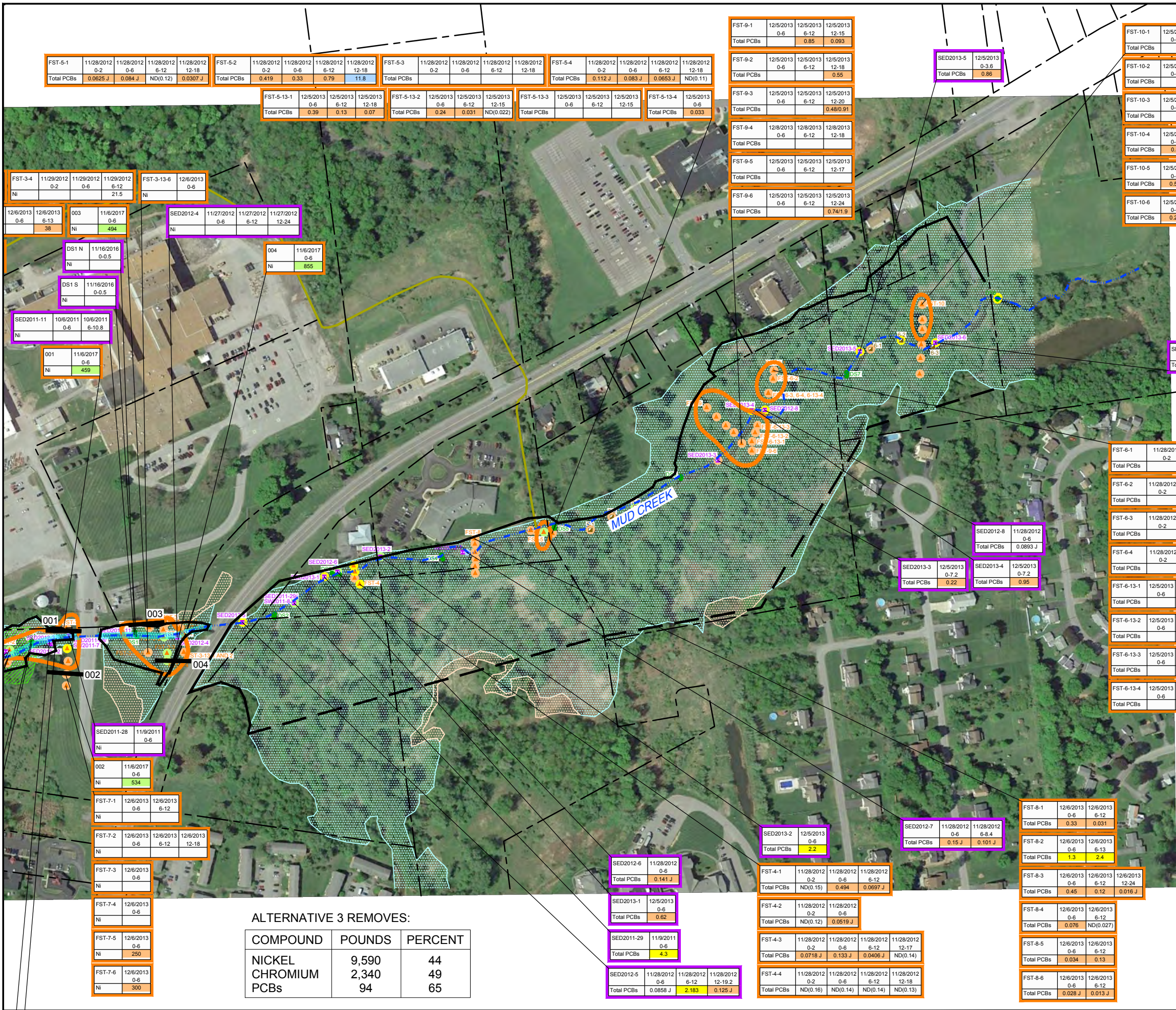


SOURCE: ARCADIS, REMEDIAL INVESTIGATION REPORT, BCP SITE NO. C633016, CHROMIUM, NICKEL, AND PCBs IN SOIL SAMPLES, PILOT PLANT AREA, FIGURE 16C, JUNE 22, 2016.

figure 2.17

CHROMIUM, NICKEL, AND PCBs IN
SOIL SAMPLES NEAR SOUTH DITCHES
SPECIAL METALS CORPORATION
New Hartford, New York





- LEGEND**
- STREAMS
 - DRAINAGE DITCH
 - PROPERTY BOUNDARY
 - WETLAND DELINEATION
 - SEDIMENT SAMPLE
 - PEEPER SEDIMENT SAMPLE LOCATION
 - FLOODPLAIN SOIL TRANSECT WITHIN WETLAND
 - FLOOD PLAIN SOIL SAMPLE LOCATION
 - STATE-REGULATED FRESHWATER WETLAND (FROM CUGIR: CORNELL UNIVERSITY GEOSPATIAL INFORMATION REPOSITORY)
 - 100-YEAR FLOOD
 - 500-YEAR FLOOD
 - CREEK EXCAVATION AREA
 - FLOODPLAIN EXCAVATION AREA (MINIMUM EXPECTED)

ALTERNATIVE NO.3 SITE SPECIFIC WITH CONSIDERATION		
	SEDIMENT	WETLAND/FLOODPLAIN
PCBs	> 1.0	> 1.0
Ni	> 400	> 400
Cr	> 200	> 200

PCB CONCENTRATIONS		SEDIMENT SAMPLE LOCATION	
SED2013-6	12/5/2013	SAMPLE DATE	
6-12	6-12	DEPTH (INCHES BELOW GROUND SURFACE)	
Total PCBs	0.25	SAMPLE RESULT (mg/kg)	
		PARAMETER	

SEDIMENT CRITERIA (mg/kg)	
< 0.1	NO EXCEEDANCE
> 0.1 TO < 1	UNRESTRICTED USE EXCEEDANCE
> 1.0	RESIDENTIAL EXCEEDANCE

FLOODPLAIN SAMPLE LOCATION	
FST-6-1	11/28/2012
0-6	SAMPLE DATE
0-6	DEPTH (INCHES BELOW GROUND SURFACE)
Total PCBs	0.537
0.537	SAMPLE RESULT (mg/kg)
PARAMETER	

FLOOD PLAIN CRITERIA (mg/kg)	
> 1 TO < 5	
> 5 TO < 10	
> 10 TO < 25	
> 25.0	
0.039 [0.044]	PARENT (DUPLICATE RESULT)
J	ESTIMATED
U	QUALIFIED NOT DETECTED ABOVE THE SAMPLE REPORT LIMIT

- NOTES:
- AERIAL IMAGERY DATED MAY 13, 2015 © GOOGLE EARTH.
 - NEW YORK CENTRAL STATE PLANE NAD83 US SURVEY FOOT.
 - BCP = BROWNFIELD CLEANUP PROGRAM.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

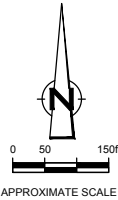
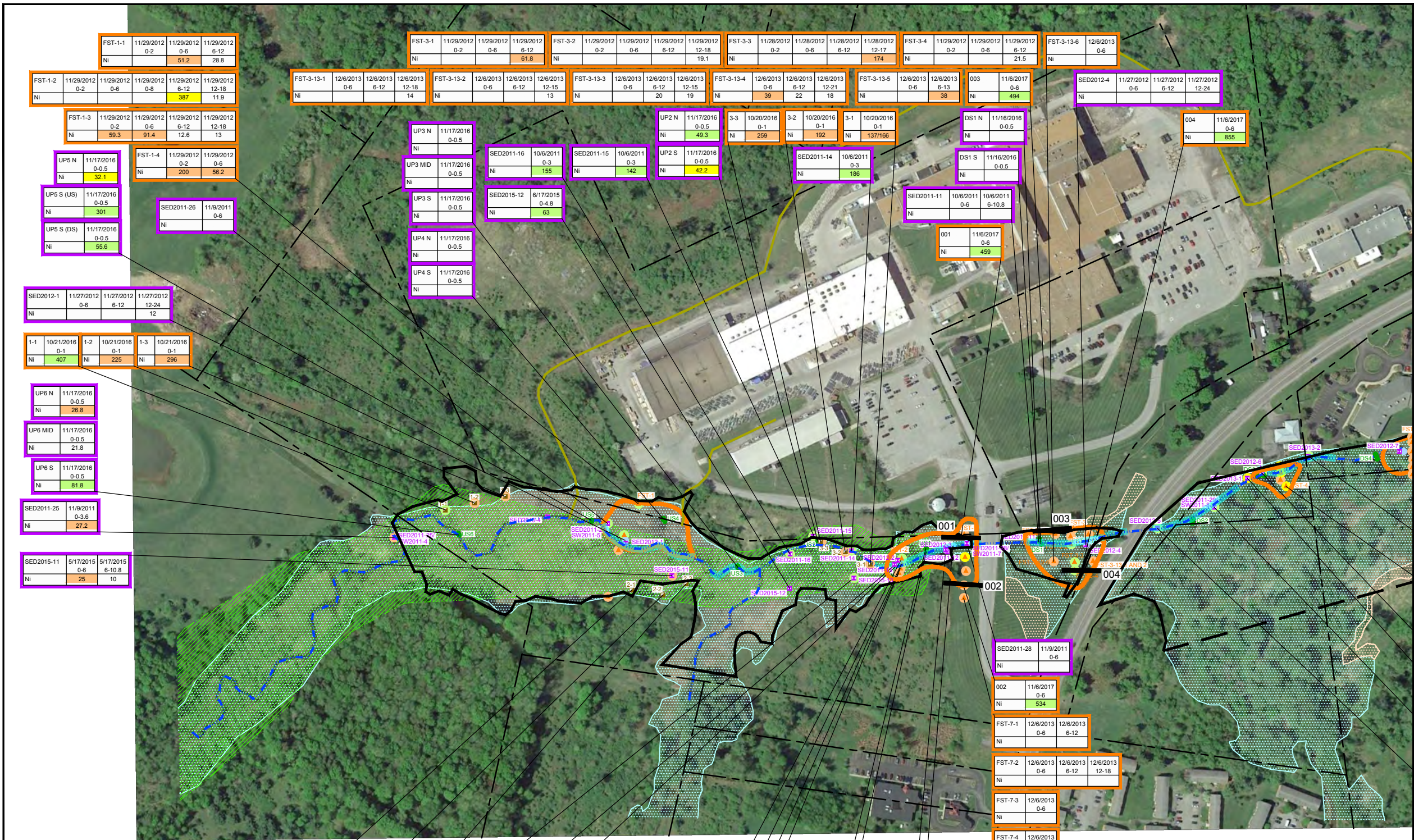
**SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK**

**ALTERNATIVE 3 - SITE SPECIFIC
(WITH CONSIDERATION) EXCAVATION AREAS
MUD CREEK (EAST)**



Source Reference:

Project Manager:	Reviewed By:	Date:
J.D.	P.K.	MAY 2017
Scale:	Project N°:	Report N°:
1:150	86188-00	022
		Drawing N°:
		figure 6.1b



- LEGEND**
- STREAMS
 - DRAINAGE DITCH
 - PROPERTY BOUNDARY
 - WETLAND DELINEATION
 - SEDIMENT SAMPLE
 - PEEPER SEDIMENT SAMPLE LOCATION
 - FLOODPLAIN SOIL TRANSECT WITHIN WETLAND
 - FLOOD PLAIN SOIL SAMPLE LOCATION
 - STATE-REGULATED FRESHWATER WETLAND (FROM CUGIR: CORNELL UNIVERSITY GEOSPATIAL INFORMATION REPOSITORY)
 - 100-YEAR FLOOD
 - 500-YEAR FLOOD
 - CREEK EXCAVATION AREA
 - FLOODPLAIN EXCAVATION AREA (MINIMUM EXPECTED)
 - WORM SAMPLING LOCATION

ALTERNATIVE NO.4 SITE SPECIFIC		
	SEDIMENT	WETLAND/FLOODPLAIN
PCBs	> 1.0	> 1.0
Ni	> 400	> 400
Cr	> 200	> 200

NICKEL CONCENTRATIONS

SEDIMENT SAMPLE LOCATION	
SED2013-5	12/5/2013
SAMPLE DATE	
0-3.6	
DEPTH (INCHES BELOW GROUND SURFACE)	
SAMPLE RESULT (mg/kg)	
45	
PARAMETER	

SEDIMENT CRITERIA (mg/kg)

< 23	NO EXCEEDANCE
> 23.0 TO < 30	CLASS B EXCEEDANCE
> 30.0 TO < 49	ECOLOGICAL EXCEEDANCE
> 49.0 TO < 400	CLASS C EXCEEDANCE
> 400.0	SITE SPECIFIC EXCEEDANCE

FLOODPLAIN SAMPLE LOCATION

FST-6-1	11/29/2012
SAMPLE DATE	
0-2	
DEPTH (INCHES BELOW GROUND SURFACE)	
SAMPLE RESULT (mg/kg)	
262	
PARAMETER	

FLOOD PLAIN CRITERIA (mg/kg)

< 30	NO EXCEEDANCE
> 30.0 TO < 310	UNRESTRICTED / RESIDENTIAL /
	ECOLOGICAL EXCEEDANCE
> 310.0 TO < 400	COMMERCIAL EXCEEDANCE
> 400.0 TO < 10,000	SITE SPECIFIC EXCEEDANCE
> 10,000	INDUSTRIAL EXCEEDANCE

0.039 [0.044] PARENT (DUPLICATE RESULT)
J ESTIMATED
U QUALIFIED NOT DETECTED ABOVE THE
SAMPLE REPORT LIMIT

- NOTES:**
- AERIAL IMAGERY DATED MAY 13, 2015 © GOOGLE EARTH.
 - NEW YORK CENTRAL STATE PLANE NAD83 US SURVEY FOOT.
 - BCP = BROWNFIELD CLEANUP PROGRAM.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

**SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK**

**ALTERNATIVE 4 - SITE SPECIFIC
(WITHOUT CONSIDERATION) EXCAVATION AREAS
MUD CREEK (WEST)**



Source Reference:

Project Manager:	Reviewed By:	Date:
J.D.	P.K.	MAY 2017
Scale:	Project N°:	Report N°:
1:150	86188-00	022
		Drawing N°:
		figure 6.2a

ALTERNATIVE 4 REMOVES:

COMPOUND	POUNDS	PERCENT
NICKEL	12,850	59
CHROMIUM	3,460	73
PCBs	123	82

2-1	10/21/2016	2-2	10/21/2016	2-3	10/21/2016
	0-1		0-1		0-1
Ni	52.2	Ni	90.4	Ni	64.0

SED2015-13	6/17/2015	6/17/2015
	0-6	6-12
Ni	62	28

SED2012-2	11/27/2012	11/27/2012	11/27/2012
	0-6	6-12	12-18
Ni			363

SED2011-13	10/6/2011 0-3
Ni	

FST-2-1	11/29/2012	11/29/2012	11/29/2012	11/29/2012
	0-2	0-6	6-12	12-18
Ni			7.5	15.1

FST-2-2	11/29/2012	11/29/2012	11/29/2012
	0-2	0-6	6-12
Ni			45.2

FST-2-3	11/29/2012	11/29/2012	11/29/2012	11/29/2012
	0-2	0-6	6-12	12-18
NI	266	165	61.2	20.3

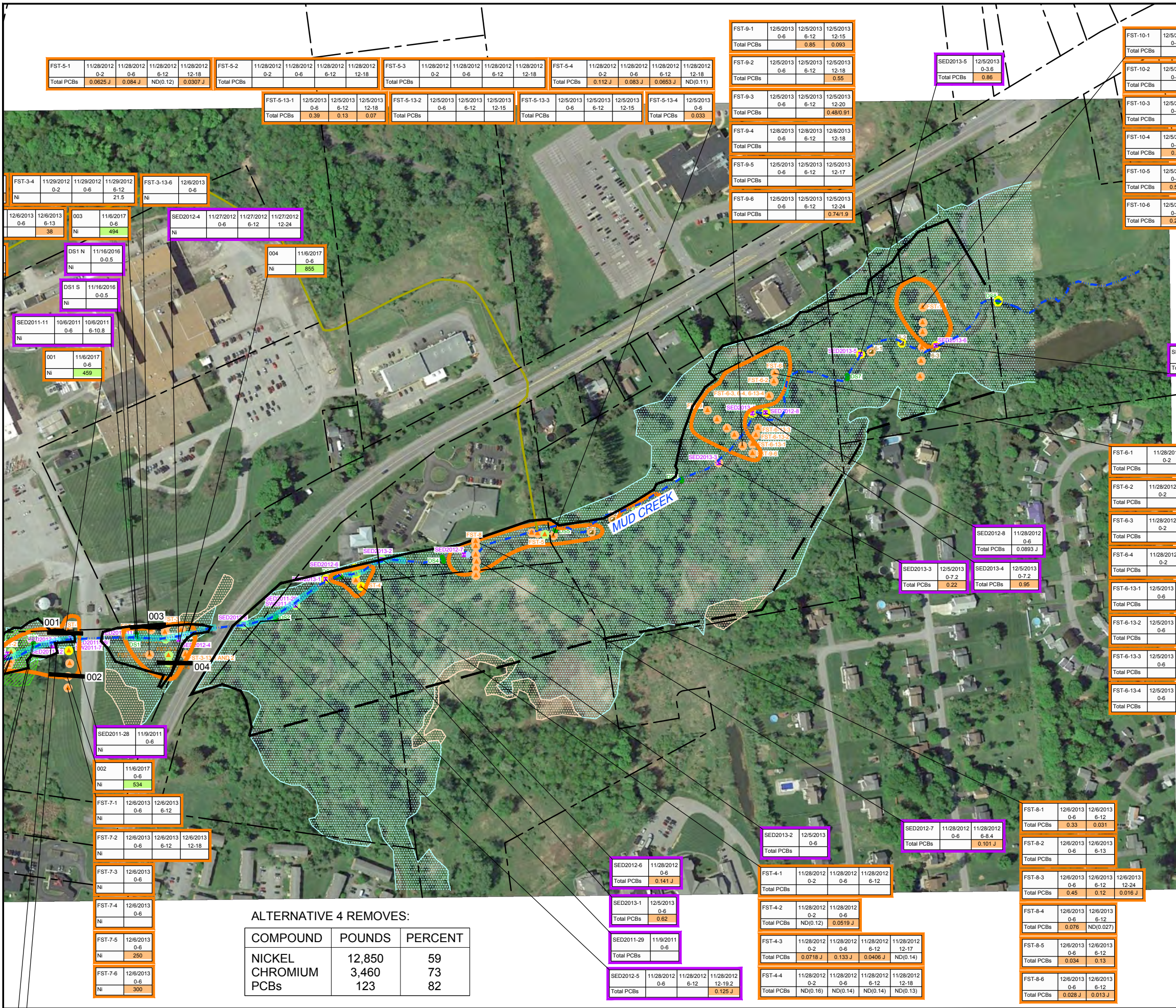
FST-2-4	11/29/2012	11/29/2012	11/29/2012
	0-2	0-6	6-12
Ni	195	71.5	20.5

UP1 N	11/16/2016
	0-0.5
Ni	

UP1 S	11/16/2016 0-0.5
Ni	

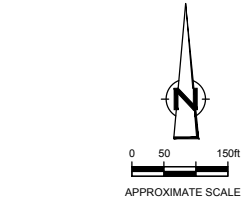
SED2011-12	10/6/2011 0-6
Ni	

SED2012-3	11/27/2012	11/27/2012
	0-6	6-10.8
Ni		



ALTERNATIVE 4 REMOVES:

COMPOUND	POUNDS	PERCENT
NICKEL	12,850	59
CHROMIUM	3,460	73
PCBs	123	82



- LEGEND**
- STREAMS
 - DRAINAGE DITCH
 - PROPERTY BOUNDARY
 - WETLAND DELINEATION
 - SEDIMENT SAMPLE
 - PEEPER SEDIMENT SAMPLE LOCATION
 - FLOODPLAIN SOIL SAMPLE LOCATION
 - STATE-REGULATED FRESHWATER WETLAND (FROM CUGIR: CORNELL UNIVERSITY GEOSPATIAL INFORMATION REPOSITORY)
 - 100-YEAR FLOOD
 - 500-YEAR FLOOD
 - CREEK EXCAVATION AREA
 - FLOODPLAIN EXCAVATION AREA (MINIMUM EXPECTED)

ALTERNATIVE NO 4 SITE SPECIFIC		
PCBs	SEDIMENT	WETLAND/FLOODPLAIN
Ni	> 1.0	> 1.0
Cr	> 400	> 400

PCB CONCENTRATIONS		SEDIMENT SAMPLE LOCATION	
SED2013-6	12/5/2013	SAMPLE DATE	6-12
Total PCBs	0.25	DEPTH (INCHES BELOW GROUND SURFACE)	0.25
		SAMPLE RESULT (mg/kg)	PARAMETER

SEDIMENT CRITERIA (mg/kg)	
< 0.1	NO EXCEEDANCE
> 0.1 TO < 1	UNRESTRICTED USE EXCEEDANCE
> 1.0	RESIDENTIAL EXCEEDANCE

FLOODPLAIN SAMPLE LOCATION	
FST-6-1	11/28/2012
Total PCBs	0.537
SAMPLE DATE	0-6
DEPTH (INCHES BELOW GROUND SURFACE)	0.537
SAMPLE RESULT (mg/kg)	PARAMETER

FLOOD PLAIN CRITERIA (mg/kg)	
> 1 TO < 5	PARENT [DUPLICATE RESULT]
> 5 TO < 10	ESTIMATED
> 10 TO < 25	QUALIFIED NOT DETECTED ABOVE THE
> 25.0	SAMPLE REPORT LIMIT

- NOTES:
- AERIAL IMAGERY DATED MAY 13, 2015 © GOOGLE EARTH.
 - NEW YORK CENTRAL STATE PLANE NAD83 US SURVEY FOOT.
 - BCP = BROWNFIELD CLEANUP PROGRAM.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 4 - SITE SPECIFIC
(WITHOUT CONSIDERATION) EXCAVATION AREAS
MUD CREEK (EAST)



Source Reference:

Project Manager:	Reviewed By:	Date:
J.D.	P.K.	MAY 2017
Scale:	Project N°:	Report N°:
1:150	86188-00	022
		figure 6.2b

FST-1-1	11/29/2012	11/29/2012	11/29/2012
Ni	0-2	0-6	28.8

FST-1-2	11/29/2012	11/29/2012	11/29/2012	11/29/2012
Ni	0-2	0-6	0-8	12-18

FST-1-3	11/29/2012	11/29/2012	11/29/2012	11/29/2012
Ni	0-2	0-6	6-12	12-18

UP5 N	11/17/2016	0-0.5
Ni		

UP5 S (US)	11/17/2016	0-0.5
Ni		

UP5 S (DS)	11/17/2016	0-0.5
Ni		

SED2012-1	11/27/2012	11/27/2012	11/27/2012
Ni	0-6	6-12	12-24

1-1	10/21/2016	0-1
Ni		407

1-2	10/21/2016	0-1
Ni		225

1-3	10/21/2016	0-1
Ni		296

UP6 N	11/17/2016	0-0.5
Ni		26.8

UP6 MID	11/17/2016	0-0.5
Ni		21.8

UP6 S	11/17/2016	0-0.5
Ni		81.8

SED2011-25	11/9/2011	0-3.6
Ni		27.2

SED2015-11	5/17/2015	5/17/2015
Ni	0-6	6-10.8

FST-3-1	11/29/2012	11/29/2012	11/29/2012	11/29/2012
Ni	0-2	0-6	6-12	61.8

FST-3-2	11/29/2012	11/29/2012	11/29/2012	11/29/2012
Ni	0-2	0-6	6-12	19.1

FST-3-3	11/28/2012	11/28/2012	11/28/2012	11/28/2012
Ni	0-2	0-6	6-12	174

FST-3-4	11/29/2012	11/29/2012	11/29/2012	11/29/2012
Ni	0-2	0-6	6-12	21.5

FST-3-13-6	12/6/2013	0-6
Ni		

FST-3-13-1	12/6/2013	12/6/2013	12/6/2013	12/6/2013
Ni	0-6	6-12	12-18	14

FST-3-13-2	12/6/2013	12/6/2013	12/6/2013	12/6/2013
Ni	0-6	6-12	12-15	13

FST-3-13-3	12/6/2013	12/6/2013	12/6/2013	12/6/2013
Ni	0-6	6-12	12-15	20

FST-3-13-4	12/6/2013	12/6/2013	12/6/2013	12/6/2013
Ni	0-6	6-12	12-21	18

FST-3-13-5	12/6/2013	12/6/2013	12/6/2013	12/6/2013
Ni	0-6	6-13	6-13	38

003	11/6/2017	0-6
Ni		494

SED2012-4	11/27/2012	11/27/2012	11/27/2012
Ni	0-6	6-12	12-24

004	11/6/2017	0-6
Ni		855

UP3 N	11/17/2016	0-0.5
Ni		

UP3 MID	11/17/2016	0-0.5
Ni		

UP3 S	11/17/2016	0-0.5
Ni		

UP4 N	11/17/2016	0-0.5
Ni		

UP4 S	11/17/2016	0-0.5
Ni		

SED2011-16	10/6/2011	0-3
Ni		

SED2011-15	10/6/2011	0-3
Ni		

UP2 N	11/17/2016	0-0.5
Ni		49.3

UP2 S	11/17/2016	0-0.5
Ni		42.2

SED2011-14	10/6/2011	0-3
Ni		

DS1 N	11/16/2016	0-0.5
Ni		

DS1 S	11/16/2016	0-0.5
Ni		

SED2011-11	10/6/2011	0-6	6-10.8
Ni			

001	11/6/2017	0-6
Ni		459

APPROXIMATE SCALE

LEGEND

- STREAMS
- DRAINAGE DITCH
- PROPERTY BOUNDARY
- WETLAND DELINEATION
- POWER TOWER AND POWER LINE
- SEDIMENT SAMPLE
- PEEPER SEDIMENT SAMPLE LOCATION
- FLOODPLAIN SOIL TRANSECT WITHIN WETLAND
- FLOOD PLAIN SOIL SAMPLE LOCATION
- STATE-REGULATED FRESHWATER WETLAND (FROM CUGIR: CORNELL UNIVERSITY GEOSPATIAL INFORMATION REPOSITORY)
- 100-YEAR FLOOD
- 500-YEAR FLOOD
- CREEK EXCAVATION AREA
- FLOODPLAIN EXCAVATION AREA (MINIMUM EXPECTED)
- WORM SAMPLING LOCATION

ALTERNATIVE NO.5

	RESIDENTIAL/CLASS C SEDIMENT	RESIDENTIAL WETLAND/FLOODPLAIN
PCBs	> 1.0	> 1.0
Ni	> 49	> 140
Cr	> 36	> 36

NICKEL CONCENTRATIONS

SEDIMENT SAMPLE LOCATION

SED2013-5	12/5/2013	0-3.6
Ni		45

PARAMETER

SEDIMENT CRITERIA (mg/kg)

< 23	NO EXCEEDANCE
> 23.0 TO < 30	CLASS B EXCEEDANCE
> 30.0 TO < 49	ECOLOGICAL EXCEEDANCE
> 49.0 TO < 400	CLASS C EXCEEDANCE
> 400.0	SITE SPECIFIC EXCEEDANCE

FLOODPLAIN SAMPLE LOCATION

FST-6-1	11/28/2012	0-2
Ni		262

PARAMETER

FLOOD PLAIN CRITERIA (mg/kg)

< 30	NO EXCEEDANCE
> 30.0 TO < 310	UNRESTRICTED / RESIDENTIAL / ECOLOGICAL EXCEEDANCE
> 310.0 TO < 400	COMMERCIAL EXCEEDANCE
> 400.0 TO < 10,000	SITE SPECIFIC EXCEEDANCE
> 10,000	INDUSTRIAL EXCEEDANCE

0.039 [0.044]	PARENT (DUPLICATE RESULT)
J	ESTIMATED
U	QUALIFIED NOT DETECTED ABOVE THE SAMPLE REPORT LIMIT

- NOTES:
- AERIAL IMAGERY DATED MAY 13, 2015 © GOOGLE EARTH.
 - NEW YORK CENTRAL STATE PLANE NAD83 US SURVEY FOOT.
 - BCP = BROWNFIELD CLEANUP PROGRAM.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 5A
RESTRICTED RESIDENTIAL
EXCAVATION AREAS - MUD CREEK (WEST)



Source Reference:

Project Manager: J.D.	Reviewed By: P.K.	Date: FEBRUARY 2018	
Scale: 1:150	Project N°: 86188-00	Report N°: 022	Drawing N°: figure 6.3a

ALTERNATIVE 5A REMOVES:

COMPOUND	POUNDS	PERCENT
NICKEL	13,520	63
CHROMIUM	3,530	74
PCBs	123	82

2-1	10/21/2016	0-1
Ni		52.2

2-2	10/21/2016	0-1
Ni		90.4

2-3	10/21/2016	0-1
Ni		64.0

SED2015-13	8/17/2015	8/17/2015
Ni	0-6	6-12

SED2012-2	11/27/2012	11/27/2012	11/27/2012
Ni	0-6	6-12	12-18

SED2011-13	10/6/2011	0-3
Ni		

FST-2-1	11/29/2012	11/29/2012	11/29/2012	11/29/2012
Ni	0-2	0-6	6-12	12-18

FST-2-2	11/29/2012	11/29/2012	11/29/2012	11/29/2012
Ni	0-2	0-6	6-12	45.2

FST-2-3	11/29/2012	11/29/2012	11/29/2012	11/29/2012
Ni	0-2	0-6	6-12	12-18

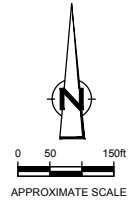
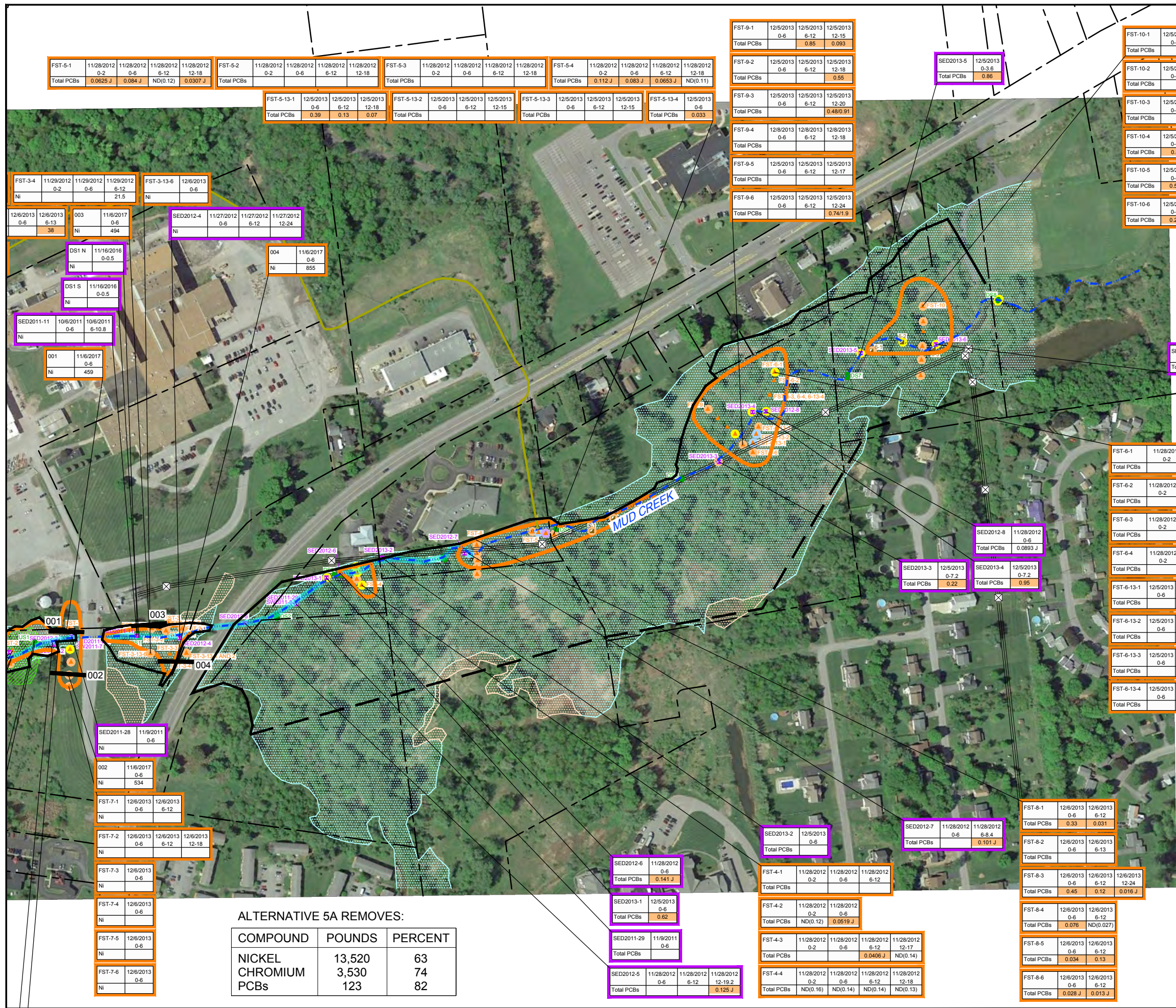
FST-2-4	11/29/2012	11/29/2012	11/29/2012	11/29/2012
Ni	0-2	0-6	6-12	20.5

UP1 N	11/16/2016	0-0.5
Ni		

UP1 S	11/16/2016	0-0.5
Ni		

SED2011-12	10/6/2011	0-6
Ni		

SED2012-3	11/27/2012	11/27/2012	11/27/2012
Ni	0-6	6-10.8	



- LEGEND**
- STREAMS
 - DRAINAGE DITCH
 - PROPERTY BOUNDARY
 - WETLAND DELINEATION
 - POWER TOWER AND POWER LINE
 - SEDIMENT SAMPLE
 - PEPPER SEDIMENT SAMPLE LOCATION
 - FLOODPLAIN SOIL TRANSECT WITHIN WETLAND
 - FLOOD PLAIN SOIL SAMPLE LOCATION
 - STATE-REGULATED FRESHWATER WETLAND (FROM CUGIR, CORNELL UNIVERSITY GEOSPATIAL INFORMATION REPOSITORY)
 - 100-YEAR FLOOD
 - 500-YEAR FLOOD
 - CREEK EXCAVATION AREA
 - FLOODPLAIN EXCAVATION AREA (MINIMUM EXPECTED)

ALTERNATIVE NO.5		
	RESIDENTIAL/CLASS C SEDIMENT	RESIDENTIAL WETLAND/FLOODPLAIN
PCBs	> 1.0	> 1.0
Ni	> 49	> 140
Cr	> 36	> 36

PCB CONCENTRATIONS		SEDIMENT SAMPLE LOCATION	
SED2013-6	12/5/2013	SAMPLE DATE DEPTH (INCHES BELOW GROUND SURFACE) SAMPLE RESULT (mg/kg) PARAMETER	
0-6	6-12		
Total PCBs	0.25		

SEDIMENT CRITERIA (mg/kg)		SEDIMENT SAMPLE LOCATION	
< 0.1	NO EXCEEDANCE		
> 0.1 TO < 1	UNRESTRICTED USE EXCEEDANCE		
> 1.0	RESIDENTIAL EXCEEDANCE		

FLOODPLAIN SAMPLE LOCATION		FLOOD PLAIN CRITERIA (mg/kg)	
FST-6-1	11/28/2012	SAMPLE DATE DEPTH (INCHES BELOW GROUND SURFACE) SAMPLE RESULT (mg/kg) PARAMETER	
0-6	6-12		
Total PCBs	0.537		

FLOOD PLAIN CRITERIA (mg/kg)		FLOOD PLAIN CRITERIA (mg/kg)	
> 1 TO < 5		> 1 TO < 5	
> 5 TO < 10		> 5 TO < 10	
> 10 TO < 25		> 10 TO < 25	
> 25.0		> 25.0	

- NOTES:
- AERIAL IMAGERY DATED MAY 13, 2015 © GOOGLE EARTH. (NEW YORK CENTRAL STATE PLANE NAD83 US SURVEY FOOT).
 - BCP = BROWNFIELD CLEANUP PROGRAM.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



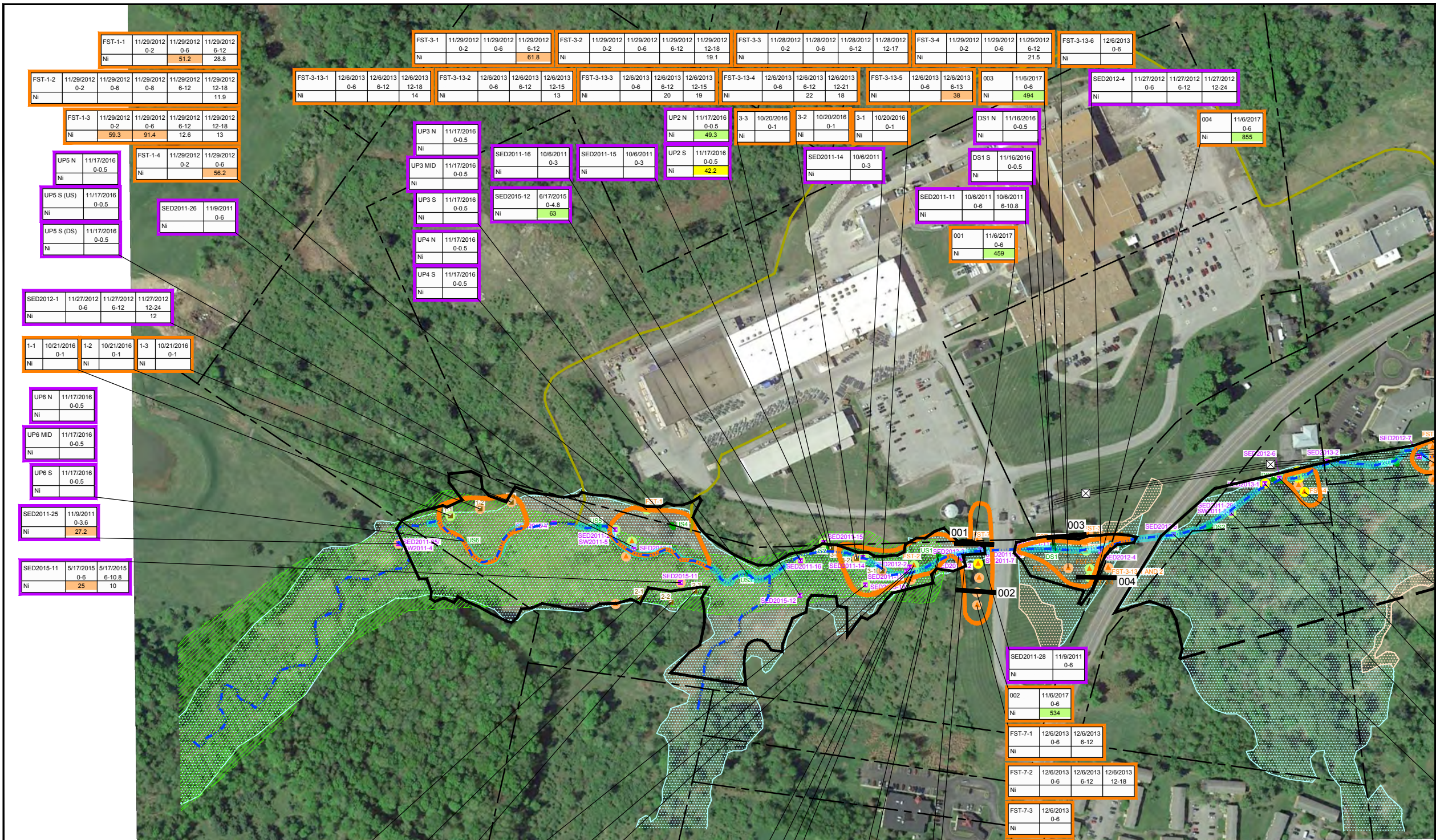
**SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK**

**ALTERNATIVE 5A
RESTRICTED RESIDENTIAL
EXCAVATION AREAS - MUD CREEK (EAST)**



Source Reference:

Project Manager:	Reviewed By:	Date:
J.D.	P.K.	FEBRUARY 2018
Scale:	Project N°:	Report N°:
1:150	86188-00	022
		Drawing N°:
		figure 6.3b



0 50 150ft
APPROXIMATE SCALE

LEGEND

- STREAMS
- DRAINAGE DITCH
- PROPERTY BOUNDARY
- WETLAND DELINEATION
- POWER TOWER AND POWER LINE
- SEDIMENT SAMPLE
- PEPPER SEDIMENT SAMPLE LOCATION
- FLOODPLAIN SOIL TRANSECT WITHIN WETLAND
- FLOOD PLAIN SOIL SAMPLE LOCATION
- STATE-REGULATED FRESHWATER WETLAND (FROM CUGIR: CORNELL UNIVERSITY GEOSPATIAL INFORMATION REPOSITORY)
- 100-YEAR FLOOD
- 500-YEAR FLOOD
- CREEK EXCAVATION AREA
- FLOODPLAIN EXCAVATION AREA (MINIMUM EXPECTED)
- WORM SAMPLING LOCATION

ALTERNATIVE NO.5		
	RESIDENTIAL/CLASS C SEDIMENT	RESIDENTIAL WETLAND/FLOODPLAIN
PCBs	> 1.0	> 1.0
Ni	> 49	> 140
Cr	> 36	> 36

NICKEL CONCENTRATIONS

SEDIMENT SAMPLE LOCATION

SEDIMENT	SAMPLE DATE	DEPTH (INCHES BELOW GROUND SURFACE)	SAMPLE RESULT (mg/kg)
SED2013-5	12/5/2013	0-3.6	45

PARAMETER

SEDIMENT CRITERIA (mg/kg)

CRITERIA	NO EXCEEDANCE	CLASS B EXCEEDANCE	ECOLOGICAL EXCEEDANCE	CLASS C EXCEEDANCE	SITE SPECIFIC EXCEEDANCE
< 23					
> 23.0 TO < 30					
> 30.0 TO < 49					
> 49.0 TO < 400					
> 400.0					

FLOODPLAIN SAMPLE LOCATION

FST	SAMPLE DATE	DEPTH (INCHES BELOW GROUND SURFACE)	SAMPLE RESULT (mg/kg)
FST-6-1	11/29/2012	0-2	262

PARAMETER

FLOOD PLAIN CRITERIA (mg/kg)

CRITERIA	NO EXCEEDANCE	UNRESTRICTED / RESIDENTIAL / ECOLOGICAL EXCEEDANCE	COMMERCIAL EXCEEDANCE	SITE SPECIFIC EXCEEDANCE	INDUSTRIAL EXCEEDANCE
< 30					
> 30.0 TO < 310					
> 310.0 TO < 400					
> 400.0 TO < 10,000					
> 10,000					

0.039 [0.044] PARENT (DUPLICATE RESULT)
J ESTIMATED
U QUALIFIED NOT DETECTED ABOVE THE SAMPLE REPORT LIMIT

NOTES:
• AERIAL IMAGERY DATED MAY 13, 2015 © GOOGLE EARTH.
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• BCP = BROWNFIELD CLEANUP PROGRAM.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

**SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK**

**ALTERNATIVE 5B - CLASS C/RESIDENTIAL
EXCAVATION AREAS
MUD CREEK (WEST)**

GHD

Source Reference:

Project Manager:	Reviewed By:	Date:
J.D.	P.K.	MAY 2017

Scale:	Project N°:	Report N°:	Drawing N°:
1:150	86188-00	022	figure 6.4a

ALTERNATIVE 5B REMOVES:

COMPOUND	POUNDS	PERCENT
NICKEL	15,330	71
CHROMIUM	3,750	79
PCBs	131	89

2-1	10/21/2016	0-1	52.2
Ni			

2-2	10/21/2016	0-1	90.4
Ni			

2-3	10/21/2016	0-1	64.0
Ni			

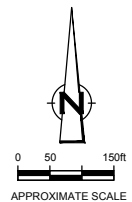
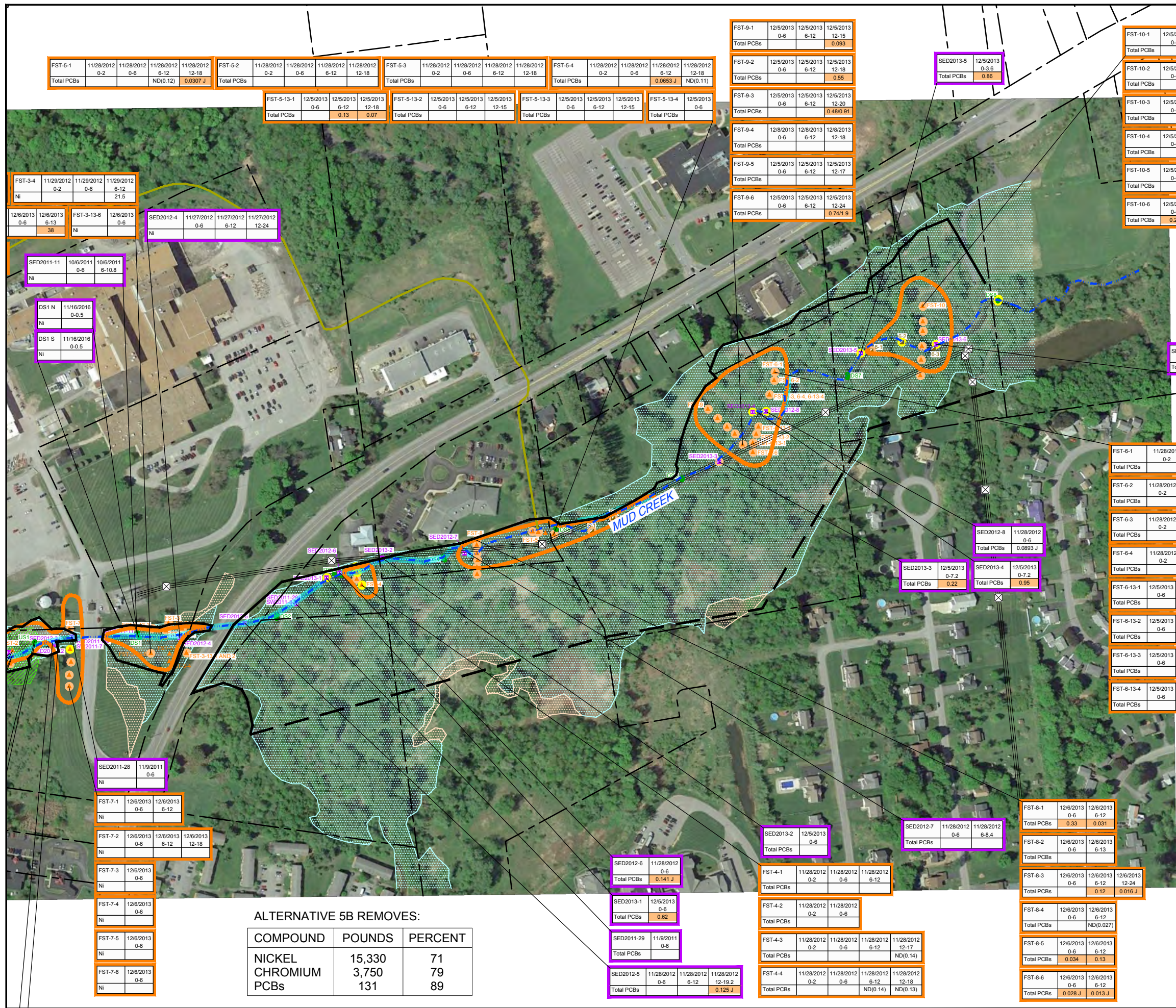
SED2015-13	6/17/2015	0-6	6-12
Ni		62	28

SED2012-2	11/27/2012	0-6	6-12	12-18
Ni				

SED2011-13	10/6/2011	0-3	
Ni			

FST-2-1	11/29/2012	0-2	6-12	12-18
FST-2-2	11/29/2012	0-2	6-12	12-18
FST-2-3	11/29/2012	0-2	6-12	12-18
FST-2-4	11/29/2012	0-2	6-12	12-18

UP1 N	11/16/2016	0-0.5	
UP1 S	11/16/2016	0-0.5	
SED2011-12	10/6/2011	0-6	
SED2012-3	11/27/2012	0-6	6-10.8



- LEGEND**
- STREAMS
 - DRAINAGE DITCH
 - PROPERTY BOUNDARY
 - WETLAND DELINEATION
 - POWER TOWER AND POWER LINE
 - SEDIMENT SAMPLE
 - PEPPER SEDIMENT SAMPLE LOCATION
 - FLOODPLAIN SOIL TRANSECT WITHIN WETLAND
 - FLOOD PLAIN SOIL SAMPLE LOCATION
 - STATE-REGULATED FRESHWATER WETLAND (FROM CUGIR, CORNELL UNIVERSITY GEOSPATIAL INFORMATION REPOSITORY)
 - 100-YEAR FLOOD
 - 500-YEAR FLOOD
 - CREEK EXCAVATION AREA
 - FLOODPLAIN EXCAVATION AREA (MINIMUM EXPECTED)

ALTERNATIVE NO.5		
	RESIDENTIAL/CLASS C SEDIMENT	RESIDENTIAL WETLAND/FLOODPLAIN
PCBs	> 1.0	> 1.0
Ni	> 49	> 140
Cr	> 36	> 36

PCB CONCENTRATIONS		SEDIMENT SAMPLE LOCATION	
SED2013-6	12/5/2013	SAMPLE DATE	
6-12		DEPTH (INCHES BELOW GROUND SURFACE)	
Total PCBs	0.25	SAMPLE RESULT (mg/kg)	
		PARAMETER	

SEDIMENT CRITERIA (mg/kg)	
< 0.1	NO EXCEEDANCE
> 0.1 TO < 1	UNRESTRICTED USE EXCEEDANCE
> 1.0	RESIDENTIAL EXCEEDANCE

FLOODPLAIN SAMPLE LOCATION	
FST-6-1	11/28/2012
0-6	
Total PCBs	0.537
	PARAMETER

FLOOD PLAIN CRITERIA (mg/kg)	
> 1 TO < 5	
> 5 TO < 10	
> 10 TO < 25	
> 25.0	
0.039 [0.044]	PARENT [DUPLICATE RESULT]
J	ESTIMATED
U	QUALIFIED NOT DETECTED ABOVE THE SAMPLE REPORT LIMIT

- NOTES:**
- AERIAL IMAGERY DATED MAY 13, 2015 © GOOGLE EARTH.
 - NEW YORK CENTRAL STATE PLANE NAD83 US SURVEY FOOT.
 - BCP = BROWNFIELD CLEANUP PROGRAM.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

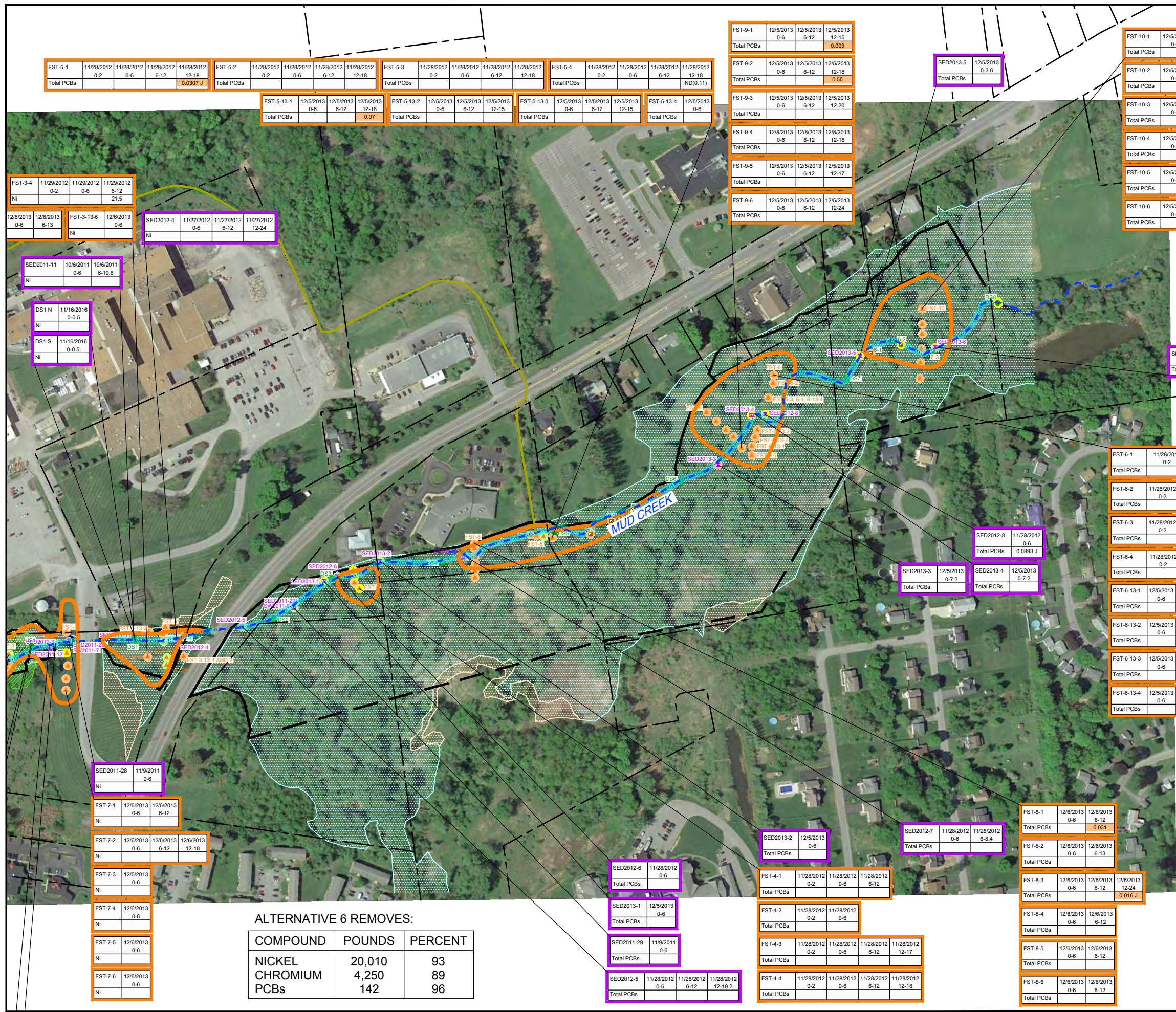
ALTERNATIVE 5B - CLASS C/RESIDENTIAL
EXCAVATION AREAS
MUD CREEK (EAST)



Source Reference:			
Project Manager:	Reviewed By:	Date:	
J.D.	P.K.	MAY 2017	
Scale:	Project N°:	Report N°:	Drawing N°:
1:150	86188-00	022	figure 6.4b

ALTERNATIVE 5B REMOVES:		
COMPOUND	POUNDS	PERCENT
NICKEL	15,330	71
CHROMIUM	3,750	79
PCBs	131	89





0 50 150ft
APPROXIMATE SCALE

Legend

- STREAMS
- DRAINAGE DITCH
- PROPERTY BOUNDARY
- WETLAND DELINEATION
- SEDIMENT SAMPLE
- PEEPER SEDIMENT SAMPLE LOCATION
- FLOODPLAIN SOIL TRANSECT WITHIN WETLAND
- FLOOD PLAIN SOIL SAMPLE LOCATION
- STATE-REGULATED FRESHWATER WETLAND (FROM CUGIR: CORNELL UNIVERSITY GEOSPATIAL INFORMATION REPOSITORY)
- 100-YEAR FLOOD
- 500-YEAR FLOOD
- CREEK EXCAVATION AREA
- FLOODPLAIN EXCAVATION AREA (MINIMUM EXPECTED)

ALTERNATIVE NO.6		
	RESIDENTIAL/CLASS A SEDIMENT	RESIDENTIAL/ECOLOGICAL WETLAND/FLOODPLAIN
PCBs	> 0.1	> 1.0
Ni	> 23	> 30
Cr	> 36	> 36

PCB CONCENTRATIONS

SEDIMENT SAMPLE LOCATION	SEDIMENT CRITERIA (mg/kg)
SED2013-6	< 0.1
SED2013-6	> 0.1 TO < 1
SED2013-6	> 1.0

FLOODPLAIN SAMPLE LOCATION

FLOOD PLAIN CRITERIA (mg/kg)
> 1 TO < 5
> 5 TO < 10
> 10 TO < 25
> 25.0

NOTES:

- AERIAL IMAGERY DATED MAY 13, 2015 © GOOGLE EARTH.
- NEW YORK CENTRAL STATE PLANE NAD83 US SURVEY FOOT.
- BCP = BROWNFIELD CLEANUP PROGRAM.

SCALE VERIFICATION

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**SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK**

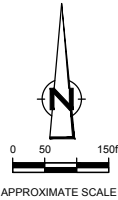
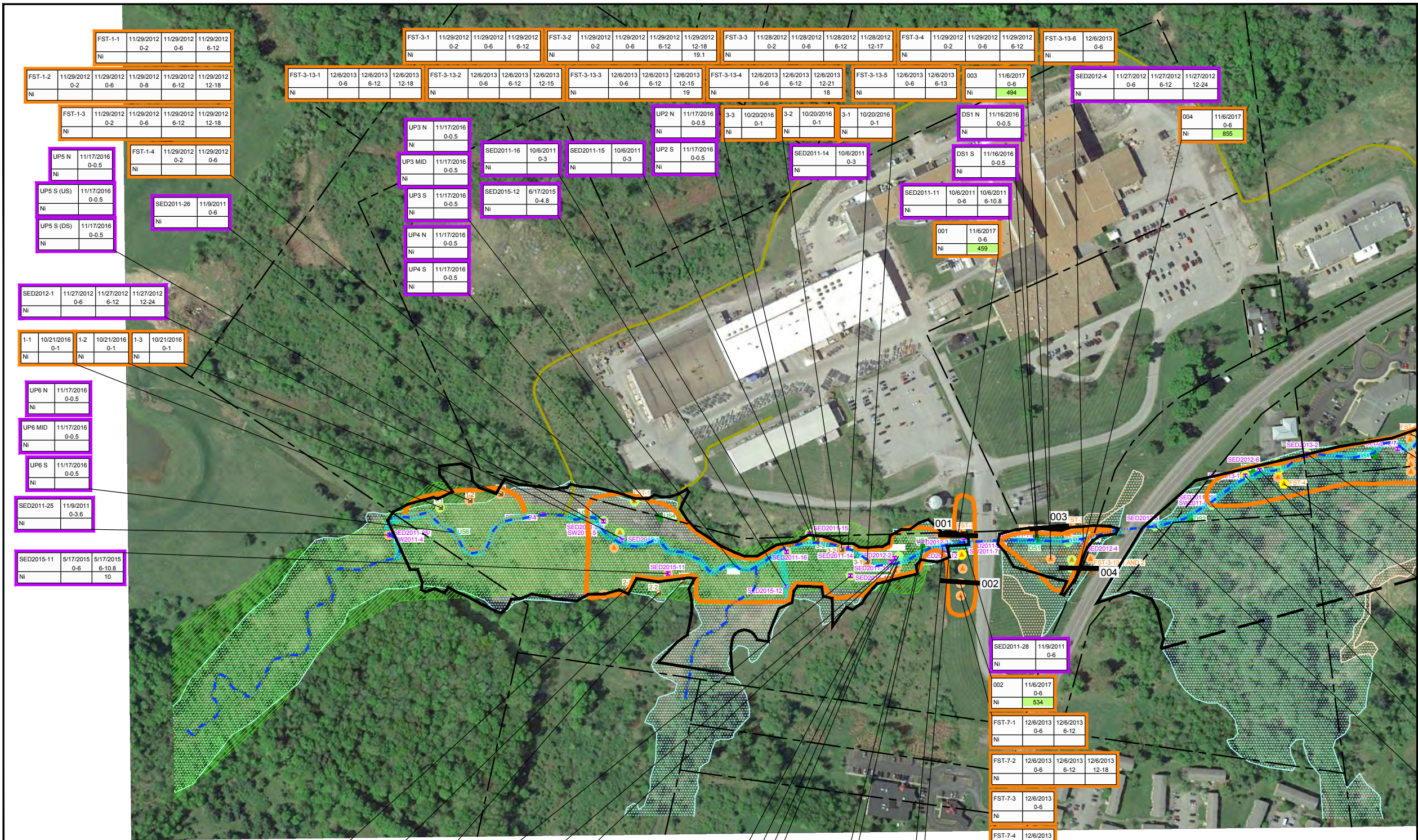
**ALTERNATIVE 6 - CLASS A/RESIDENTIAL -
ECOLOGICAL EXCAVATION AREAS
MUD CREEK (EAST)**

GHD

Source Reference:

Project Manager:	Reviewed By:	Date:
J.D.	P.K.	MAY 2017

Scale:	Project N°:	Report N°:	Drawing N°:
1:150	86188-00	022	figure 6.5b



- LEGEND**
- STREAMS
 - DRAINAGE DITCH
 - PROPERTY BOUNDARY
 - WETLAND DELINEATION
 - SEDIMENT SAMPLE
 - PEEPER SEDIMENT SAMPLE LOCATION
 - FLOODPLAIN SOIL TRANSECT WITHIN WETLAND
 - FLOOD PLAIN SOIL SAMPLE LOCATION
 - STATE-REGULATED FRESHWATER WETLAND (FROM CUGIR: CORNELL UNIVERSITY GEOSPATIAL INFORMATION REPOSITORY)
 - 100-YEAR FLOOD
 - 500-YEAR FLOOD
 - CREEK EXCAVATION AREA
 - FLOODPLAIN EXCAVATION AREA (MINIMUM EXPECTED)
 - WORM SAMPLING LOCATION

ALTERNATIVE NO.7		
	RESIDENTIAL/CLASS A SEDIMENT	UNRESTRICTED WETLAND/FLOODPLAIN
PCBs	> 0.1	> 0.1
Ni	> 23	> 30
Cr	> 36	> 30

NICKEL CONCENTRATIONS		
SEDIMENT SAMPLE LOCATION		
SED2013-5	12/5/2013	SAMPLE DATE
	0-3.6	DEPTH (INCHES BELOW GROUND SURFACE)
Ni	45	SAMPLE RESULT (mg/kg)
		PARAMETER

SEDIMENT CRITERIA (mg/kg)	
< 23	NO EXCEEDANCE
> 23.0 TO < 30	CLASS B EXCEEDANCE
> 30.0 TO < 49	ECOLOGICAL EXCEEDANCE
> 49.0 TO < 400	CLASS C EXCEEDANCE
> 400.0	SITE SPECIFIC EXCEEDANCE

FLOODPLAIN SAMPLE LOCATION		
FST-6-1	11/28/2012	SAMPLE DATE
	0-2	DEPTH (INCHES BELOW GROUND SURFACE)
Ni	262	SAMPLE RESULT (mg/kg)
		PARAMETER

FLOOD PLAIN CRITERIA (mg/kg)	
< 30	NO EXCEEDANCE
> 30.0 TO < 310	UNRESTRICTED / RESIDENTIAL / ECOLOGICAL EXCEEDANCE
> 310.0 TO < 400	COMMERCIAL EXCEEDANCE
> 400.0 TO < 10,000	SITE SPECIFIC EXCEEDANCE
> 10,000	INDUSTRIAL EXCEEDANCE

0.039 [0.044]	PARENT (DUPLICATE RESULT)
J	ESTIMATED
U	QUALIFIED NOT DETECTED ABOVE THE SAMPLE REPORT LIMIT

- NOTES:
- AERIAL IMAGERY DATED MAY 13, 2015 © GOOGLE EARTH.
 - NEW YORK CENTRAL STATE PLANE NAD83 US SURVEY FOOT.
 - BCP = BROWNFIELD CLEANUP PROGRAM.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

**SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK**

**ALTERNATIVE 7 - CLASS A/UNRESTRICTED
EXCAVATION AREAS
MUD CREEK (WEST)**



Source Reference:			
Project Manager:	Reviewed By:	Date:	
J.D.	P.K.	MAY 2017	
Scale:	Project N°:	Report N°:	Drawing N°:
1:150	86188-00	022	figure 6.6a

ALTERNATIVE 7 REMOVES:

COMPOUND	POUNDS	PERCENT
NICKEL	21,640	100
CHROMIUM	4,760	100
PCBs	148	100

2-1	10/21/2016	0-1	2-2	10/21/2016	0-1	2-3	10/21/2016	0-1
Ni			Ni	90.4		Ni		

SED2015-13	6/17/2015	0-6	6/17/2015	6-12
Ni				

SED2012-2	11/27/2012 0-6	11/27/2012 6-12	11/27/2012 12-18
Ni			

SED2011-13	10/6/2011	0-3
Ni		

FST-2-1	11/29/2012 0-2	11/29/2012 0-6	11/29/2012 6-12	11/29/2012 12-18
Ni				

FST-2-2	11/29/2012 0-2	11/29/2012 0-6	11/29/2012 6-12
Ni			

FST-2-3	11/29/2012 0-2	11/29/2012 0-6	11/29/2012 6-12	11/29/2012 12-18
Ni				

FST-2-4	11/29/2012 0-2	11/29/2012 0-6	11/29/2012 6-12
Ni			

UP1 N	11/16/2016	0-0.5
Ni		

UP1 S	11/16/2016	0-0.5
Ni		

SED2011-12	10/6/2011	0-6
Ni		

SED2012-3	11/27/2012	0-6	11/27/2012	6-10.8
Ni				

SED2011-28	11/9/2011	0-6
Ni		

002	11/6/2017	0-6
Ni	534	

FST-7-1	12/6/2013 0-6	12/6/2013 6-12
Ni		

FST-7-2	12/6/2013 0-6	12/6/2013 6-12	12/6/2013 12-18
Ni			

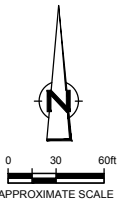
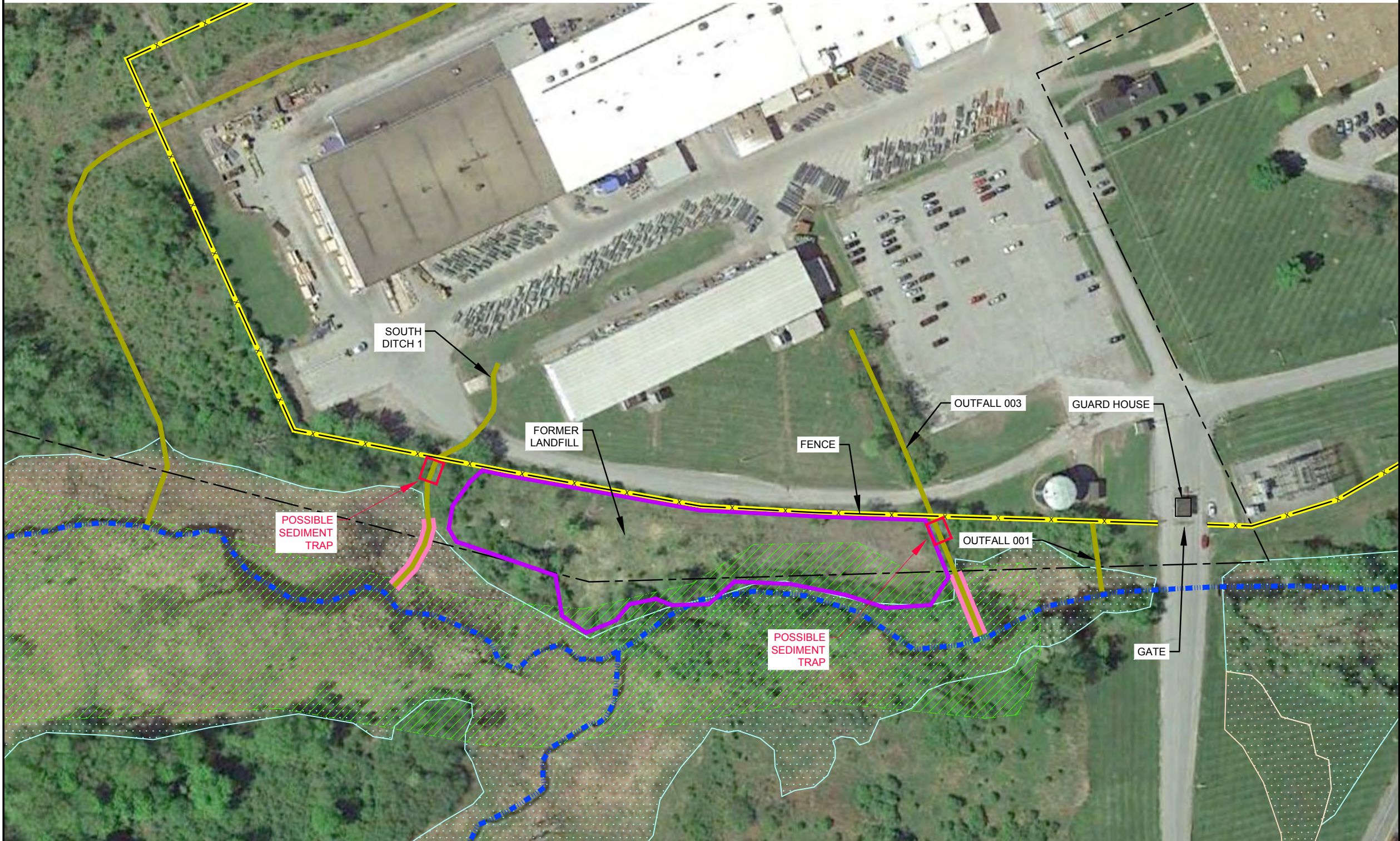
FST-7-3	12/6/2013	0-6
Ni		

FST-7-4	12/6/2013	0-6
Ni		

FST-7-5	12/6/2013	0-6
Ni		

FST-7-6	12/6/2013	0-6
Ni		





- LEGEND**
- STREAMS
 - APPROXIMATE LIMIT OF FORMER LANDFILL
 - STATE-REGULATED FRESHWATER WETLAND (FROM CUGIR: CORNELL UNIVERSITY GEOSPATIAL INFORMATION REPOSITORY)
 - 100-YEAR FLOOD
 - 500-YEAR FLOOD
 - ON-SITE DITCH
 - PORTION OF ON-SITE DITCH IN WETLAND BEING CONSIDERED FOR REMEDIATION

- NOTES:**
- AERIAL IMAGERY DATED MAY 13, 2015 © GOOGLE EARTH. (NEW YORK CENTRAL STATE PLANE NAD83 US SURVEY FOOT).
 - BCP = BROWNFIELD CLEANUP PROGRAM.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



**SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK**

**SOUTH DITCHES / FORMER LANDFILL
LOCATION**



Source Reference:

Project Manager: J.D.	Reviewed By: P.K.	Date: NOVEMBER 2017
Scale: 1:60	Project NR: 86188-00	Report NR: 022
		Drawing NR: figure 7.1

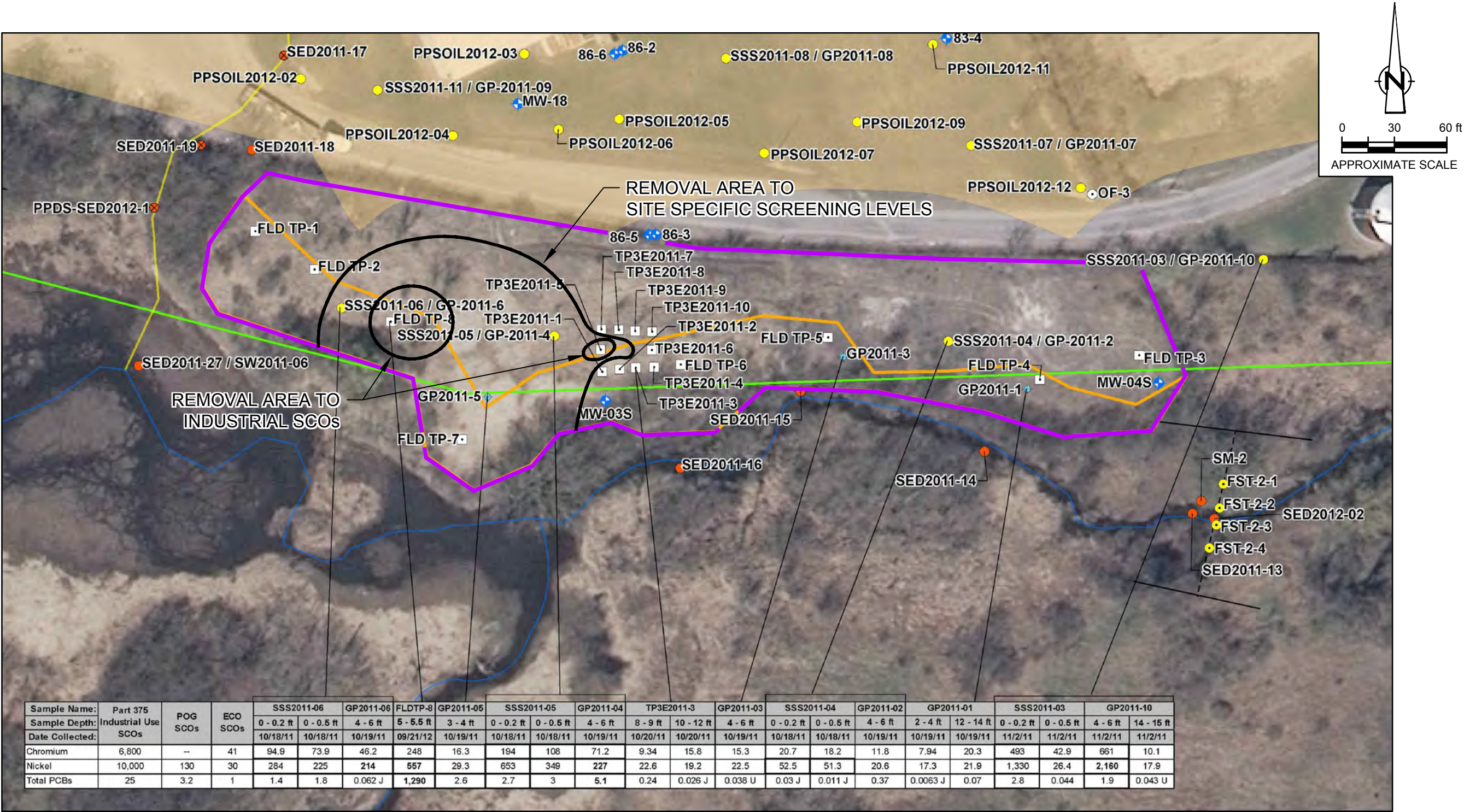


figure 7.2
FORMER LANDFILL REMOVAL ALTERNATIVES
SPECIAL METALS CORPORATION
New Hartford, New York



SOURCE:
ARCADIS, SPECIAL METALS CORPORATION, NEW HARTFORD, NEW YORK, REMEDIAL INVESTIGATION REPORT,
BCP SITE NO. C633016, CHROMIUM, NICKEL, AND PCBs IN SOIL SAMPLES, FORMER LANDFILL, FIGURE 15, 6/22/2016.

Table 3.1

**Chemical Specific Cleanup Criteria
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY**

Media	Criteria	Nickel Concentration	Chromium Concentration	PCB Concentration
Sediment	Site Specific	< 400 mg/kg	< 200 mg/kg	< 1 mg/kg
	Restricted Residential	< 310 mg/kg	< 180 mg/kg	< 1 mg/kg
	Class C	> 49 mg/kg	> 110 mg/kg	>1 mg/kg
	Class B	> 23 mg/kg < 49 mg/kg	> 43 mg/kg < 110 mg/kg	< 0.1 mg/kg
	Class A	< 23 mg/kg	< 43 mg/kg	< 0.1 mg/kg
Wetland/Flood Plain Soil	Site Specific	< 400 mg/kg	< 200 mg/kg	< 1 mg/kg
	Restricted Residential	< 310 mg/kg	< 180 mg/ kg	< 1 mg/kg
	Residential	< 140 mg/kg	< 36 mg/kg	< 1 mg/kg
	Ecological	< 30 mg/kg	< 41 mg/kg	< 1 mg/kg
	Unrestricted Use	< 30 mg/kg	< 30 mg/kg	< 0.1 mg/kg

Table 3.2

Potential Action-Specific Standards, Criteria and Guidelines
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY

Activity	Title	Subtitle	Citation
Remediation	Soil Cleanup Guidance Policy	--	CP-51
	Technical Guidance for Site Investigation and Remediation		DER-10
	Green Remediation		DER-31
	Institutional Controls		DER-33
	Environmental Remediation Programs	General Requirements Brownfield Cleanup Program	6 NYCRR Subpart 375-1 6 NYCRR Subpart 375-3
Capping	Hazardous waste treatment, storage and disposal facility permitting requirements		6 NYCRR Subpart 373-1
	Final status standards for owners and operators of hazardous waste treatment, storage and disposal facilities	--	6 NYCRR Subpart 373-2
Container Storage	Hazardous waste treatment, storage and disposal facility permitting requirements	--	6 NYCRR Subpart 373-1
Construction of New Landfill on Site	Hazardous waste treatment, storage and disposal facility permitting requirements	--	6 NYCRR Subpart 373-1
	Solid Waste Management Facilities		6 NYCRR Part 360
	Siting of Industrial Hazardous Waste Facilities		6 NYCRR Part 361
Discharge of Treatment System Effluent	Implementation of SPDES program in New York State	--	6 NYCRR Part 750
	Technical and Operations Guidance Series	Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations	TOGS 1.1.1
		Procedures for derivation of Site-specific Standards and Guidance values for Protection of Aquatic Life	TOGS 1.1.3
		Procedures for Derivation of Bioaccumulation Factors	TOGS 1.1.4
		Administrative Procedures and Environmental Benefit Strategy for Individual SPDES Permits	TOGS 1.2.2
	Blending policy for use of sources of drinking water	--	NYSDOH PWS 68
	Drinking water supplies	--	Part 5 of State Sanitary Code
	Use and protection of waters	--	6 NYCRR Part 608
	Air Quality Standards	Particulates	6 NYCRR Part 257-3
	Clean Water Act		33 USC 466 Part 404
Excavation	USACE Permit program	Nationwide Permit Program	33 CFR Part 330
	Land Disposal Restrictions	--	6 NYCRR Subpart 376
	Brownfield Cleanup Program		6 NYCRR Part 375-3
	Use and Protection of Waters		6 NYCRR Part 608
	Freshwater Wetlands Permit Requirements		6 NYCRR Part 663
	Uniform procedures		6 NYCRR Part 621
	Technical and Operations Guidance Series	New York Standards and Specifications for Erosion and Sediment Controls	TOGS 5.1.10
	Hazardous waste treatment, storage and disposal facility permitting requirements	--	6 NYCRR Subpart 373-1
	New York air pollution control regulations	General provisions Permits and certificates General prohibitions Process Operations	6 NYCRR Part 200 6 NYCRR Part 201 6 NYCRR Part 211 6 NYCRR Part 212
Land Treatment			

Table 3.2

Potential Action-Specific Standards, Criteria and Guidelines
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY

Activity	Title	Subtitle	Citation
Placement of Waste in Land Disposal Unit	Hazardous waste treatment, storage and disposal facility permitting requirements	-- Basis for Listing Hazardous Waste	6 NYCRR Subpart 373-1 6 NYCRR Appendix 22
Surface Water Control	Hazardous waste treatment, storage and disposal facility permitting requirements Classifications - Surface waters and Groundwaters Surface water and groundwater Quality Standards and groundwater effluent limitations	--	6 NYCRR Subpart 373-1 6 NYCRR Part 701 6 NYCRR Part 703
Treatment (in a unit)	Hazardous waste treatment, storage and disposal facility permitting requirements Interim status standards for owners and operators of hazardous waste facilities New York air pollution control regulations	-- General provisions Permits and certificates General prohibitions General process emission sources	6 NYCRR Subpart 373-1 6 NYCRR Subpart 373-3 6 NYCRR Part 200 6 NYCRR Part 201 6 NYCRR Part 211 6 NYCRR Part 212
Treatment (when waste will be land disposed)	Hazardous waste treatment, storage and disposal facility permitting requirements Interim status standards for owners and operators of hazardous waste facilities	-- --	6 NYCRR Subpart 373-1 6 NYCRR Subpart 373-3
Waste Pile	New York air pollution control regulations Hazardous waste treatment, storage and disposal facility permitting requirements Interim status standards for owners and operators of hazardous waste facilities	General provisions Permits and certificates General prohibitions General process emission sources -- --	6 NYCRR Part 200 6 NYCRR Part 201 6 NYCRR Part 211 6 NYCRR Part 212 6 NYCRR Subpart 373-1 6 NYCRR Subpart 373-3
Transporting Waste Off-Site	Waste transporters Hazardous waste manifest system and related standards for generators, transporters and Facilities	--	6 NYCRR Part 364 6 NYCRR Part 372
Vapor Emissions	NY air pollution control regulations	General provisions Permits and certificates General prohibitions General process emission sources	6 NYCRR Part 200 6 NYCRR Part 201 6 NYCRR Part 211 6 NYCRR Part 212

**Potential Response Actions and Remedial Technologies for Sediment/Soil
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY**

Medium	General Response Action	Remedial Technology	Process Options	Description
Sediment/Floodplain Soil	No Action	None	Not Applicable	No action. Natural processes are allowed to reduce chemical concentrations to acceptable levels.
	Institutional Control	None	Physical Restrictions, Environmental Easements	Restrict land use and exposure to impacted sediment soil and/or develop and enforce special procedures for worker protection.
	Containment	Physical Treatment	Capping	A permanent surface barrier is placed over the area containing contaminated sediment/soil thus preventing or minimizing physical contact.
	Collection	Excavation	Excavation	Excavate contaminated sediment/soil for on-site treatment or off-site disposal. Backfill excavation with treated soil or clean, imported soil.
	Ex Situ Treatment	Physical Treatment	Thermal Desorption	Excavated soil is heated to volatilize chemicals. Treated soils may be used as excavation backfill or transported off-site for disposal.
			Incineration	Excavated soil is processed at high temperature to volatilize and combust organic contaminants. Treated soils may be used as excavation backfill or transported off-site for disposal.
	Disposal	On-site Disposal	Backfilling	Treated excavated sediment/soil is returned to the original excavation as backfill.
			Construct Permitted Landfill Cell	Untreated excavated sediment/soil is placed in a permitted landfill cell on-Site.
		Off-site Disposal	Off-site Disposal	Treated or untreated excavated sediment/soil is transported to a permitted treatment, storage, and disposal facility.

Table 4.2

**Initial Screening of Identified Remedial Alternatives for Sediment/Soil
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY**

General Response Action	Description	Effectiveness	Implementability
NO FURTHER ACTION	No additional measures are taken to improve Site environmental conditions with respect to sediment/soil. All contaminants remain in place. Environmental risks and potential exposure pathways are not directly addressed by any activities.	- Not effective in meeting all RAOs. - No reduction of volume, toxicity, or mobility of Site contaminants. - No additional risk during implementation.	- Readily implemented.
INSTITUTIONAL CONTROLS Physical Restriction Environmental Easements	Implementation of institutional controls, such as environmental easement installation of fences, or safe work practices to reduce potential exposure to Site related chemicals in sediment/soil.	- Effectiveness is dependant on future enforcement of restrictions. - No reduction of volume, toxicity, or mobility of COCs. - Effective in reducing potential for human exposure to COCs.	- Implementable if permission is granted by property owners.
COLLECTION Excavation	Removal of impacted sediment/soil.	- Effectively reduces the mobility of contaminants. The volume and toxicity can be reduced based on futher treatment/securement.	- Implementable. - Scope of work highly dependent upon chemical cleanup goals selected
EX SITU TREATMENT AND DISPOSAL Thermal Desorption	Excavated sediment/soil is treated on-site or off-site utilizing high temperature thermal desorption. Treated sediment/soil is used as backfill or transported off-Site for disposal.	- Does not reduce the volume, toxicity, or mobility of COCs without vapor treatment and is not for metals.	- Not technically feasible for on-site use.
Incineration	Chemical presence in excavated sediment/soil is treated through volatilization and combustion. Treated sediment is used as backfill or transported off-Site for disposal.	- Does not reduce the volume, toxicity, or mobility of COCs without vapor treatment and is not for metals.	- Not technically feasible for on-site use.
DISPOSAL Off-Site Treatment & Disposal	Transport sediment to a permitted waste treatment, storage, and disposal facility.	- Eliminates potential for exposure to chemicals in the sediment/soil. - Reduces mobility of Site contaminants and secures the volume and toxicity.	- Readily implemented. - Technically feasible.
On-Site Disposal	Construct a cell on-Site and dispose of untreated excavated sediment/soil.	- Eliminates potential for exposure to chemicals in the sediment/soil. - Concentrates contaminants in one area reducing area of contamination. - Reduces mobility of Site contaminants and secures the volume and toxicity.	- Very difficult to obtain permits. - Technical feasibility is low. - Waste remains on site. - Does not reduce volume or toxicity of Site contaminants.

Notes:

COCs Chemicals of Concern.
RAOs Remedial Action Objectives.

Table 4.3

**Summary of Development and Screening of Remedial Alternatives for Sediment/Soil
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY**

	No Further Action	Institutional Controls	Removal to Various SCOs with Off-Site Disposal
Effectiveness			
• Further reduces toxicity, mobility, and volume of COCs	No	No	Yes
• Further minimizes residual risk and affords additional long-term protection	No	Yes	Yes
Implementability	Readily implemented	Implementable	Difficult to implement
Relative Cost			
• Capital	None	Low	High
• O&M (30 years)	None	Low	None
Recommendation	Required for detailed analysis	Retained for detailed analysis	Retained for detailed analysis

Table 4.4

Remedial Alternatives Screening for Mud Creek Drainage Systems
Alternatives Assessment Report
SMC - Mud Creek
New Hartford, NY

Alternative No.	Remedial Alternative	Description	Effectiveness Evaluation	Implementability Evaluation	Relative Cost Evaluation	Retained	Decision Rationale
Former Landfill							
1	No Action (No Use)	No remedial action.	-	-	-	Yes	Required as a baseline for comparison to other process options.
2	Site Management and Institutional Controls (Industrial Use)	Site management and execution of an environmental easement restricting the AOC to Industrial Use.	Effective if physical barriers are maintained and land use restrictions are enforced.	Can easily implement access/use restrictions.	Negligible cost.	Yes	Puts restrictions in place
3	Capping of the Former Landfill	Minor regrading over landfill and installation of a 1 foot thick permeable soil cover. Execution of an environmental easement restricting the AOC to Industrial Use.	Reduces potential for direct contact; does not remediate environmental impacts. Long-term effectiveness depends on future maintenance and land use restrictions being enforced.	Implementable, although some regrading is necessary to maintain drainage.	Low capital costs; low O&M costs.	Yes	Covers all impacted areas
4	Excavation and Off-Site Disposal to Industrial SCOs with Capping	Removal and Off-Site Disposal of all impacted soil to meet Industrial SCOs, followed by consolidation of the remaining material to the extent practicable and then capping of the entire site as in Alternative 3	Permanently removes the most contaminated soil and provides a cover to prevent future contact and erosion. Long-term effectiveness depends on future maintenance and land use restrictions being enforced.	Potential concerns due to above-ground or subsurface structures, utilities, etc. Excavation of soils may present additional health and safety concerns.	Moderate capital costs; low O&M costs.	Yes	Removes highly impacted soil and covers the entire landfill.
5	Excavation and Off-Site Disposal to Industrial SCOs with Capping	Removal and Off-Site Disposal of all impacted soil to meet Industrial SCOs, followed by consolidation of the remaining material to the extent practicable and then capping of the entire site as in Alternative 3	Permanently removes most contaminated soil	Potential concerns due to above-ground or subsurface structures, utilities, etc. Excavation of soils may present additional health and safety concerns.	Moderate capital costs; low O&M costs.	Yes	Removes highly impacted soil and covers the entire landfill.
6	Excavation and Off-Site Disposal to Unrestricted SCOs (Unrestricted Use)	Removal and Off-Site Disposal of all impacted soil to meet Unrestricted Use SCOs, followed by the placement of clean fill and topsoil for vegetation.	Permanently removes contaminated soil	Potential concerns due to above-ground or subsurface structures, utilities, etc. Excavation of soils may present additional health and safety concerns.	High capital costs; no O&M costs.	Yes	Conventional technology that does not limit future land use.
7	Encapsulation of the landfill material	Remove all landfill material and place it back in the excavation on top of a synthetic liner with an overlying cap.	Liner provides protection of the groundwater from the landfill contents and placement of a cap over the material prevents future contact and erosion	Potential concerns due to above-ground or subsurface structures, utilities, etc. Double handling of excavated soils may present additional health and safety concerns.	High capital costs; no O&M costs.	Yes	Encapsulates impacted soil
Ditches							
1	No Action (No Use)	No remedial action.	-	-	-	Yes	Required as a baseline for comparison to other process options.
2	Site Management and Institutional Controls (Industrial Use)	Site management and execution of an environmental easement restricting the AOC to Industrial Use.	Effective if physical barriers are maintained and land use restrictions are enforced.	Can easily implement access/use restrictions.	Negligible cost.	Yes	Puts restrictions in place
3	Capping of the Ditches	Minor regrading along ditches and installation of a 1 foot thick permeable soil cover.	Reduces potential for direct contact; does not remediate environmental impacts. Long-term effectiveness depends on future maintenance and land use restrictions being enforced.	Implementable, although some regrading is necessary to maintain drainage.	Low capital costs; low O&M costs.	Yes	Covers all impacted areas
4	Install Sediment Traps	Construct sediment traps downstream of the ditches to collect mobile sediment. Requires periodic removal of accumulated sediment and testing for disposal	Does not remove any contaminated soil. Long-term effectiveness depends on future maintenance and land use restrictions being enforced.	Implementable, although some regrading is necessary to maintain drainage.	Low capital costs; low O&M costs.	Yes	Protects Mud Creek from on-site sediment
5	Excavation and Off-Site Disposal to Industrial SCOs.	Removal and Off-Site Disposal of impacted soil to meet Industrial SCOs, followed by the placement of clean fill and topsoil for vegetation. The surface soils along the South Ditches already meet Industrial SCOs and therefore, no soil removal will occur	Does not remove any contaminated soil. Long-term effectiveness depends on future maintenance and land use restrictions being enforced.	Does not require any excavation and therefore is easily implemented	Nil to Low capital costs; low O&M costs.	Yes	Puts restrictions in place
6	Excavation and Off-Site Disposal to Site Specific Screening Levels.	Removal and Off-Site Disposal of all impacted soil to meet Site-Specific Screening Levels, followed by the placement of clean fill and topsoil for vegetation.	Permanently removes most contaminated soil, but does not remediate all environmental impacts; Long-term effectiveness depends on future maintenance and land use restrictions being enforced.	Potential concerns due to above-ground or subsurface structures, utilities, etc. Excavation of soils may present additional health and safety concerns.	Moderate capital costs; low O&M costs.	Yes	Removes and covers all impacted areas above Site Specific criteria
7	Excavation and Off-Site Disposal to Unrestricted SCOs (Unrestricted Use)	Removal and Off-Site Disposal of all impacted soil to meet Unrestricted Use SCOs, followed by the placement of clean fill and topsoil for vegetation.	Permanently removes contaminated soil	Potential concerns due to above-ground or subsurface structures, utilities, etc. Excavation of soils may present additional health and safety concerns.	High capital costs; no O&M costs.	Yes	Conventional technology that does not limit future land use.

Table 4.4

Remedial Alternatives Screening for Mud Creek Drainage Systems
Alternatives Assessment Report
SMC - Mud Creek
New Hartford, NY

Alternative No.	Remedial Alternative	Description	Effectiveness Evaluation	Implementability Evaluation	Relative Cost Evaluation	Retained	Decision Rationale
On-Site Storm Sewer System							
1	No Action	No remedial action.	Effective if storm sewer treatment system remains in proper operation	Implementable	Negligible cost.	Yes	Required as a baseline for comparison to other process options.
2	One Time Cleaning	Clean the existing storm sewer system using power flushing	Effective in removing accumulated sediment but sewers remain effective as long as storm sewer treatment system remains in proper operation, regardless of cleaning	Implementable, although some work in sewers is difficult	Low capital cost	Yes	Removes impacted sediment in sewer.
3	Multiple Cleaning	Clean the existing storm sewer system using power flushing on a periodic basis (assumed every 5 years)	Effective in removing accumulated sediment but sewers remain effective as long as storm sewer treatment system remains in proper operation, regardless of cleaning	Implementable, although some work in sewers is difficult	Low capital cost	Yes	Removes impacted sediment in sewer.
4	Removal of Sewer System to POG SCOs	Removal of the entire sewer system and all surrounding soil to POG SCOs and replace with an above grade ditch system	Effective in removing impacted soil around sewer but not really applicable to the contents of the sewer system. Effective as long as storm sewer treatment system remains in proper operation.	Implementable, although causes major disruption to plant operations	High capital cost	Yes	Removes soil around sewer to the extent impacted.
5	Removal of Sewer System to Unrestricted Use	Removal of the entire sewer system and all surrounding soil to Unrestricted SCOs and replace with an above grade ditch system	Effective in removing impacted soil around sewer but not really applicable to the contents of the sewer system. Effective as long as storm sewer treatment system remains in proper operation.	Implementable, although causes major disruption to plant operations	High capital cost	Yes	Removes soil around sewer to the extent impacted.
Storm Sewer Treatment System							
1	No Action (Decommission Plant)	Demolish the existing storm water treatment plant	Not Effective if plant is to continue operating	Not implementable	High capital cost	Yes	Required as a baseline for comparison to other process options.
2	Continued Operation Under SPDES	Continue to operate the treatment plant with appropriate modifications to meet effluent standards under SPDES	Current system is in compliance with SPDES limits	Implementable	No capital cost	Yes	Current system meets SPDES requirements
3	Continued Operation Under SMP	Continue to operate the treatment plant with appropriate modifications to meet effluent standards that would apply under the Site Management Plan	Current system is in compliance with SPDES limits	Implementable	No capital cost	Yes	Current system meets SPDES requirements

**Average Concentrations by Transect in Mud Creek
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY**

Section	Average Concentrations						Ranges					
	Surface			Subsurface			Surface			Subsurface		
	Nickel	Chromium	PCB	Nickel	Chromium	PCB	Nickel	Chromium	PCB	Nickel	Chromium	PCB
FP1	444.62	54.86	0.70	144.04	17.09	0.22	21.8-3410	12-150	0.0077-4.8	10-677	10-38	0.005-0.47
FP2	215.68	52.89	0.18	109.87	31.68	0.24	26.5-703	21.2-173	0.0255-0.53	7.5-428	8.1-86.7	0.025-0.578
FP3	1397.11	462.51	71.20	1615.50	567.50	147.20	40-8740	20-2920	0.49-502.76	37-6210	20-2160	3.1-578.78
FP4	1666.33	511.63	3.24	817.11	262.81	1.27	34-10700	12-3530	0.027-8.1	13-8950	11-2790	0.019-7
FP5	186.64	76.94	0.53	84.49	137.20	0.40	31-410	15-149	0.05194.3	8.6-259	7.1-645	0.0406-2.183
FP6	123.62	46.94	0.34	59.63	27.24	0.35	44-488	22.1-165	0.028-1.3	23-182	16-55.9	0.013-2.4
FP7	187.47	67.46	0.70	102.44	60.73	6.24	35-507	17.5-175	0.033-4.38	28-393	18-343	0.021-60.6
FP8	164.57	65.77	1.43	101.63	51.13	2.08	30-310	13-120	0.22-2.8	22-230	18-96	0.093-6
FP9	143.57	58.37	2.79	63.42	36.75	2.82	39-262	14.3-98	0.0657-9.1	20-140	15.7-110	0.0441-15
FP10	117.29	51.10	1.40	34.58	21.50	0.70	27.4-311	16.9-125	0.28-4.6	21-96	16-52	0.013-6.1

**Mud Creek Cost Estimate
Alternative 2-Institutional Control
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY**

Bid Item	Description	Status - Rnd	Quantity	Units	Unit Price	Bid Total
1	Permits		1.000	LS	2,000.00	2,000.00
2	Environmental Easement		1.000	LS	5,000.00	5,000.00
3	Clearing		2.000	AC	16,000.00	32,000.00
4	Fence Installation		9,000.000	LF	20.00	180,000.00
					Bid Total	\$219,000.00

Table 6.3

Mud Creek Cost Estimate - Alternative 3
Site Specific (With Consideration for Frequency and Significance)
Alternatives Assessment Report
SMC - Mud Creek
New Hartford, NY

Bid Item	Description	Status -	Quantity	Units	Unit Price	Bid Total
1	HASP Preparation		1.000	LS	3,198.62	3,198.62
2	Permits		1.000	LS	16,227.68	16,227.68
3	General Conditions		84.000	DA	2,225.52	186,943.68
4	Mobilization		1.000	LS	44,379.27	44,379.27
5	Erosion Controls		5,500.000	LF	7.87	43,285.00
6	Access Road		3,500.000	LF	44.57	155,995.00
7	Staging Areas		3.000	EA	45,333.50	136,000.50
8	Clearing		9.000	AC	15,993.12	143,938.08
9	Water Treatment - Setup		3.000	EA	20,257.95	60,773.85
10	Water Treatment - Operations		72.000	DA	2,599.34	187,152.48
11	Water Treatment - Carbon Change		3.000	EA	3,518.49	10,555.47
12	Creek By-Pass System - Setup		1.000	EA	125,812.51	125,812.51
13	Creek By-Pass System - Operations		60.000	DA	2,667.79	160,067.40
14	Excavation		13,525.000	CY	47.99	649,064.75
15	Surveying		21.000	DA	1,919.17	40,302.57
16	Backfill (Gravel)		5,000.000	TN	23.46	117,300.00
17	Backfill (Large Stone)		200.000	TN	27.72	5,544.00
18	Backfill (Rip Rap)		100.000	TN	53.31	5,331.00
19	Backfill (Topsoil)		780.000	CY	28.09	21,910.20
20	Backfill (General Fill)		18,260.000	TN	16.30	297,638.00
21	Plantings (Trees)		90.000	EA	479.79	43,181.10
22	Plantings (Grass)		6.000	AC	6,648.34	39,890.04
23	Plantings (Wetlands)		3.000	AC	22,390.36	67,171.08
24	T&D Non Haz		20,290.000	TN	42.65	865,368.50
25	T&D Haz		100.000	TN	266.55	26,655.00
26	Supplemental Investigation		1.000	LS	30,000.00	30,000.00
27	O&M - Creek Area		5.000	YE	13,500.00	67,500.00
28	Demobilization		1.000	LS	177,817.51	<u>177,817.51</u>
Bid Total						<u>\$3,729,003.29</u>

Table 6.4

**Mud Creek Cost Estimate - Alternative 4 - Site Specific
Alternatives Assessment Report
SMC - Mud Creek
New Hartford, NY**

Bid Item	Description	Status - Rnd	Quantity	Units	Unit Price	Bid Total
1	HASP Preparation		1.000	LS	3,200.20	3,200.20
2	Permits		1.000	LS	16,235.66	16,235.66
3	General Conditions		100.000	DA	2,226.36	222,636.00
4	Mobilization		1.000	LS	44,401.09	44,401.09
5	Erosion Controls		8,000.000	LF	7.87	62,960.00
6	Access Road		4,000.000	LF	44.44	177,760.00
7	Staging Areas		3.000	EA	45,355.80	136,067.40
8	Clearing		11.500	AC	16,000.98	184,011.27
9	Water Treatment - Setup		3.000	EA	20,267.91	60,803.73
10	Water Treatment - Operations		90.000	DA	2,601.23	234,110.70
11	Water Treatment - Carbon Change		3.000	EA	3,520.22	10,560.66
12	Creek By-Pass System - Setup		1.000	EA	125,874.39	125,874.39
13	Creek By-Pass System -		75.000	DA	2,669.74	200,230.50
14	Excavation		19,429.000	CY	48.01	932,786.29
15	Surveying		30.000	DA	1,920.12	57,603.60
16	Backfill (Gravel)		5,000.000	TN	23.47	117,350.00
17	Backfill (Large Stone)		200.000	TN	27.74	5,548.00
18	Backfill (Rip Rap)		100.000	TN	53.34	5,334.00
19	Backfill (Topsoil)		1,150.000	CY	27.64	31,786.00
20	Backfill (General Fill)		26,230.000	TN	16.25	426,237.50
21	Plantings (Trees)		115.000	EA	480.03	55,203.45
22	Plantings (Grass)		7.000	AC	6,651.61	46,561.27
23	Plantings (Wetlands)		4.500	AC	22,401.37	100,806.17
24	T&D Non Haz		29,143.000	TN	42.67	1,243,531.81
25	T&D Haz		100.000	TN	266.68	26,668.00
26	Supplemental Investigation		1.000	LS	300,000.00	30,000.00
27	O&M - Creek Area		5.000	YE	16,500.00	82,500.00
28	Demobilization		1.000	LS	177,904.96	<u>177,904.96</u>
Bid Total						<u>\$4,818,672.65</u>

Table 6.5

**Mud Creek Cost Estimate - Alternative 5A - Restricted Residential
Alternatives Assessment Report
SMC - Mud Creek
New Hartford, NY**

Bid Item	Description	Status - Rnd	Quantity	Units	Unit Price	Bid Total
1	HASP Preparation		1.000	LS	3,205.22	3,205.22
2	Permits		1.000	LS	16,261.17	16,261.17
3	General Conditions		120.000	DA	2,229.87	267,584.40
4	Mobilization		1.000	LS	44,470.84	44,470.84
5	Erosion Controls		8,000.000	LF	7.88	63,040.00
6	Access Road		4,000.000	LF	44.51	178,040.00
7	Staging Areas		3.000	EA	45,427.04	136,281.12
8	Clearing		17.000	AC	16,026.12	272,444.04
9	Water Treatment - Setup		3.000	EA	20,299.75	60,899.25
10	Water Treatment - Operations		110.000	DA	2,605.25	286,577.50
11	Water Treatment - Carbon Change		3.000	EA	3,525.75	10,577.25
12	Creek By-Pass System - Setup		1.000	EA	126,072.11	126,072.11
13	Creek By-Pass System - Operations		90.000	DA	2,677.92	241,012.80
14	Excavation		20,750.000	CY	44.15	916,112.50
15	Surveying		35.000	DA	1,923.13	67,309.55
16	Backfill (Gravel)		5,000.000	TN	23.50	117,500.00
17	Backfill (Large Stone)		200.000	TN	27.78	5,556.00
18	Backfill (Rip Rap)		100.000	TN	53.42	5,342.00
19	Backfill (Topsoil)		1,350.000	CY	27.48	37,098.00
20	Backfill (General Fill)		29,400.000	TN	16.29	478,926.00
21	Plantings (Trees)		170.000	EA	480.78	81,732.60
22	Plantings (Grass)		12.000	AC	6,662.06	79,944.72
23	Plantings (Wetlands)		5.000	AC	22,436.56	112,182.80
24	T&D Non Haz		31,100.000	TN	42.74	1,329,214.00
25	T&D Haz		100.000	TN	267.10	26,710.00
26	Supplemental Investigation		1.000	LS	30,000.00	30,000.00
27	O&M - Creek Area		5.000	YE	25,500.00	127,500.00
28	Demobilization		1.000	LS	178,184.41	178,184.41
Bid Total						<u>\$5,299,778.28</u>

Table 6.6

**Mud Creek Cost Estimate - Alternative 5B - Class C/Residential
Alternatives Assessment Report
SMC - Mud Creek
New Hartford, NY**

Bid Item	Description	Status - Rnd	Quantity	Units	Unit Price	Bid Total
1	HASP Preparation		1.000	LS	3,205.22	3,205.22
2	Permits		1.000	LS	16,261.17	16,261.17
3	General Conditions		120.000	DA	2,229.87	267,584.40
4	Mobilization		1.000	LS	44,470.84	44,470.84
5	Erosion Controls		8,000.000	LF	7.88	63,040.00
6	Access Road		4,000.000	LF	44.51	178,040.00
7	Staging Areas		3.000	EA	45,427.04	136,281.12
8	Clearing		17.000	AC	16,026.12	272,444.04
9	Water Treatment - Setup		3.000	EA	20,299.75	60,899.25
10	Water Treatment - Operations		110.000	DA	2,605.25	286,577.50
11	Water Treatment - Carbon Change		3.000	EA	3,525.75	10,577.25
12	Creek By-Pass System - Setup		1.000	EA	126,072.11	126,072.11
13	Creek By-Pass System - Operations		90.000	DA	2,677.92	241,012.80
14	Excavation		25,002.000	CY	44.15	1,103,838.30
15	Surveying		35.000	DA	1,923.13	67,309.55
16	Backfill (Gravel)		5,000.000	TN	23.50	117,500.00
17	Backfill (Large Stone)		200.000	TN	27.78	5,556.00
18	Backfill (Rip Rap)		100.000	TN	53.42	5,342.00
19	Backfill (Topsoil)		1,450.000	CY	27.48	39,846.00
20	Backfill (General Fill)		33,750.000	TN	16.29	549,787.50
21	Plantings (Trees)		170.000	EA	480.78	81,732.60
22	Plantings (Grass)		12.000	AC	6,662.06	79,944.72
23	Plantings (Wetlands)		5.000	AC	22,436.56	112,182.80
24	T&D Non Haz		37,503.000	TN	42.74	1,602,878.22
25	T&D Haz		100.000	TN	267.10	26,710.00
26	Supplemental Investigation		1.000	LS	30,000.00	30,000.00
27	O&M - Creek Area		5.000	YE	25,500.00	127,500.00
28	Demobilization		1.000	LS	178,184.41	178,184.41
Bid Total						<u>\$5,834,777.80</u>

Table 6.7

**Mud Creek Cost Estimate - Alternative 6 - Class A/Ecological Residential
Alternatives Assessment Report
SMC - Mud Creek
New Hartford, NY**

Bid Item	Description	Status - Rnd	Quantity	Units	Unit Price	Bid Total
1	HASP Preparation		1.000	LS	3,209.81	3,209.81
2	Permits		1.000	LS	16,284.45	16,284.45
3	General Conditions		145.000	DA	2,233.05	323,792.25
4	Mobilization		1.000	LS	44,534.52	44,534.52
5	Erosion Controls		8,000.000	LF	7.90	63,200.00
6	Access Road		4,000.000	LF	44.57	178,280.00
7	Staging Areas		3.000	EA	45,492.09	136,476.27
8	Clearing		20.000	AC	16,049.06	320,981.20
9	Water Treatment - Setup		3.000	EA	20,328.82	60,986.46
10	Water Treatment - Operations		130.000	DA	2,609.64	339,253.20
11	Water Treatment - Carbon Change		3.000	EA	3,530.79	10,592.37
12	Creek By-Pass System - Setup		1.000	EA	126,252.64	126,252.64
13	Creek By-Pass System - Operations		120.000	DA	2,680.54	321,664.80
14	Excavation		35,022.000	CY	39.87	1,396,327.14
15	Surveying		50.000	DA	1,925.89	96,294.50
16	Backfill (Gravel)		5,000.000	TN	23.54	117,700.00
17	Backfill (Large Stone)		200.000	TN	27.82	5,564.00
18	Backfill (Rip Rap)		100.000	TN	53.50	5,350.00
19	Backfill (Topsoil)		2,010.000	CY	27.16	54,591.60
20	Backfill (General Fill)		47,280.000	TN	16.27	769,245.60
21	Plantings (Trees)		200.000	EA	481.47	96,294.00
22	Plantings (Grass)		15.000	AC	6,671.60	100,074.00
23	Plantings (Wetlands)		5.000	AC	22,468.69	112,343.45
24	T&D Non Haz		52,533.000	TN	42.80	2,248,412.40
25	T&D Haz		100.000	TN	267.48	26,748.00
26	Supplemental Investigation		1.000	LS	30,000.00	30,000.00
27	O&M - Creek Area		5.000	YE	30,000.00	150,000.00
28	Demobilization		1.000	LS	178,439.57	178,439.57
Bid Total						<u>\$7,332,892.23</u>

Table 6.8

**Mud Creek Cost Estimate - Alternative 7 - Class A/Unrestricted
Alternatives Assessment Report
SMC - Mud Creek
New Hartford, NY**

Bid Item	Description	Status Rnd	Quantity	Units	Unit Price	Bid Total
1	HASP Preparation		1.000	LS	3,211.54	3,211.54
2	Permits		1.000	LS	16,293.21	16,293.21
3	General Conditions		160.000	DA	2,234.26	357,486.40
4	Mobilization		1.000	LS	44,558.46	44,558.46
5	Erosion Controls		8,000.000	LF	7.90	63,200.00
6	Access Road		4,000.000	LF	44.59	178,360.00
7	Staging Areas		3.000	EA	45,516.56	136,549.68
8	Clearing		20.000	AC	16,057.69	321,153.80
9	Water Treatment - Setup		3.000	EA	20,339.75	64,019.25
10	Water Treatment - Operations		142.000	DA	2,610.92	370,750.64
11	Water Treatment - Carbon Change		3.000	EA	3,532.69	10,598.07
12	Creek By-Pass System - Setup		1.000	EA	126,320.53	126,320.53
13	Creek By-Pass System - Operations		130.000	DA	2,681.19	348,554.70
14	Excavation		46,340.000	CY	44.15	2,045,911.00
15	Surveying		65.000	DA	1,926.92	125,249.80
16	Backfill (Gravel)		5,000.000	TN	2,355.00	117,750.00
17	Backfill (Large Stone)		200.000	TN	27.83	5,566.00
18	Backfill (Rip Rap)		100.000	TN	5,353.00	5,353.00
19	Backfill (Topsoil)		2,665.000	CY	2,718.00	72,434.70
20	Backfill (General Fill)		6,2560.00	TN	16.28	1,018,476.80
21	Plantings (Trees)		200.00	EA	481.73	96,346.00
22	Plantings (Grass)		15.000	AC	6,675.18	100,127.70
23	Plantings (Wetlands)		5.000	AC	22,480.77	112,403.85
24	T&D Non Haz		69,550.00	TN	42.82	2,978,131.00
25	T&D Haz		100.000	TN	267.63	26,763.00
26	Supplemental Investigation		1	LS	30,000.00	30,000.00
27	O&M - Creek Area		5	YE	30,000.00	150,000.00
28	Demobilization		1.000	LS	178,535.52	178,535.52
Bid Total						<u>\$9,104,104.65</u>

Table 6.9

Comparative Ranking of Mud Creek Sediment/Soil Remedial Alternatives
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY

	Sediment/Soil Alternative							
	1	2	3	4	5A	5B	6	7
	No Action	Institutional Control	Excavation to Site Specific (With Consideration)	Excavation to Site Specific	Excavation to Restricted Residential	Excavation to Class C/Residential	Excavation to Class A/Ecological	Excavation to Class A/Unrestricted
Overall Protection of Human Health + Environmental	1	2	8.5	9.5	10	9.5	8.5	8.5
Compliance with SCGs	1	2	7.5	8.5	9.5	9.5	9.5	10
Reduction of Toxicity, Mobility, and Volume	1	1	7.5	8.5	9.5	9.5	10	10
Short-Term Effectiveness	10	10	9	8	7	6	5	4
Long-Term Effectiveness and Permanence	1	2	8	9	9.5	9.5	9.5	10
Implementability	10	9	9	8	7	6	5	4
Cost	10	10	6	5	4	3	2	1
Preliminary Estimated Cost	\$0	\$219,000,000	\$3,700,000	\$4,800,000	\$5,300,000	\$5,800,000	\$7,300,000	\$9,100,000
TOTAL SCORE	34	36	55.5	56.5	56.5	53	49.5	47.5

Note:

* Alternatives of same ranking are equally effective.

Table 6.10

**Comparative Excavation Volumes and Mass of SOCs-Mud Creek
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY**

Alternative Evaluation for Sediment Removal

Alternative	Description	Estimated Removal Volume (Y ³)	Contaminant Mass Removal (lbs)			Contaminant Mass in Fill (lbs)		Removal (lbs)			Percent Removals (%)			
			Nickel	Chromium	PCB	Nickel	Chromium	Nickel	Chromium	PCBs	Nickel	Chromium	PCBs>1ppm	PCBs>0.1ppm
3	Site Specific with Consideration	847	1,862	503	29	39	30	1,823	473	29	69.9%	84.8%	97.5%	80.6%
4	Site Specific	1,327	2,266	565	30	60	47	2,206	518	30	84.6%	92.8%	100.0%	83.3%
5A	Restricted Residential	1,362	2,286	569	30	62	48	2,224	521	30	85.3%	93.3%	100.0%	83.3%
5B	Class C	1,729	2,349	590	30	79	61	2,270	529	30	87.0%	94.8%	100.0%	83.3%
6	Class B	2,659	2,730	653	36	121	94	2,609	558	36	100.0%	100.0%	100.0%	100.0%

Alternative Evaluation for Soil Removal

Alternative	Description	Estimated Removal Volume (Y ³)	Contaminant Mass Removal (lbs)			Contaminant Mass in Fill (lbs)		Removal (lbs)			Percent Removals (%)			
			Nickel	Chromium	PCB	Nickel	Chromium	Nickel	Chromium	PCBs	Nickel	Chromium	PCBs>1ppm	PCBs>0.1ppm
3	Site Specific with Consideration	12,878	8,353	2,324	65	585	457	7,768	1,867	65	40.8%	44.4%	95.6%	57.5%
4	Site Specific	18,409	11,485	3,595	93	838	653	10,647	2,942	93	55.9%	70.0%	100.0%	82.3%
5A	Restricted Residential	19,376	12,180	3,695	93	882	688	11,298	3,007	93	59.4%	71.5%	100.0%	82.3%
5B	Residential	23,277	14,118	4,043	101	1,059	826	13,059	3,217	101	68.6%	76.5%	100.0%	89.4%
6	Lower of Res/Eco	33,293	19,257	4,903	112	1,515	1,182	17,742	3,722	112	93.2%	88.5%	100.0%	99.1%
7	Unrestricted	43,682	21,021	5,756	113	1,988	1,550	19,034	4,206	113	100.0%	100.0%	100.0%	100.0%

Alternative Evaluation for Total Removal

Alternative	Description	Estimated Removal Volume (Y ³)	Contaminant Mass Removal (lbs)			Contaminant Mass in Fill (lbs)		Removal (lbs)			Percent Removals (%)			
			Nickel	Chromium	PCB	Nickel	Chromium	Nickel	Chromium	PCBs	Nickel	Chromium	PCBs>1ppm	PCBs>0.1ppm
3	Site Specific with Consideration	13,725	10,215	2,827	94	624	487	9,591	2,340	94	44.3%	49.1%	96.2%	65.0%
4	Site Specific	19,736	13,751	4,160	123	898	700	12,853	3,460	123	59.4%	72.6%	100.0%	82.4%
5A	Restricted Residential	20,738	14,466	4,264	123	944	736	13,522	3,528	123	62.5%	74.1%	100.0%	82.4%
5B	Residential	25,006	16,467	4,633	131	1,138	887	15,329	3,746	131	70.8%	78.6%	100.0%	88.5%
6	Lower of Res/Eco	35,022	21,605	5,493	142	1,594	1,243	20,012	4,250	142	92.5%	89.2%	100.0%	95.9%
7	Unrestricted	46,341	23,751	6,409	148	2,109	1,645	21,642	4,764	148	100.0%	100.0%	100.0%	100.0%

Note:

Percent Removals calculated based on mass exceeding most stringent criteria as Nickel > 30 ppm, Chromium > 30 ppm, and PCB > 1 ppm and > 0.1 ppm.

Table 7.1

Comparative Ranking of Drainage Systems Remedial Alternatives
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY

	Former Landfill Alternatives						
	1 No Action	2 Institutional Control	3 Capping	4 Excavation to Industrial &	5 Excavation to Site Specific	6 Excavation to	7 Placement Within a Liner
Overall Protection of Human Health + Environmental	1	2	3	4	5	5	5
Compliance with SCGs	1	2	3	4	4	5	3
Reduction of Toxicity, Mobility, and Volume	1	1	3	4	5	5	3
Short-Term Effectiveness	5	5	4	3	2	1	1
Long-Term Effectiveness and Permanence	1	2	3	4	5	5	3
Implementability	5	5	4	3	2	1	1
Cost	5	5	4	3	2	1	1
Land Use	1	2	3	4	4	5	3
Preliminary Estimated Cost	\$0	\$0	\$130,000	\$420,000	\$900,000	\$2,570,000	\$1,500,000
TOTAL SCORE	20	24	27	29	29	0	20

Note:

* Alternatives of same ranking are equally effective.

Table 7.1

Comparative Ranking of Drainage Systems Remedial Alternatives
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY

	On-Site Ditch Alternatives							
	1 No Action	2 Institutional Control	3 Capping	4 Sediment Traps	5 North Excavation to Industrial	5 South Excavation to Industrial	6 Excavation to Site Specific	7 Excavation to Unrestricted
Overall Protection of Human Health + Environmental	1	2	4	3	3	3	5	5
Compliance with SCGs	1	2	3	2	2	2	5	5
Reduction of Toxicity, Mobility, and Volume	1	1	2	2	2	2	5	5
Short-Term Effectiveness	5	5	3	4	3	5	2	1
Long-Term Effectiveness and Permanence	1	2	3	2	2	2	5	5
Implementability	5	5	3	3	3	5	2	1
Cost	5	5	4	4	4	5	3	1
Land Use	1	1	4	2	2	2	4	5
Preliminary Estimated Cost - North	\$0	\$0	\$290,000	\$30,000	\$50,000		\$550,000	\$1,270,000
Preliminary Estimated Cost - South	\$0	\$0	\$70,000	\$20,000		\$0	\$220,000	\$580,000
TOTAL SCORE	20	0	23	0	26	0	22	0

Note:

* Alternatives of same ranking are equally effective.

Table 7.1

Comparative Ranking of Drainage Systems Remedial Alternatives
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY

	On-Site Sewer System Alternatives				
	1 No Action	2 One Time Cleaning	3 Periodic Cleaning	4 Removal to POG	5 Removal to Unrestricted
Overall Protection of Human Health + Environmental	5	5	5	5	5
Compliance with SCGs	5	5	5	5	5
Reduction of Toxicity, Mobility, and Volume	4	4	4	4	4
Short-Term Effectiveness	5	4	3	1	1
Long-Term Effectiveness and Permanence	4	4	4	4	4
Implementability	5	4	3	1	1
Cost	5	4	3	1	1
Land Use	5	5	5	2	1
Preliminary Estimated Cost	<u>\$0</u>	<u>\$70,000</u>	<u>\$400,000</u>	<u>\$1,540,000</u>	<u>\$1,730,000</u>
TOTAL SCORE	38	0	35	0	22

Note:

* Alternatives of same ranking are equally effective.

	Sewer Treatment System Alternatives		
	1 No Action - Decommission	2 Continue Under	3 Continue Under BCP
Overall Protection of Human Health + Environmental	1	5	5
Compliance with SCGs	1	5	5
Reduction of Toxicity, Mobility, and Volume	1	5	5
Short-Term Effectiveness	2	5	5
Long-Term Effectiveness and Permanence	1	5	5
Implementability	1	3	3
Cost	1	5	5
Land Use	1	5	5
Preliminary Estimated Cost	<u>\$240,000</u>	<u>\$0</u>	<u>\$0</u>
TOTAL SCORE	9	0	38

Note:

* Alternatives of same ranking are equally effective.

Table 7.2

Alternative Costs for Mud Creek Drainage System Alternatives
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY

Task No.	Task Description	Estimated Quantity	Unit	Unit Price	Total Cost
Former Landfill - Alternative 3: Capping					
1	Project Management	1	LS	\$ 13,000.00	\$ 13,000.00
2	Mobilization/Demobilization	1	LS	\$ 10,000.00	\$ 10,000.00
3	Utility Investigation and Surveying	1	LS	\$ 2,500.00	\$ 2,500.00
4	Erosion and Sediment Controls	1500	LF	\$ 8.00	\$ 12,000.00
5	Air Monitoring and Dust Suppression	4	WEEKS	\$ 1,500.00	\$ 6,000.00
6	Pregrading of Area	3	DAYS	\$ 720.00	\$ 2,160.00
7	Clearing Vegetation	1	LS	\$ 2,000.00	\$ 2,000.00
8	Supply and Place Topsoil and Seeding	1150	CY	\$ 52.00	\$ 59,800.00
9	Supply and Place Clean Soil	1150	CY	\$ 20.00	\$ 23,000.00
Capital Costs					\$ 130,460.00
10	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ 1,000.00	\$ 30,000.00
Operation & Maintenance Costs					\$ 30,000.00
Former Landfill - Alternative 3 Costs					\$ 160,460.00
Former Landfill - Alternative 4: Excavation and Off-Site Disposal to Industrial SCOs With Capping (Assumes 5000 Square Foot Excavation to 6')					
1	Project Management	1	LS	\$ 40,000.00	\$ 40,000.00
2	Mobilization/Demobilization	1	LS	\$ 20,000.00	\$ 20,000.00
3	Utility Investigation and Surveying	1	LS	\$ 2,500.00	\$ 2,500.00
4	Erosion and Sediment Controls	1500	LF	\$ 8.00	\$ 12,000.00
5	Air Monitoring and Dust Suppression	5	WEEKS	\$ 1,500.00	\$ 7,500.00
6	Excavation of Overlying Soil	740	CY	\$ 40.00	\$ 29,600.00
7	Excavation and Live Loading of Impacted Soils	360	CY	\$ 50.00	\$ 18,000.00
8	Profile Waste (Assume 1 per 500 CY)	1	EA	\$ 750.00	\$ 750.00
9	Transportation and Disposal of TSCA Regulated (>50 PPM PCBs)	550	TON	\$ 322.00	\$ 177,100.00
10	Transportation and Disposal of Non-Haz (25 < PCBs < 50 PPM)	0	TON	\$ 99.00	\$ -
11	Transportation and Disposal of Non-Haz (25 < PCBs)	0	TON	\$ 53.00	\$ -
12	Clearing Vegetation	1	LS	\$ 500.00	\$ 500.00
13	Backfill with Excavated Material	740	CY	\$ 20.00	\$ 14,800.00
14	Regrade Site to Consolidate for Removed Material	2	Days	\$ 720.00	\$ 1,440.00
15	Supply and Place Topsoil and Seeding Over Entire Landfill (6")	1150	CY	\$ 52.00	\$ 59,800.00
16	Supply and Place Clean Soil Over Entire Site (6")	1150	CY	\$ 20.00	\$ 23,000.00
17	Supply and Place Filter Fabric	6800	SY	\$ 2.00	\$ 13,600.00
Capital Costs					\$ 420,590.00
18	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ 1,000.00	\$ 30,000.00
Operation & Maintenance Costs					\$ 30,000.00
Former Landfill - Alternative 4 Costs					\$ 450,590.00

Table 7.2

Alternative Costs for Mud Creek Drainage System Alternatives
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY

Task No.	Task Description	Estimated Quantity	Unit	Unit Price	Total Cost
Former Landfill - Alternative 5: Excavation and Off-Site Disposal to Site Specific Levels With Capping (Assumes 15,000 Sq. Ft. Excavation to 6')					
1	Project Management	1	LS	\$ 50,000.00	\$ 50,000.00
2	Mobilization/Demobilization	1	LS	\$ 25,000.00	\$ 25,000.00
3	Utility Investigation and Surveying	1	LS	\$ 2,500.00	\$ 2,500.00
4	Erosion and Sediment Controls	1500	LF	\$ 8.00	\$ 12,000.00
5	Air Monitoring and Dust Suppression	6	WEEKS	\$ 1,500.00	\$ 9,000.00
6	Excavation and Live Loading of Impacted Soils	4300	CY	\$ 50.00	\$ 215,000.00
7	Profile Waste (Assume 1 per 500 CY)	8	EA	\$ 750.00	\$ 6,000.00
8	Transportation and Disposal of TSCA Regulated (>50 PPM PCBs)	550	TON	\$ 322.00	\$ 177,100.00
9	Transportation and Disposal of Non-Haz (25 < PCBS < 50 PPM)	0	TON	\$ 99.00	\$ -
10	Transportation and Disposal of Non-Haz (25 < PCBS)	5900	TON	\$ 53.00	\$ 312,700.00
11	Clearing Vegetation	1	LS	\$ 1,000.00	\$ 1,000.00
12	Regrade Site to Consolidate for Removed Material	4	Days	\$ 720.00	\$ 2,880.00
13	Supply and Place Topsoil and Seeding (6")	1000	CY	\$ 52.00	\$ 52,000.00
14	Supply and Place Clean Soil (6")	1000	CY	\$ 20.00	\$ 20,000.00
15	Supply and Place Filter Fabric	6000	SY	\$ 2.00	\$ 12,000.00
Capital Costs					\$ 897,180.00
16	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ 1,000.00	\$ 30,000.00
Operation & Maintenance Costs					\$ 30,000.00
Former Landfill - Alternative 5 Costs					\$ 927,180.00
Former Landfill - Alternative 6: Excavation and Off-Site Disposal of All Soil to Unrestricted Use SCOs					
1	Project Management	1	LS	\$ 75,000.00	\$ 75,000.00
2	Mobilization/Demobilization	1	LS	\$ 40,000.00	\$ 40,000.00
3	Utility Investigation and Surveying	1	LS	\$ 2,500.00	\$ 2,500.00
4	Erosion and Sediment Controls	1500	LF	\$ 8.00	\$ 12,000.00
5	Air Monitoring and Dust Suppression	15	WEEKS	\$ 1,500.00	\$ 22,500.00
6	Excavation and Live Loading of Impacted Soils	16500	CY	\$ 50.00	\$ 825,000.00
7	Profile Waste (Assume 1 per 500 CY)	33	EA	\$ 750.00	\$ 24,750.00
8	Transportation and Disposal of TSCA Regulated (>50 PPM PCBs)	550	TON	\$ 322.00	\$ 177,100.00
9	Transportation and Disposal of Non-Haz (25 < PCBS < 50 PPM)	0	TON	\$ 99.00	\$ -
10	Transportation and Disposal of Non-Haz (25 < PCBS)	24200	TON	\$ 53.00	\$ 1,282,600.00
11	Clearing Vegetation	1	LS	\$ 2,000.00	\$ 2,000.00
12	Supply and Place Topsoil and Seeding	1150	CY	\$ 52.00	\$ 59,800.00
13	Supply and Place Clean Soil	2500	CY	\$ 20.00	\$ 50,000.00
Capital Costs					\$ 2,573,250.00
14	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ -	\$ -
Operation & Maintenance Costs					\$ -
Former Landfill - Alternative 6 Costs					\$ 2,573,250.00

Table 7.2

Alternative Costs for Mud Creek Drainage System Alternatives
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY

Task No.	Task Description	Estimated Quantity	Unit	Unit Price	Total Cost
Former Landfill - Alternative 7: Excavation and Placement on a Liner with Capping					
1	Project Management	1	LS	\$ 75,000.00	\$ 75,000.00
2	Mobilization/Demobilization	1	LS	\$ 40,000.00	\$ 40,000.00
3	Utility Investigation and Surveying	1	LS	\$ 2,500.00	\$ 2,500.00
4	Erosion and Sediment Controls	1500	LF	\$ 8.00	\$ 12,000.00
5	Air Monitoring and Dust Suppression	15	WEEKS	\$ 1,500.00	\$ 22,500.00
6	Excavation of Impacted Soils and Temporary Placement	16500	CY	\$ 40.00	\$ 660,000.00
7	Construction of Temporary Placement Area	1	LS	\$ 25,000.00	\$ 25,000.00
8	Supply and Install Liner	46000	SF	\$ 3.00	\$ 138,000.00
9	Backfilling of Excavated Soil onto Liner	16500	CY	\$ 25.00	\$ 412,500.00
10	Clearing Vegetation	1	LS	\$ 2,000.00	\$ 2,000.00
11	Supply and Place Topsoil and Seeding	1150	CY	\$ 52.00	\$ 59,800.00
12	Supply and Place Clean Soil	2500	CY	\$ 20.00	\$ 50,000.00
Capital Costs					\$ 1,499,300.00
13	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ 1,000.00	\$ 30,000.00
Operation & Maintenance Costs					\$ 30,000.00
Former Landfill - Alternative 7 Costs					\$ 1,529,300.00
North Ditches - Alternative 3: Capping (Assumes 30 foot wide placement)					
1	Project Management	1	LS	\$ 29,000.00	\$ 29,000.00
2	Mobilization/Demobilization	1	LS	\$ 15,000.00	\$ 15,000.00
3	Utility Investigation and Surveying	1	LS	\$ 2,500.00	\$ 2,500.00
4	Erosion and Sediment Controls	7500	LF	\$ 8.00	\$ 60,000.00
5	Air Monitoring and Dust Suppression	5	WEEKS	\$ 1,500.00	\$ 7,500.00
6	Pregrading of Area	3	DAYS	\$ 720.00	\$ 2,160.00
7	Clearing Vegetation	1	LS	\$ 5,000.00	\$ 5,000.00
8	Supply and Place Topsoil and Seeding	1200	CY	\$ 52.00	\$ 62,400.00
9	Supply and Place Clean Soil	1200	CY	\$ 20.00	\$ 24,000.00
10	Supply and Place Rip Rap	2400	TON	\$ 24.00	\$ 57,600.00
11	Supply and Place Filter Fabric	12000	SY	\$ 2.00	\$ 24,000.00
Capital Costs					\$ 289,160.00
12	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ 2,500.00	\$ 75,000.00
Operation & Maintenance Costs					\$ 75,000.00
North Ditches - Alternative 3 Costs					\$ 364,160.00

Table 7.2

Alternative Costs for Mud Creek Drainage System Alternatives
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY

Task No.	Task Description	Estimated Quantity	Unit	Unit Price	Total Cost
North Ditches - Alternative 4: Collection Through Sediment Traps					
1	Project Management	1	LS	\$ 2,000.00	\$ 2,000.00
2	Mobilization/Demobilization	1	LS	\$ 1,500.00	\$ 1,500.00
3	Utility Investigation and Surveying	1	LS	\$ 2,500.00	\$ 2,500.00
4	Erosion and Sediment Controls	200	LF	\$ 8.00	\$ 1,600.00
5	Air Monitoring and Dust Suppression	1	WEEKS	\$ 1,500.00	\$ 1,500.00
6	Pregrading of Area	1	DAYS	\$ 720.00	\$ 720.00
7	Clearing Vegetation	1	LS	\$ 500.00	\$ 500.00
8	Supply and Place Liner	1600	SF	\$ 10.00	\$ 16,000.00
9	Supply and Place Filter Material	2	EACH	\$ 1,500.00	\$ 3,000.00
10	Restoration	2	EACH	\$ 500.00	\$ 1,000.00
Capital Costs					\$ 30,320.00
10	Long Term Monitoring & Maintenance (including PM and Reporting)	5	YRS	\$ 2,500.00	\$ 12,500.00
Operation & Maintenance Costs					\$ 12,500.00
North Ditches - Alternative 4 Costs					\$ 42,820.00
North Ditches - Alternative 5: Excavation and Off-Site Disposal to Industrial SCOs					
1	Project Management	1	LS	\$ 5,000.00	\$ 5,000.00
2	Mobilization/Demobilization	1	LS	\$ 5,000.00	\$ 5,000.00
3	Utility Investigation and Surveying	1	LS	\$ 2,500.00	\$ 2,500.00
4	Erosion and Sediment Controls	1000	LF	\$ 8.00	\$ 8,000.00
5	Air Monitoring and Dust Suppression	1	WEEKS	\$ 1,500.00	\$ 1,500.00
6	Excavation and Live Loading of Impacted Soils	100	CY	\$ 50.00	\$ 5,000.00
7	Profile Waste (Assume 1 per 500 CY)	1	EA	\$ 750.00	\$ 750.00
8	Transportation and Disposal of TSCA Regulated (>50 PPM PCBs)	0	TON	\$ 322.00	\$ -
9	Transportation and Disposal of Non-Haz (Nickel > 10,000 PPM)	140	TON	\$ 99.00	\$ 13,860.00
10	Transportation and Disposal of Non-Haz (25 < PCBs)	0	TON	\$ 53.00	\$ -
11	Clearing Vegetation	1	LS	\$ 500.00	\$ 500.00
12	Supply and Place Topsoil and Seeding	100	CY	\$ 52.00	\$ 5,200.00
13	Supply and Place Clean Soil	0	CY	\$ 20.00	\$ -
14	Supply and Place Rip Rap	0	TON	\$ 24.00	\$ -
15	Supply and Place Filter Fabric	560	SY	\$ 2.00	\$ 1,120.00
Capital Costs					\$ 48,430.00
16	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ 100.00	\$ 3,000.00
Operation & Maintenance Costs					\$ 3,000.00
North Ditches - Alternative 6 Costs					\$ 51,430.00

Table 7.2

Alternative Costs for Mud Creek Drainage System Alternatives
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY

Task No.	Task Description	Estimated Quantity	Unit	Unit Price	Total Cost
North Ditches - Alternative 6: Excavation and Off-Site Disposal to Site Specific Screening Levels (Assumes 25-foot wide removal)					
1	Project Management	1	LS	\$ 50,000.00	\$ 50,000.00
2	Mobilization/Demobilization	1	LS	\$ 20,000.00	\$ 20,000.00
3	Utility Investigation and Surveying	1	LS	\$ 2,500.00	\$ 2,500.00
4	Erosion and Sediment Controls	4000	LF	\$ 8.00	\$ 32,000.00
5	Air Monitoring and Dust Suppression	6	WEEKS	\$ 1,500.00	\$ 9,000.00
6	Excavation and Live Loading of Impacted Soils	2600	CY	\$ 50.00	\$ 130,000.00
7	Profile Waste (Assume 1 per 500 CY)	5	EA	\$ 750.00	\$ 3,750.00
8	Transportation and Disposal of TSCA Regulated (>50 PPM PCBs)	0	TON	\$ 322.00	\$ -
9	Transportation and Disposal of Non-Haz (Nickel > 10,000 PPM)	140	TON	\$ 99.00	\$ 13,860.00
10	Transportation and Disposal of Non-Haz (Nickel > 400 PPM)	3660	TON	\$ 53.00	\$ 193,980.00
11	Clearing Vegetation	1	LS	\$ 3,500.00	\$ 3,500.00
12	Supply and Place Topsoil and Seeding	660	CY	\$ 52.00	\$ 34,320.00
13	Supply and Place Clean Soil	660	CY	\$ 20.00	\$ 13,200.00
14	Supply and Place Rip Rap	1350	TON	\$ 24.00	\$ 32,400.00
15	Supply and Place Filter Fabric	6700	SY	\$ 2.00	\$ 13,400.00
Capital Costs					\$ 551,910.00
16	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ 2,500.00	\$ 75,000.00
Operation & Maintenance Costs					\$ 75,000.00
North Ditches - Alternative 6 Costs					\$ 626,910.00
North Ditches - Alternative 7: Excavation and Off-Site Disposal to Unrestricted Use SCOs (Assumes 25-foot wide removal)					
1	Project Management	1	LS	\$ 58,000.00	\$ 58,000.00
2	Mobilization/Demobilization	1	LS	\$ 20,000.00	\$ 20,000.00
3	Utility Investigation and Surveying	1	LS	\$ 2,500.00	\$ 2,500.00
4	Erosion and Sediment Controls	7200	LF	\$ 8.00	\$ 57,600.00
5	Air Monitoring and Dust Suppression	15	WEEKS	\$ 1,500.00	\$ 22,500.00
6	Excavation and Live Loading of Impacted Soils	6700	CY	\$ 50.00	\$ 335,000.00
7	Profile Waste (Assume 1 per 500 CY)	14	EA	\$ 750.00	\$ 10,500.00
8	Transportation and Disposal of TSCA Regulated (>50 PPM PCBs)	0	TON	\$ 322.00	\$ -
9	Transportation and Disposal of Non-Haz (Nickel > 10,000 PPM)	140	TON	\$ 99.00	\$ 13,860.00
10	Transportation and Disposal of Non-Haz (Nickel > 30 PPM)	9910	TON	\$ 53.00	\$ 525,230.00
11	Clearing Vegetation	1	LS	\$ 5,000.00	\$ 5,000.00
12	Supply and Place Topsoil and Seeding	1200	CY	\$ 52.00	\$ 62,400.00
13	Supply and Place Clean Soil	3900	CY	\$ 20.00	\$ 78,000.00
14	Supply and Place Rip Rap	2400	TON	\$ 24.00	\$ 57,600.00
15	Supply and Place Filter Fabric	12000	SY	\$ 2.00	\$ 24,000.00
Capital Costs					\$ 1,272,190.00
16	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ 1,000.00	\$ 30,000.00
Operation & Maintenance Costs					\$ 30,000.00
North Ditches - Alternative 7 Costs					\$ 1,302,190.00

Table 7.2

Alternative Costs for Mud Creek Drainage System Alternatives
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY

Task No.	Task Description	Estimated Quantity	Unit	Unit Price	Total Cost
South Ditches - Alternative 3: Capping (Assumes 30-foot wide placement)					
1	Project Management	1	LS	\$ 7,000.00	\$ 7,000.00
2	Mobilization/Demobilization	1	LS	\$ 10,000.00	\$ 10,000.00
3	Utility Investigation and Surveying	1	LS	\$ 2,500.00	\$ 2,500.00
4	Erosion and Sediment Controls	1340	LF	\$ 8.00	\$ 10,720.00
5	Air Monitoring and Dust Suppression	3	WEEKS	\$ 1,500.00	\$ 4,500.00
6	Pregrading of Area	3	DAYS	\$ 720.00	\$ 2,160.00
7	Clearing Vegetation	1	LS	\$ 500.00	\$ 500.00
8	Supply and Place Topsoil and Seeding	250	CY	\$ 52.00	\$ 13,000.00
9	Supply and Place Clean Soil	250	CY	\$ 20.00	\$ 5,000.00
10	Supply and Place Rip Rap	375	TON	\$ 24.00	\$ 9,000.00
11	Supply and Place Filter Fabric	2600	SY	\$ 2.00	\$ 5,200.00
Capital Costs					\$ 69,580.00
12	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ 2,500.00	\$ 75,000.00
Operation & Maintenance Costs					\$ 75,000.00
South Ditches - Alternative 3 Costs					\$ 144,580.00
South Ditches - Alternative 4: Collection Through Sediment Traps					
1	Project Management	1	LS	\$ 2,000.00	\$ 2,000.00
2	Mobilization/Demobilization	1	LS	\$ 1,500.00	\$ 1,500.00
3	Utility Investigation and Surveying	1	LS	\$ 2,500.00	\$ 2,500.00
4	Erosion and Sediment Controls	200	LF	\$ 8.00	\$ 1,600.00
5	Air Monitoring and Dust Suppression	1	WEEKS	\$ 1,500.00	\$ 1,500.00
6	Pregrading of Area	1	DAYS	\$ 720.00	\$ 720.00
7	Clearing Vegetation	1	LS	\$ 500.00	\$ 500.00
8	Supply and Place Liner	500	SF	\$ 10.00	\$ 5,000.00
9	Supply and Place Filter Material	4	EACH	\$ 1,000.00	\$ 4,000.00
10	Restoration	4	EACH	\$ 500.00	\$ 2,000.00
Capital Costs					\$ 21,320.00
11	Long Term Monitoring & Maintenance (including PM and Reporting)	5	YRS	\$ 2,500.00	\$ 12,500.00
Operation & Maintenance Costs					\$ 12,500.00
South Ditches - Alternative 4 Costs					\$ 33,820.00

Table 7.2

Alternative Costs for Mud Creek Drainage System Alternatives
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY

Task No.	Task Description	Estimated Quantity	Unit	Unit Price	Total Cost
South Ditches - Alternative 5: Excavation and Off-Site Disposal to Industrial SCOs					
1	Project Management	0	LS	\$ 8,000.00	\$ -
2	Mobilization/Demobilization	0	LS	\$ 10,000.00	\$ -
3	Utility Investigation and Surveying	0	LS	\$ 2,500.00	\$ -
4	Erosion and Sediment Controls	0	LS	\$ 500.00	\$ -
5	Air Monitoring and Dust Suppression	0	LS	\$ 500.00	\$ -
6	Excavation and Live Loading of Impacted Soils	0	CY	\$ 50.00	\$ -
7	Profile Waste (Assume 1 per 500 CY)	0	EA	\$ 750.00	\$ -
8	Transportation and Disposal of TSCA Regulated (>50 PPM PCBs)	0	TON	\$ 322.00	\$ -
9	Transportation and Disposal of Non-Haz (25 < PCBS < 50 PPM)	0	TON	\$ 99.00	\$ -
10	Transportation and Disposal of Non-Haz (25 > PCBS)	0	TON	\$ 53.00	\$ -
11	Clean Fill and Compaction - w/ Analytical	0	CY	\$ 20.00	\$ -
12	Supply and Place Topsoil and Seeding	0	CY	\$ 52.00	\$ -
Capital Costs					\$ -
13	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ 2,500.00	\$ 75,000.00
Operation & Maintenance Costs					\$ 75,000.00
South Ditches - Alternative 5 Costs					\$ 75,000.00
South Ditches - Alternative 6: Excavation and Off-Site Disposal to Site Specific Screening Levels (Assumes 20-foot wide removal)					
1	Project Management	1	LS	\$ 20,000.00	\$ 20,000.00
2	Mobilization/Demobilization	1	LS	\$ 20,000.00	\$ 20,000.00
3	Utility Investigation and Surveying	1	LS	\$ 2,500.00	\$ 2,500.00
4	Erosion and Sediment Controls	1340	LF	\$ 8.00	\$ 10,720.00
5	Air Monitoring and Dust Suppression	4	WEEKS	\$ 1,500.00	\$ 6,000.00
6	Excavation and Live Loading of Impacted Soils	800	CY	\$ 50.00	\$ 40,000.00
7	Profile Waste (Assume 1 per 500 CY)	2	EA	\$ 750.00	\$ 1,500.00
8	Transportation and Disposal of TSCA Regulated (>50 PPM PCBs)	0	TON	\$ 322.00	\$ -
9	Transportation and Disposal of Non-Haz (25 < PCBS < 50 PPM)	0	TON	\$ 99.00	\$ -
10	Transportation and Disposal of Non-Haz (25 > PCBS)	1200	TON	\$ 53.00	\$ 63,600.00
11	Clearing Vegetation	1	LS	\$ 500.00	\$ 500.00
12	Supply and Place Topsoil and Seeding	250	CY	\$ 52.00	\$ 13,000.00
13	Supply and Place Clean Soil	250	CY	\$ 20.00	\$ 5,000.00
14	Supply and Place Rip Rap	375	TON	\$ 24.00	\$ 9,000.00
15	Supply and Place Filter Fabric	2600	SY	\$ 2.00	\$ 5,200.00
16	Install two Sediment Traps	1	LS	\$ 21,000.00	\$ 21,000.00
Capital Costs					\$ 218,020.00
16	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ 2,500.00	\$ 75,000.00
Operation & Maintenance Costs					\$ 75,000.00
South Ditches - Alternative 6 Costs					\$ 293,020.00

Table 7.2

Alternative Costs for Mud Creek Drainage System Alternatives
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY

Task No.	Task Description	Estimated Quantity	Unit	Unit Price	Total Cost
South Ditches - Alternative 7: Excavation and Off-Site Disposal to Unrestricted Use SCOs (Assumes 25-foot wide removal)					
1	Project Management	1	LS	\$ 58,000.00	\$ 58,000.00
2	Mobilization/Demobilization	1	LS	\$ 20,000.00	\$ 20,000.00
3	Utility Investigation and Surveying	1	LS	\$ 2,500.00	\$ 2,500.00
4	Erosion and Sediment Controls	1340	LF	\$ 8.00	\$ 10,720.00
5	Air Monitoring and Dust Suppression	10	WEEKS	\$ 1,500.00	\$ 15,000.00
6	Excavation and Live Loading of Impacted Soils	3000	CY	\$ 50.00	\$ 150,000.00
7	Profile Waste (Assume 1 per 500 CY)	6	EA	\$ 750.00	\$ 4,500.00
8	Transportation and Disposal of TSCA Regulated (>50 PPM PCBs)	0	TON	\$ 322.00	\$ -
9	Transportation and Disposal of Non-Haz (25 < PCBS < 50 PPM)	0	TON	\$ 99.00	\$ -
10	Transportation and Disposal of Non-Haz (25 < PCBS)	4500	TON	\$ 53.00	\$ 238,500.00
11	Clearing Vegetation	1	LS	\$ 500.00	\$ 500.00
12	Supply and Place Topsoil and Seeding	250	CY	\$ 52.00	\$ 13,000.00
13	Supply and Place Clean Soil	2500	CY	\$ 20.00	\$ 50,000.00
14	Supply and Place Rip Rap	375	TON	\$ 24.00	\$ 9,000.00
15	Supply and Place Filter Fabric	2600	SY	\$ 2.00	\$ 5,200.00
Capital Costs					\$ 576,920.00
16	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ 1,000.00	\$ 30,000.00
Operation & Maintenance Costs					\$ 30,000.00
South Ditches - Alternative 7 Costs					\$ 606,920.00
On-Site Sewer System - Alternative 2: One Time Cleaning					
1	Project Management	1	LS	\$ 6,000.00	\$ 6,000.00
2	Mobilization/Demobilization	1	LS	\$ 5,000.00	\$ 5,000.00
3	Sewer Cleaning Contractor	1	LS	\$ 50,000.00	\$ 50,000.00
4	Disposal of Accumulated Material	1	LS	\$ 5,000.00	\$ 5,000.00
Capital Costs					\$ 66,000.00
5	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ 2,000.00	\$ 60,000.00
Operation & Maintenance Costs					\$ 60,000.00
On-Site Sewer System - Alternative 2 Costs					\$ 126,000.00

Table 7.2

Alternative Costs for Mud Creek Drainage System Alternatives
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY

Task No.	Task Description	Estimated Quantity	Unit	Unit Price	Total Cost
On-Site Sewer System - Alternative 3: Multiple Sewer Cleaning (Assumes Every 5 Years)					
1	Project Management	1	LS	\$ 36,000.00	\$ 36,000.00
2	Mobilization/Demobilization	6	EACH	\$ 5,000.00	\$ 30,000.00
3	Sewer Cleaning Contractor	6	EACH	\$ 50,000.00	\$ 300,000.00
4	Disposal of Accumulated Material	6	EACH	\$ 5,000.00	\$ 30,000.00
Capital Costs					\$ 396,000.00
5	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ 2,000.00	\$ 60,000.00
Operation & Maintenance Costs					\$ 60,000.00
On-Site Sewer System - Alternative 3 Costs					\$ 456,000.00
On-Site Sewer System - Alternative 4: Removal of Sewer and Excavation to POG SCOs with Replacement with Surface Drainage System					
1	Project Management	1	LS	\$ 100,000.00	\$ 100,000.00
2	Mobilization/Demobilization	1	LS	\$ 50,000.00	\$ 50,000.00
3	Utility Investigation and Surveying	1	LS	\$ 10,000.00	\$ 10,000.00
4	Erosion and Sediment Controls	11000	LF	\$ 8.00	\$ 88,000.00
5	Air Monitoring and Dust Suppression	20	WEEKS	\$ 1,500.00	\$ 30,000.00
6	Excavation and Live Loading of Impacted Soils	4250	CY	\$ 50.00	\$ 212,500.00
7	Profile Waste (Assume 1 per 500 CY)	9	EA	\$ 750.00	\$ 6,750.00
8	Excavation and Temporary Storage of Overlying Non Impacted Soils	4250	CY	\$ 40.00	\$ 170,000.00
9	Transportation and Disposal of Non-Haz (25 > PCBS)	6375	TON	\$ 53.00	\$ 337,875.00
10	Backfill with Excavated Material	4250	CY	\$ 20.00	\$ 85,000.00
11	Clearing Vegetation	1	LS	\$ 2,000.00	\$ 2,000.00
12	Supply and Place Topsoil and Seeding	325	CY	\$ 52.00	\$ 16,900.00
13	Supply and Place Clean Soil	2400	CY	\$ 20.00	\$ 48,000.00
14	Supply and Place Rip Rap	2400	TONS	\$ 24.00	\$ 57,600.00
15	Supply and Place Concrete Drainage Trough	2000	LF	\$ 150.00	\$ 300,000.00
16	Supply and Place Filter Fabric	12200	SY	\$ 2.00	\$ 24,400.00
Capital Costs					\$ 1,539,025.00
17	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ 2,000.00	\$ 60,000.00
Operation & Maintenance Costs					\$ 60,000.00
On-Site Sewer System - Alternative 4 Costs					\$ 1,599,025.00
Note - this alternative does not include any work that may be required on the sewers located beneath buildings					

Table 7.2

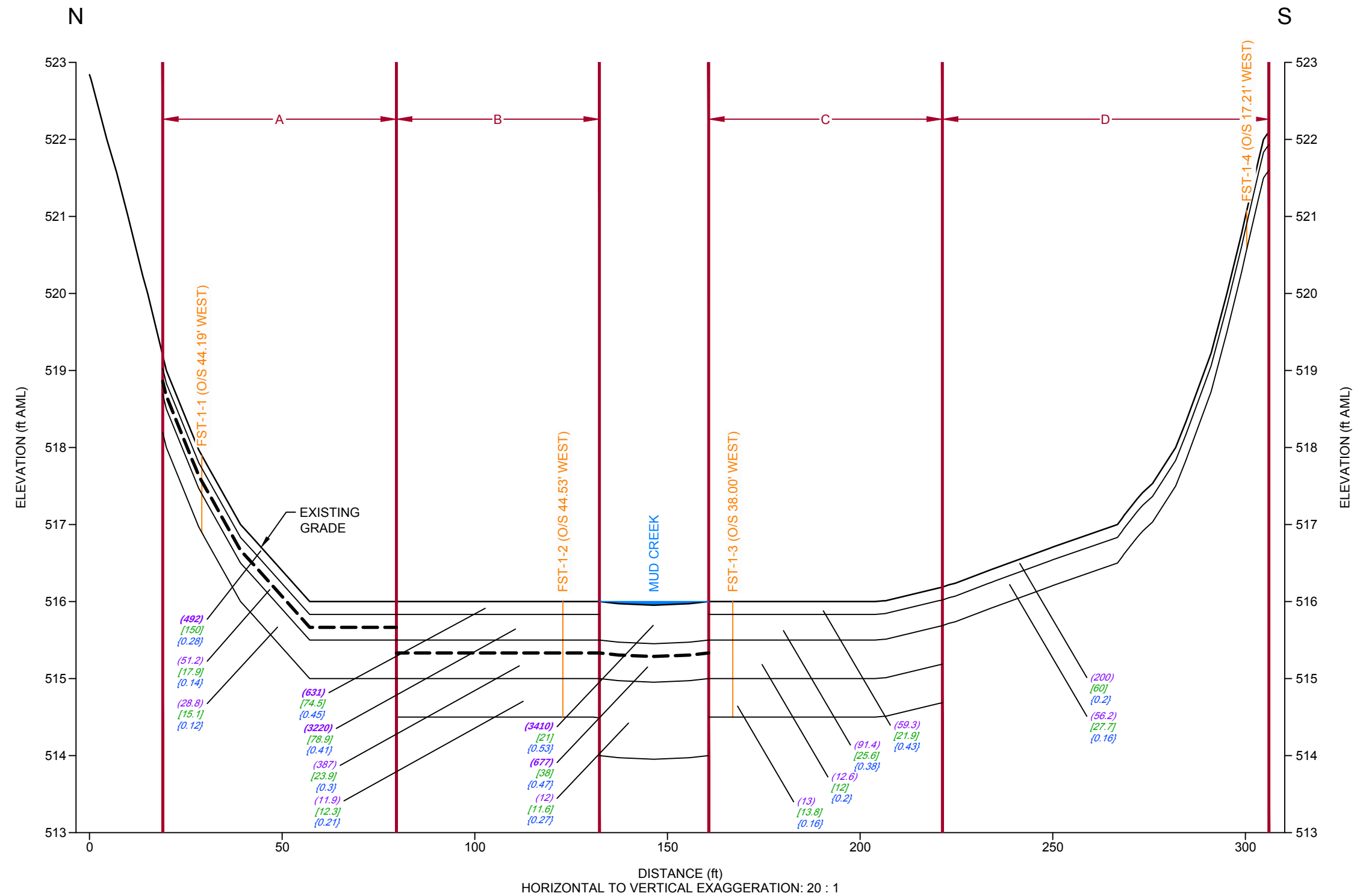
Alternative Costs for Mud Creek Drainage System Alternatives
Alternatives Assessment Report
SMC-Mud Creek
New Hartford, NY

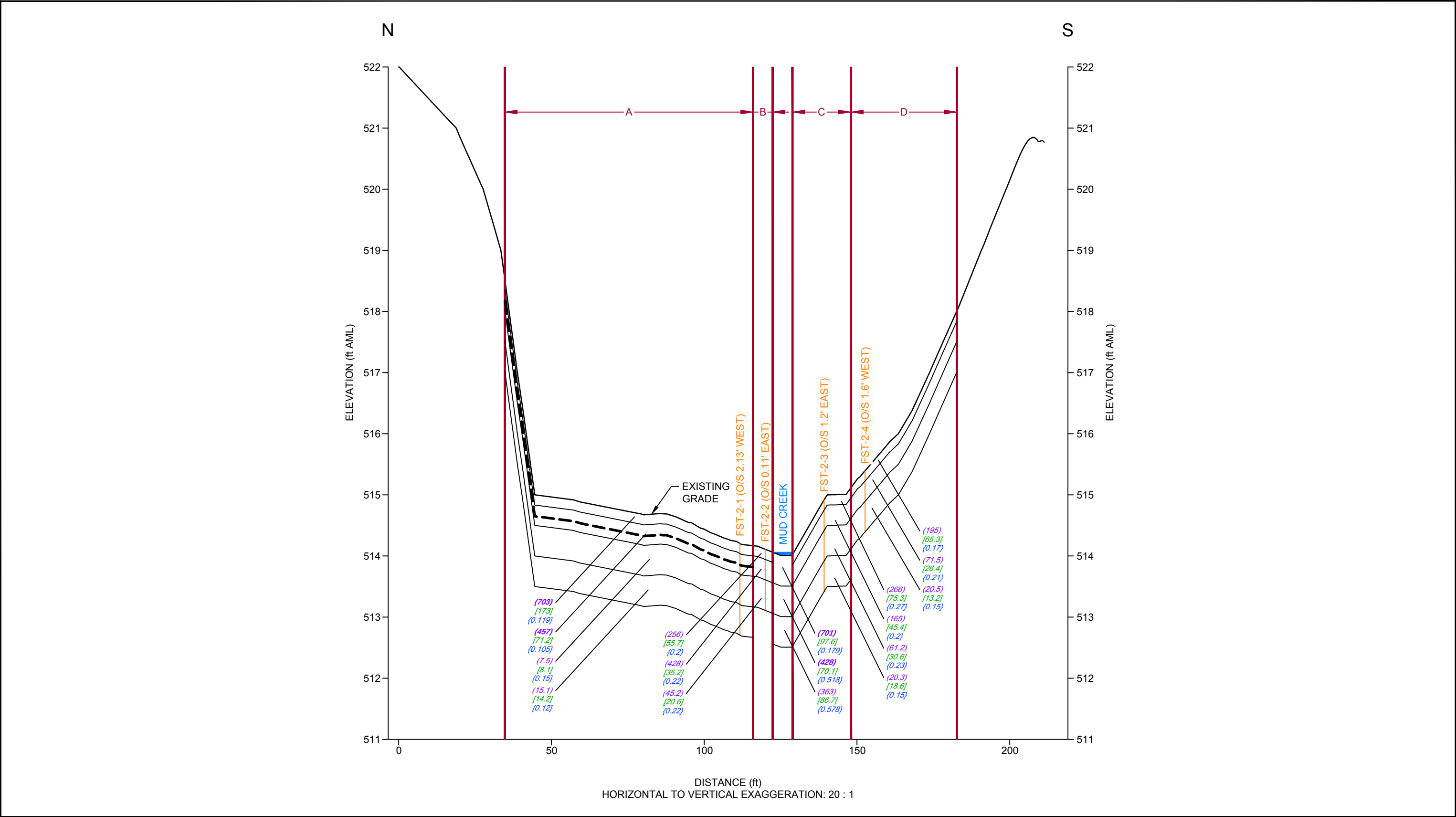
Task No.	Task Description	Estimated Quantity	Unit	Unit Price	Total Cost
On-Site Sewer System - Alternative 5: Removal of Sewer and Excavation to Unrestricted Use with Replacement with Surface Drainage System					
1	Project Management	1	LS	\$ 100,000.00	\$ 100,000.00
2	Mobilization/Demobilization	1	LS	\$ 50,000.00	\$ 50,000.00
3	Utility Investigation and Surveying	1	LS	\$ 10,000.00	\$ 10,000.00
4	Erosion and Sediment Controls	11000	LF	\$ 8.00	\$ 88,000.00
5	Air Monitoring and Dust Suppression	20	WEEKS	\$ 1,500.00	\$ 30,000.00
6	Excavation and Live Loading of Impacted Soils	6375	CY	\$ 50.00	\$ 318,750.00
7	Profile Waste (Assume 1 per 500 CY)	13	EA	\$ 750.00	\$ 9,750.00
8	Excavation and Temporary Storage of Overlying Non Impacted Soils	2125	CY	\$ 40.00	\$ 85,000.00
9	Transportation and Disposal of Non-Haz (25 > PCBS)	9600	TON	\$ 53.00	\$ 508,800.00
10	Backfill with Excavated Material	2125	CY	\$ 20.00	\$ 42,500.00
11	Clearing Vegetation	1	LS	\$ 2,000.00	\$ 2,000.00
12	Supply and Place Topsoil and Seeding	325	CY	\$ 52.00	\$ 16,900.00
13	Supply and Place Clean Soil	4525	CY	\$ 20.00	\$ 90,500.00
14	Supply and Place Rip Rap	2400	TONS	\$ 24.00	\$ 57,600.00
15	Supply and Place Concrete Drainage Trough	2000	LF	\$ 150.00	\$ 300,000.00
16	Supply and Place Filter Fabric	12200	SY	\$ 2.00	\$ 24,400.00
Capital Costs					\$ 1,734,200.00
17	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ 2,000.00	\$ 60,000.00
Operation & Maintenance Costs					\$ 60,000.00
On-Site Sewer System - Alternative 5 Costs					\$ 1,794,200.00
Note - this alternative does not include any work that may be required on the sewers located beneath buildings					
Storm Sewer Treatment System - Alternative 1: Decommission					
1	Project Management	1	LS	\$ 24,000.00	\$ 24,000.00
2	Mobilization/Demobilization	1	LS	\$ 20,000.00	\$ 20,000.00
3	Decommissioning Contractor	1	LS	\$ 200,000.00	\$ 200,000.00
Capital Costs					\$ 244,000.00
4	Long Term Monitoring & Maintenance (including PM and Reporting)	30	YRS	\$ -	\$ -
Operation & Maintenance Costs					\$ -
Storm Sewer Treatment System - Alternative 1 Costs					\$ 244,000.00

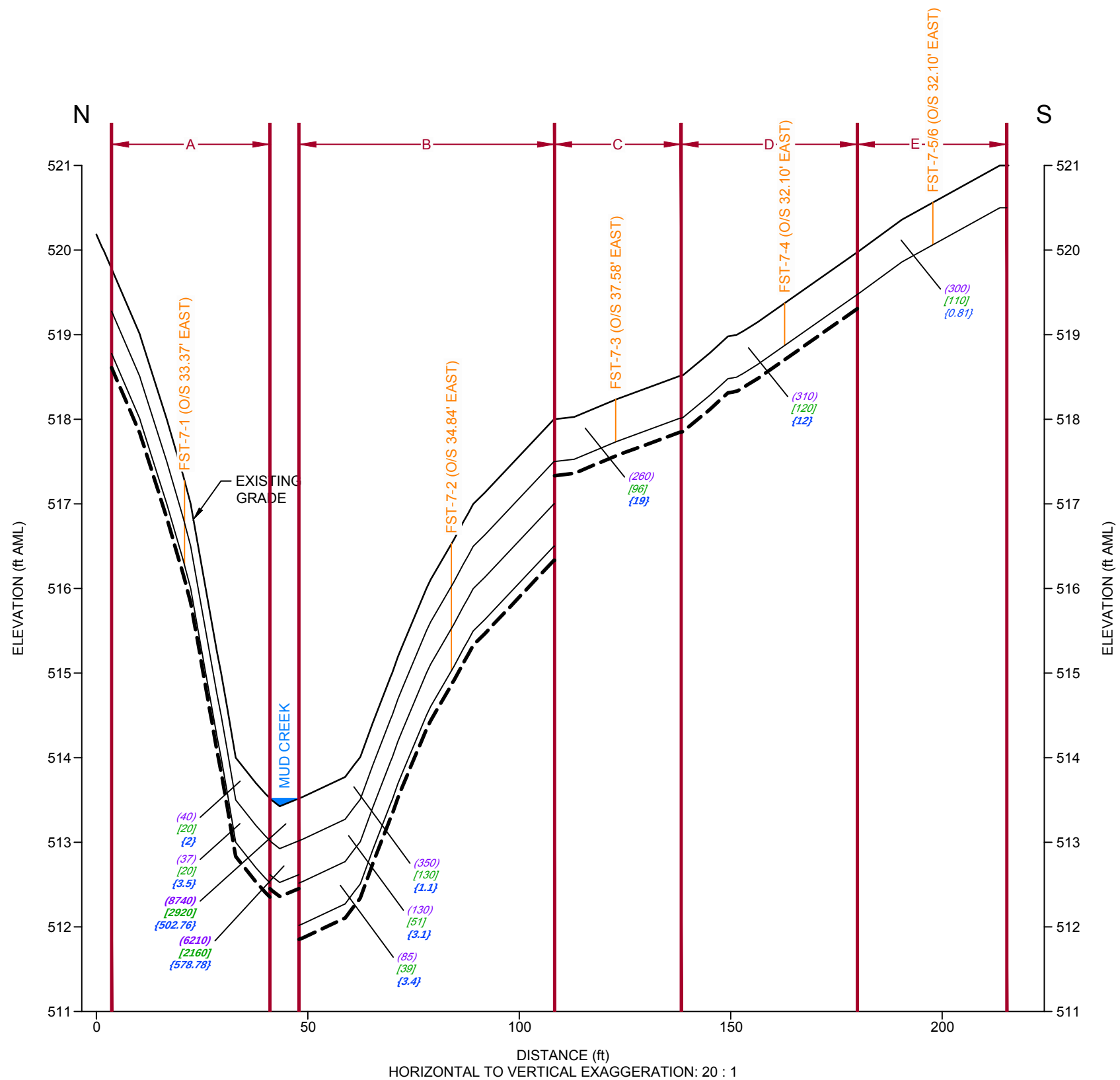
Appendices

Appendix A

Cross Sectional Transect Views







LEGEND

--- EXCAVATION LIMIT
 (8740) NICKEL (mg/kg)
 [2920] CHROMIUM (mg/kg)

{502.76} PCBs (mg/kg)
 (8740) EXCEEDANCE (BOLD)

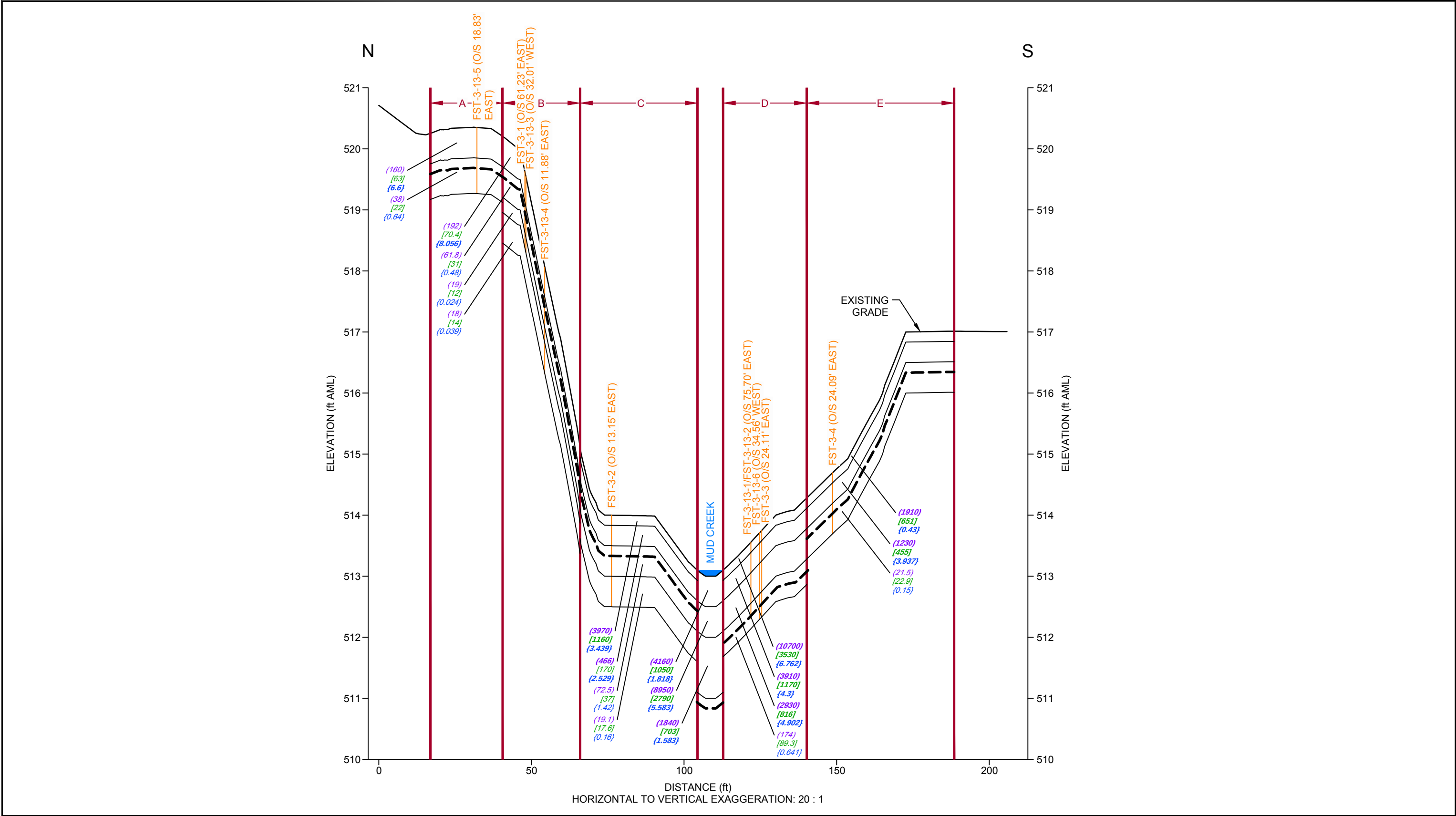


SPECIAL METALS CORPORATION
 NEW HARTFORD, NEW YORK

ALTERNATIVE 3 - SITE SPECIFIC (WITH CONSIDERATION)
 CROSS-SECTION C-C'

86188-00
 Jan 29, 2018

FIGURE 3-C



LEGEND

--- EXCAVATION LIMIT

(10700) NICKEL (mg/kg)

[3530] CHROMIUM (mg/kg)

{6.762} PCBs (mg/kg)

(10700) EXCEEDANCE (BOLD)

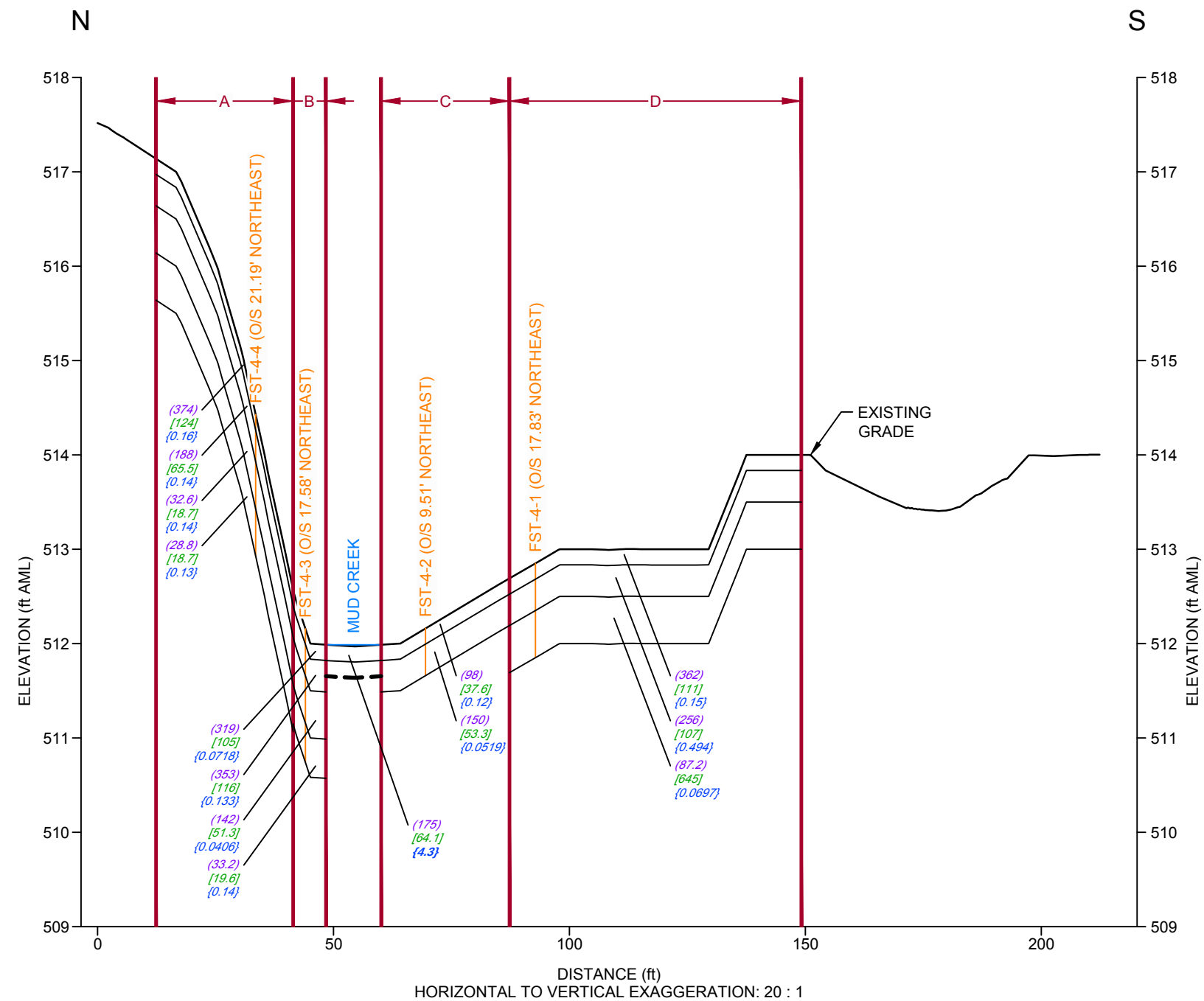


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 3 - SITE SPECIFIC (WITH CONSIDERATION)
CROSS-SECTION D-D'

86188-00
Jan 29, 2018

FIGURE 3-D



LEGEND	
---	EXCAVATION LIMIT
(374)	NICKEL (mg/kg)
[124]	CHROMIUM (mg/kg)
{0.16}	PCBs (mg/kg)
{4.3}	EXCEEDANCE (BOLD)

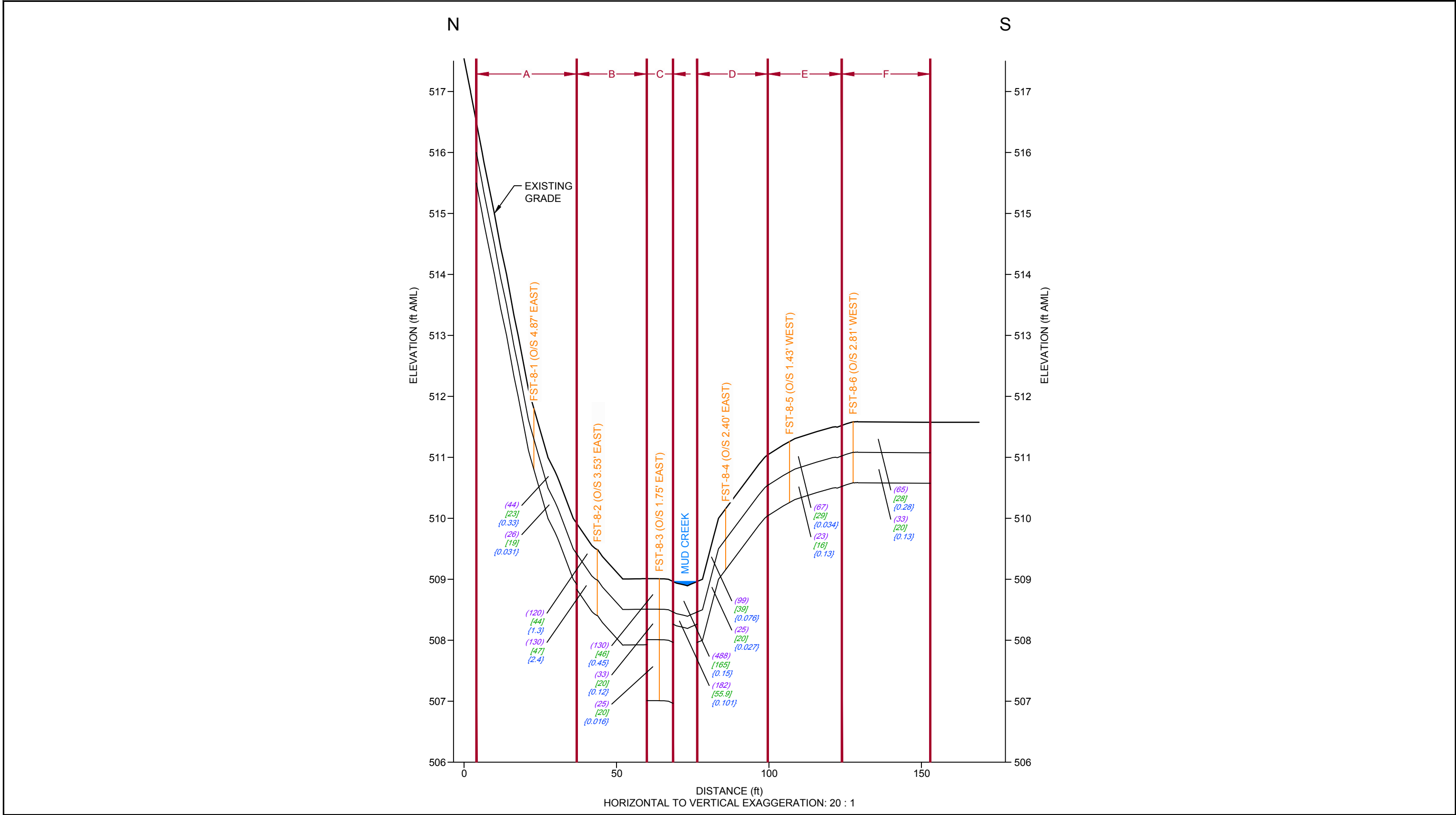


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 3 - SITE SPECIFIC (WITH CONSIDERATION)
CROSS-SECTION E-E'

86188-00
Jan 29, 2018

FIGURE 3-E



LEGEND

--- EXCAVATION LIMIT

(44) NICKEL (mg/kg)

[23] CHROMIUM (mg/kg)

{0.33} PCBs (mg/kg)

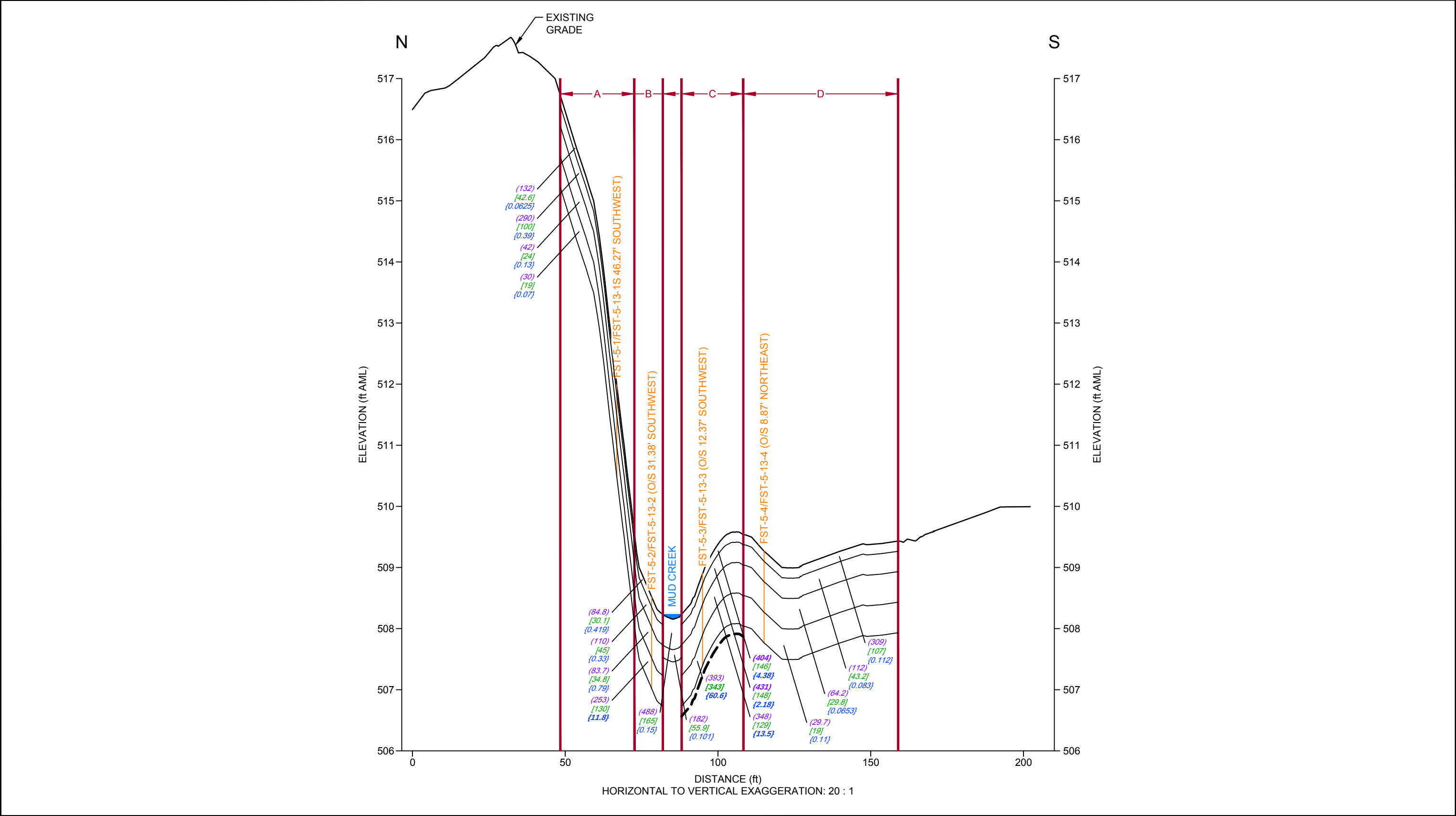
(492) EXCEEDANCE (BOLD)

SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 3 - SITE SPECIFIC (WITH CONSIDERATION)
CROSS-SECTION F-F'

86188-00
Jan 29, 2018

FIGURE 3-F



LEGEND

--- EXCAVATION LIMIT

(132) NICKEL (mg/kg)

[42.6] CHROMIUM (mg/kg)

{0.0625} PCBs (mg/kg)

(492) EXCEEDANCE (BOLD)

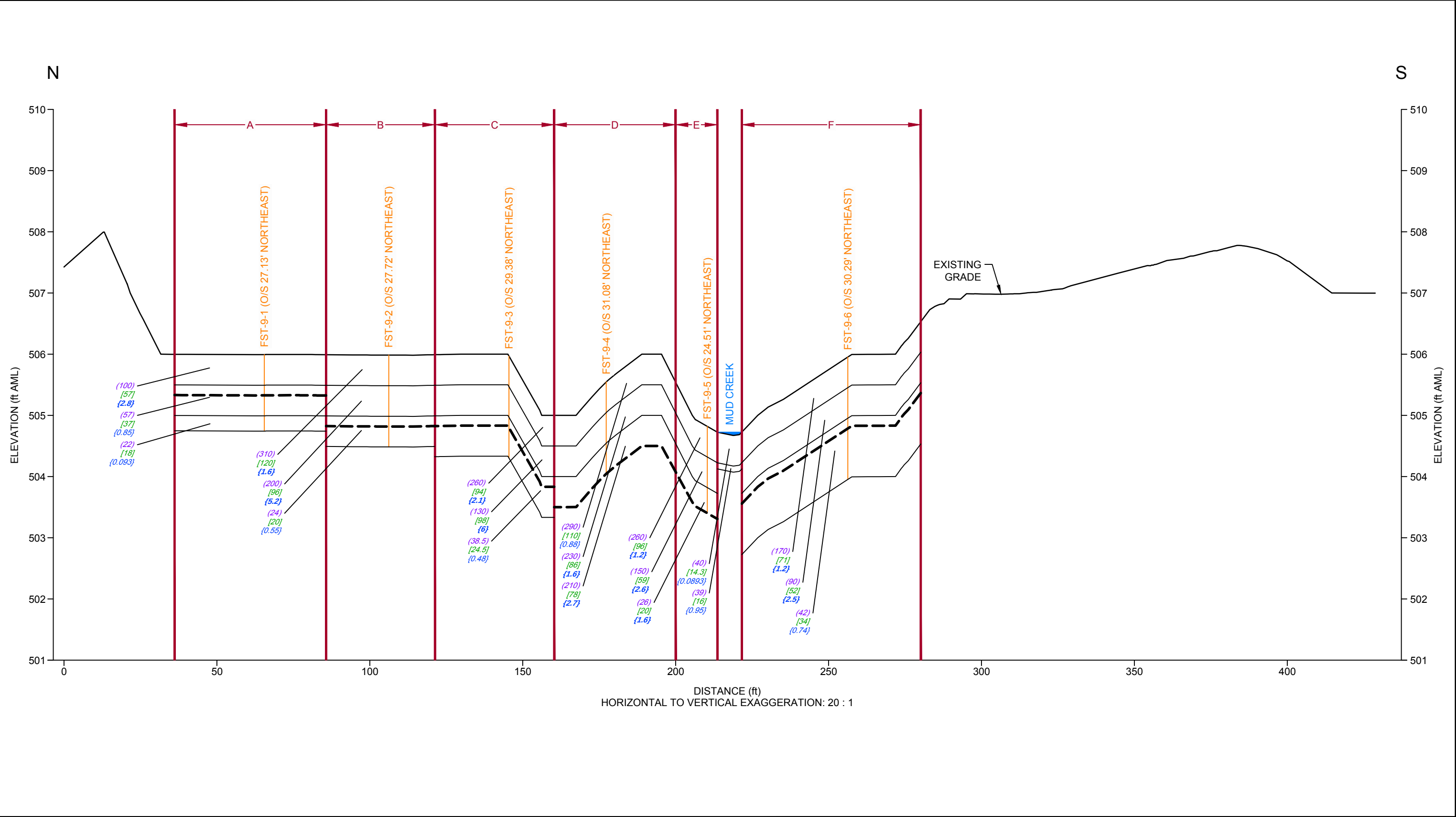


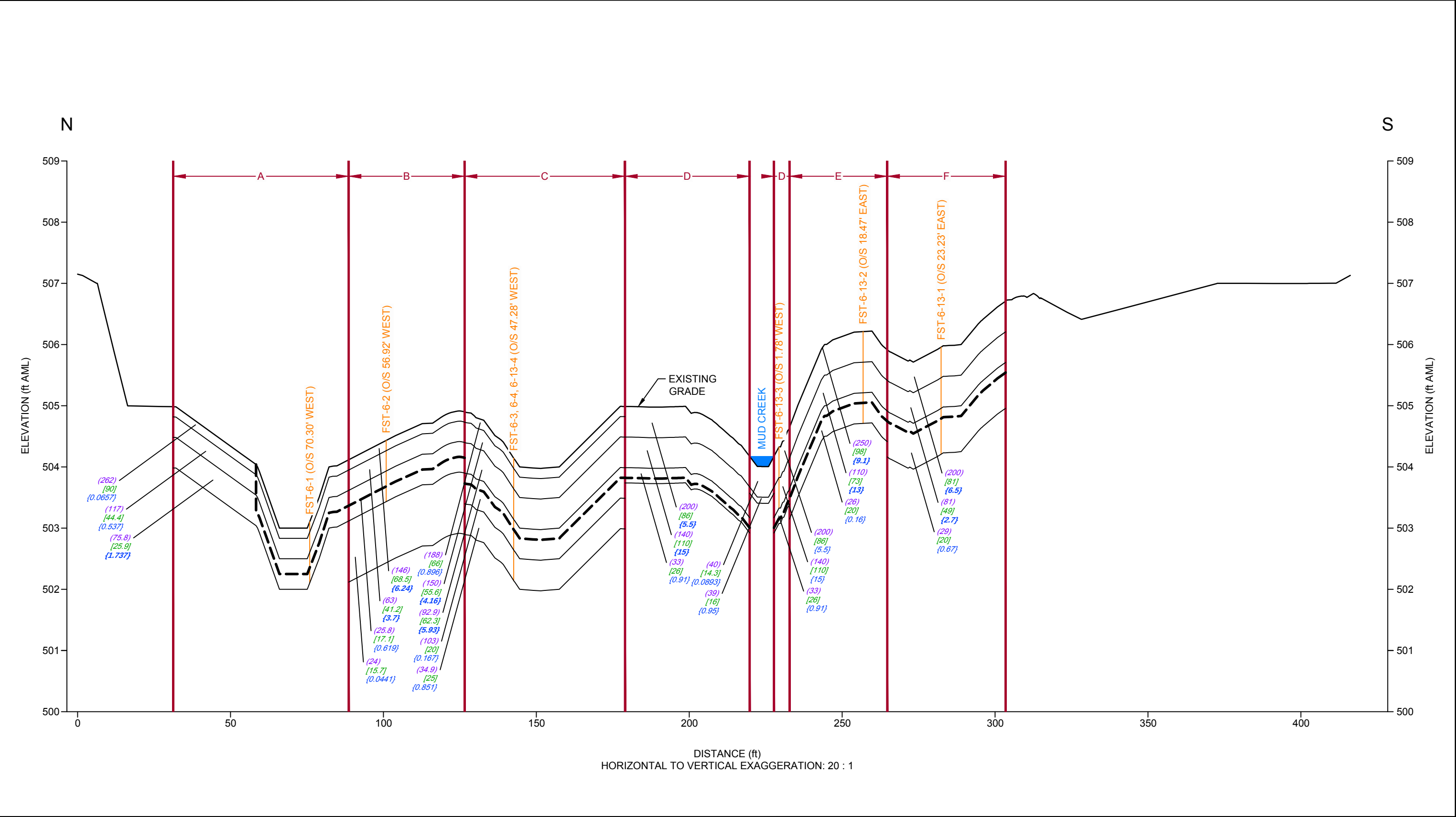
SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

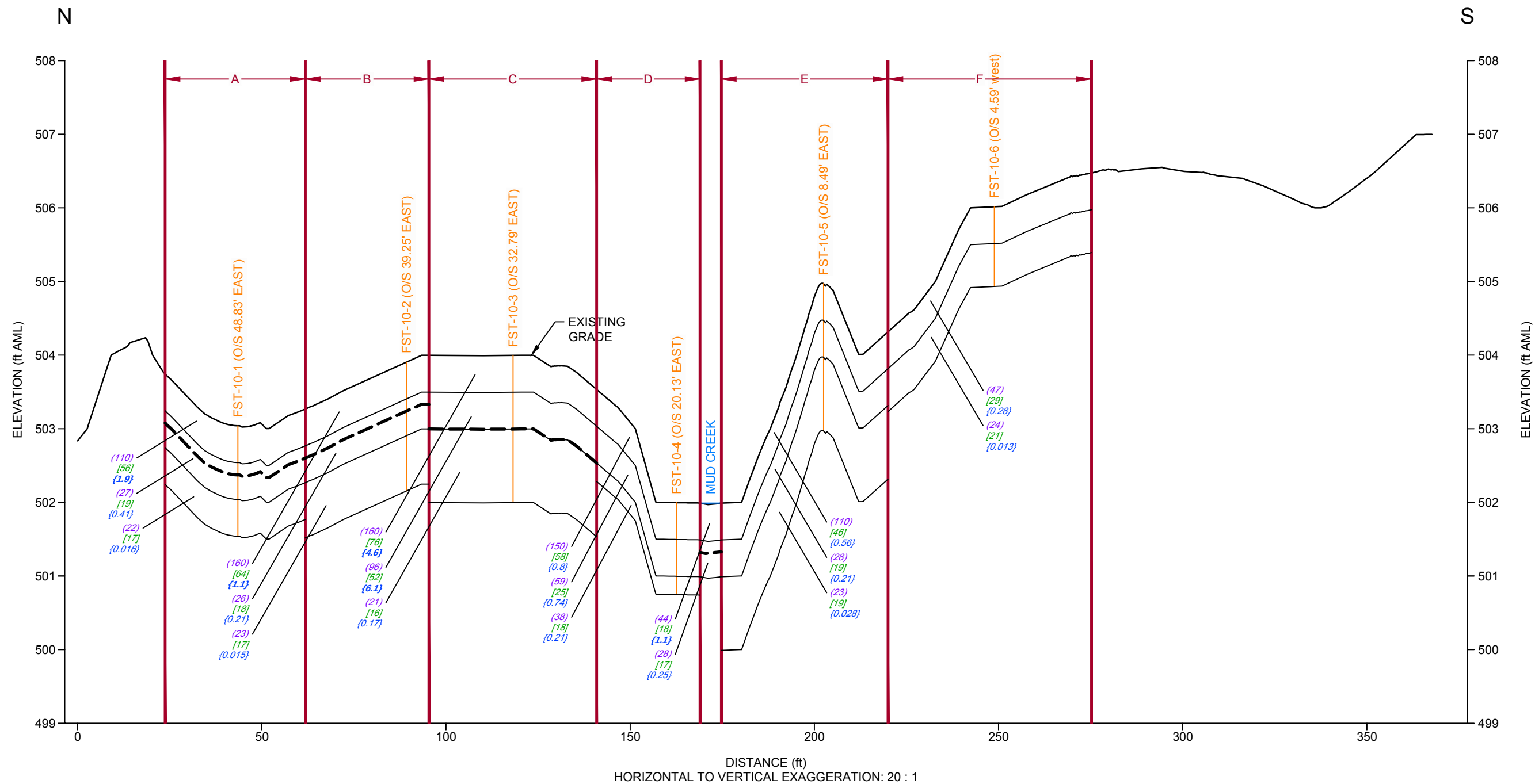
ALTERNATIVE 3 - SITE SPECIFIC (WITH CONSIDERATION)
CROSS-SECTION G-G'

86188-00
Jan 29, 2018

FIGURE 3-G







LEGEND			
---	EXCAVATION LIMIT	{4.6}	PCBs (mg/kg)
(180)	NICKEL (mg/kg)	{4.6}	EXCEEDANCE (BOLD)
[76]	CHROMIUM (mg/kg)		

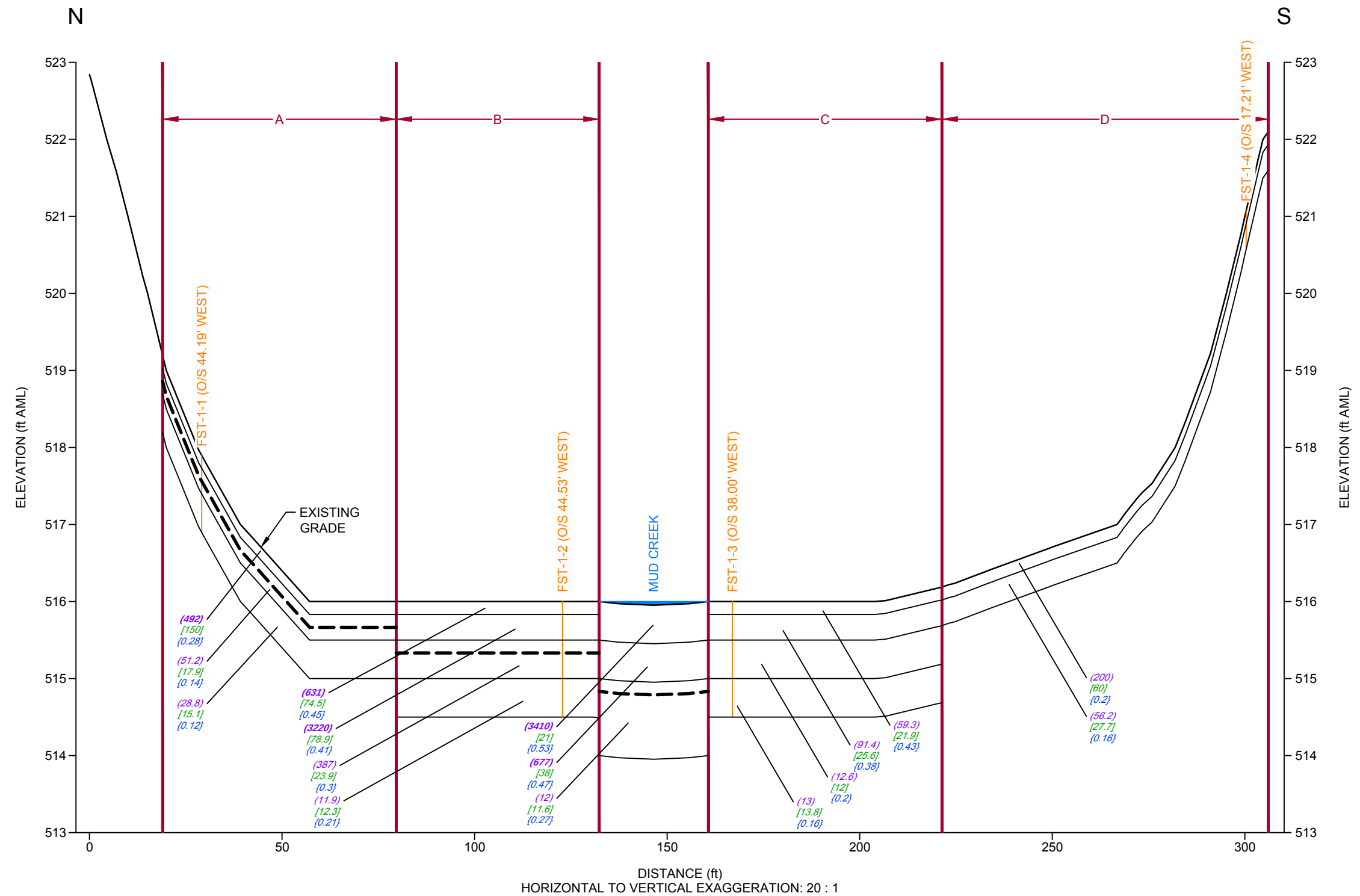


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 3 - SITE SPECIFIC (WITH CONSIDERATION)
CROSS-SECTION J-J'

86188-00
Jan 29, 2018

FIGURE 3-J



LEGEND	
---	EXCAVATION LIMIT
(12)	NICKEL (mg/kg)
[11.6]	CHROMIUM (mg/kg)
{0.27}	PCBs (mg/kg)
(492)	EXCEEDANCE (BOLD)

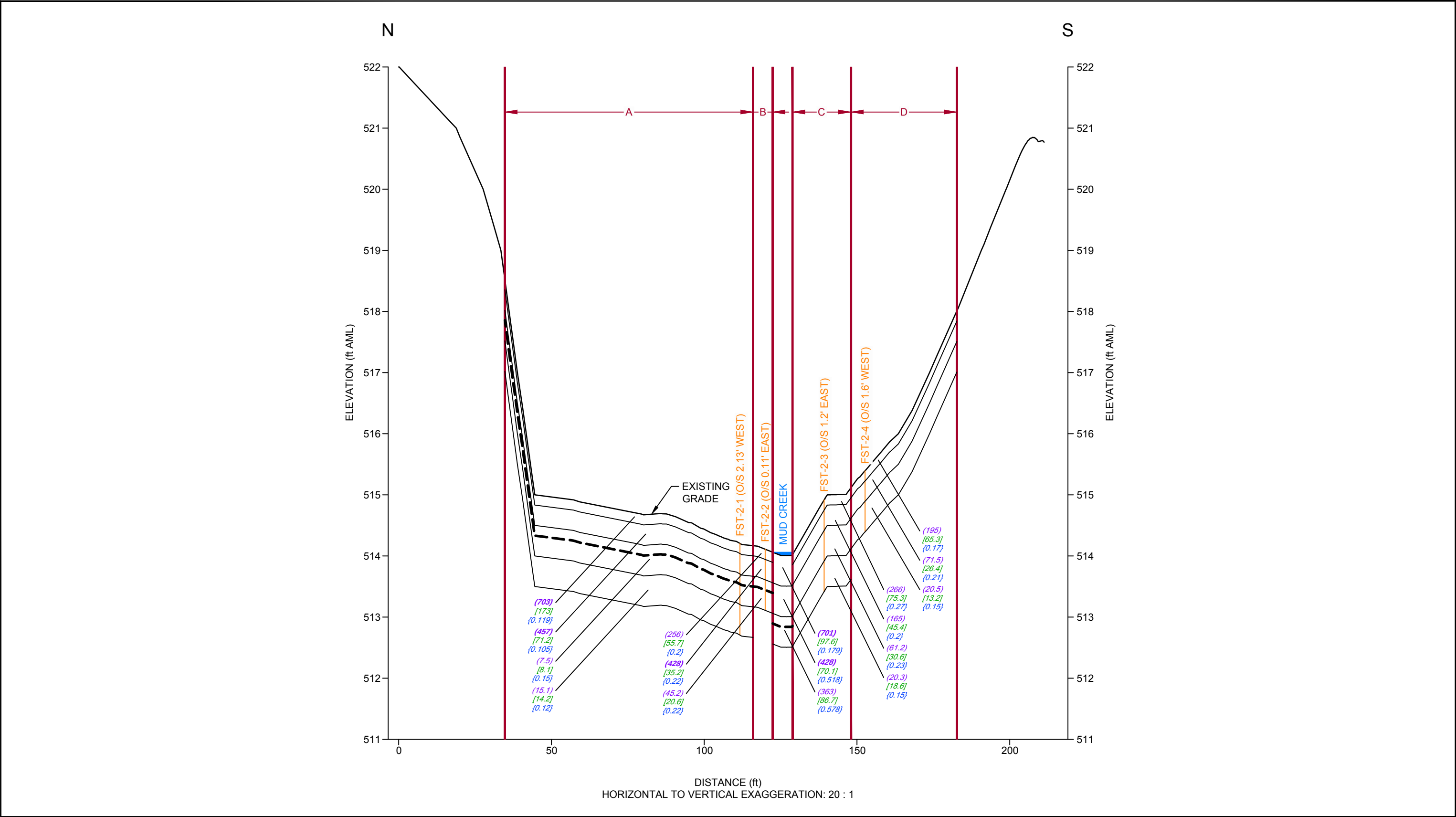


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 4 - SITE SPECIFIC (WITHOUT CONSIDERATION)
CROSS-SECTION A-A'

86188-00
Nov 29, 2017

FIGURE 4-A



LEGEND

--- EXCAVATION LIMIT

(7.5) NICKEL (mg/kg)

[8.1] CHROMIUM (mg/kg)

{0.15} PCBs (mg/kg)

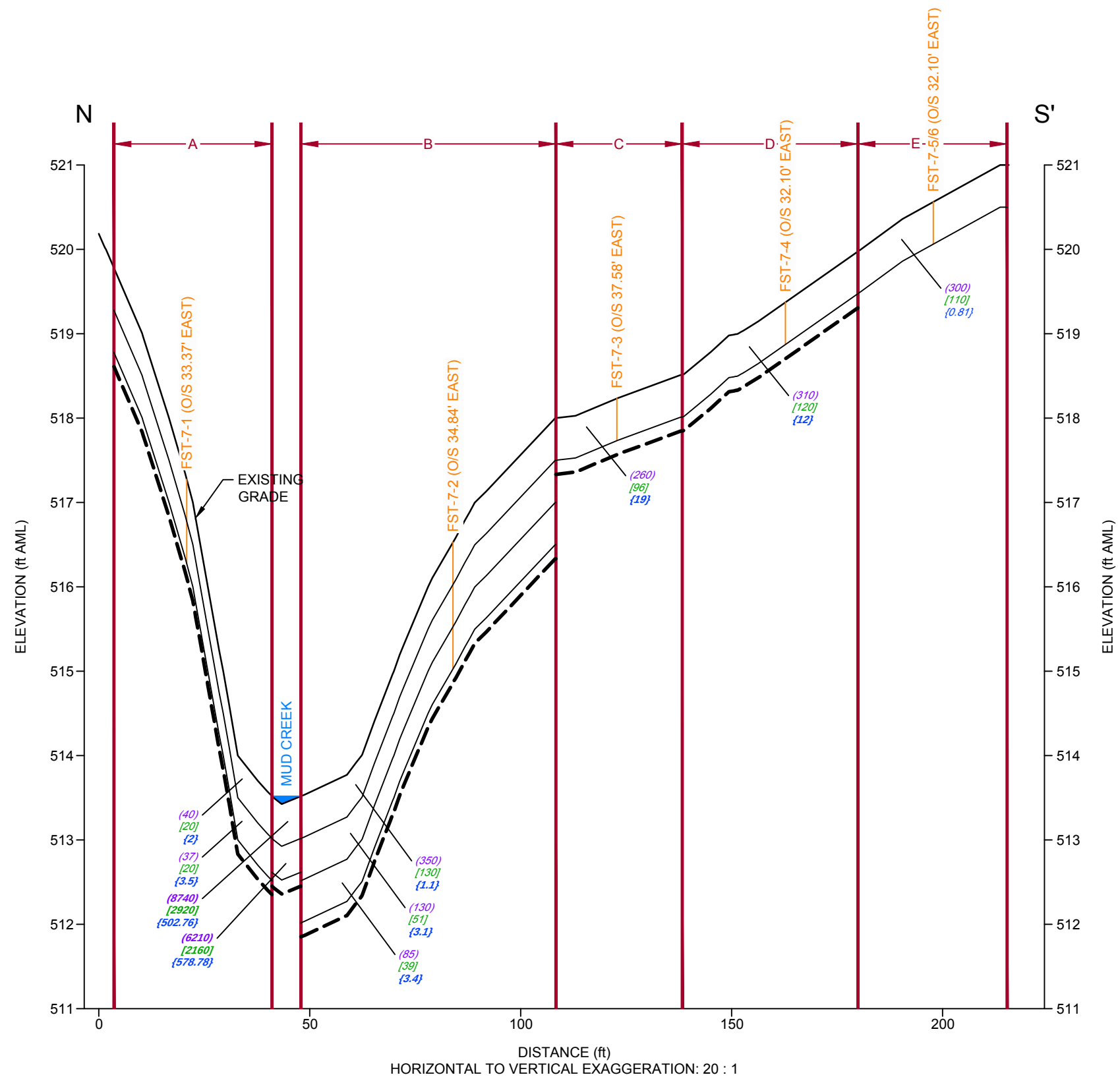
(492) EXCEEDANCE (BOLD)

SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 4 - SITE SPECIFIC (WITHOUT CONSIDERATION)
CROSS-SECTION B-B'

86188-00
Nov 29, 2017

FIGURE 4-B



LEGEND

- EXCAVATION LIMIT
- (8740) NICKEL (mg/kg)
- [2920] CHROMIUM (mg/kg)

- [502.76] PCBs (mg/kg)
- (8740) EXCEEDANCE (BOLD)

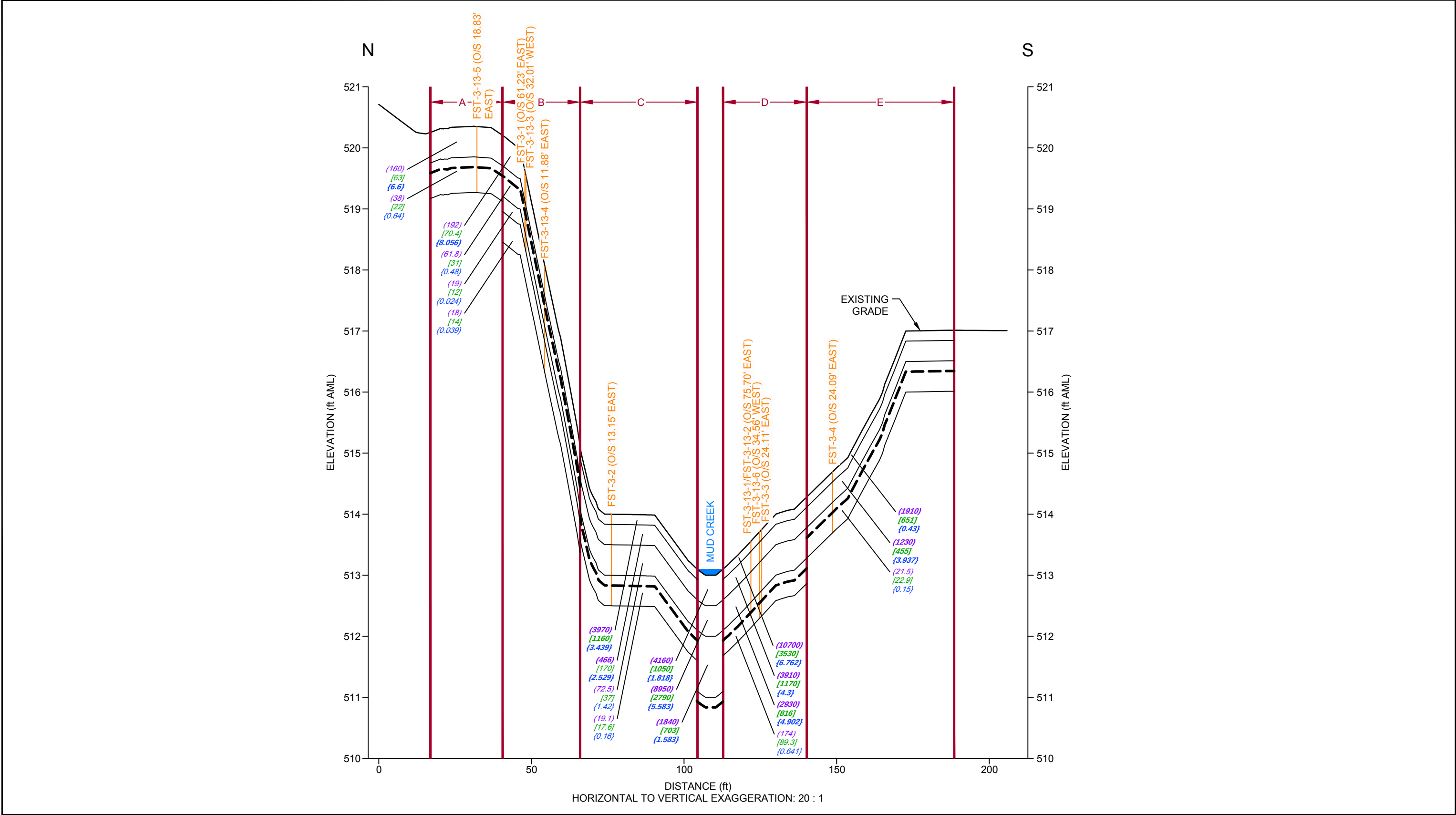


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 4 - SITE SPECIFIC (WITHOUT CONSIDERATION)
CROSS-SECTION C-C'

86188-00
Nov 29, 2017

FIGURE 4-C



LEGEND

--- EXCAVATION LIMIT

(374) NICKEL (mg/kg)

[124] CHROMIUM (mg/kg)

{0.16} PCBs (mg/kg)

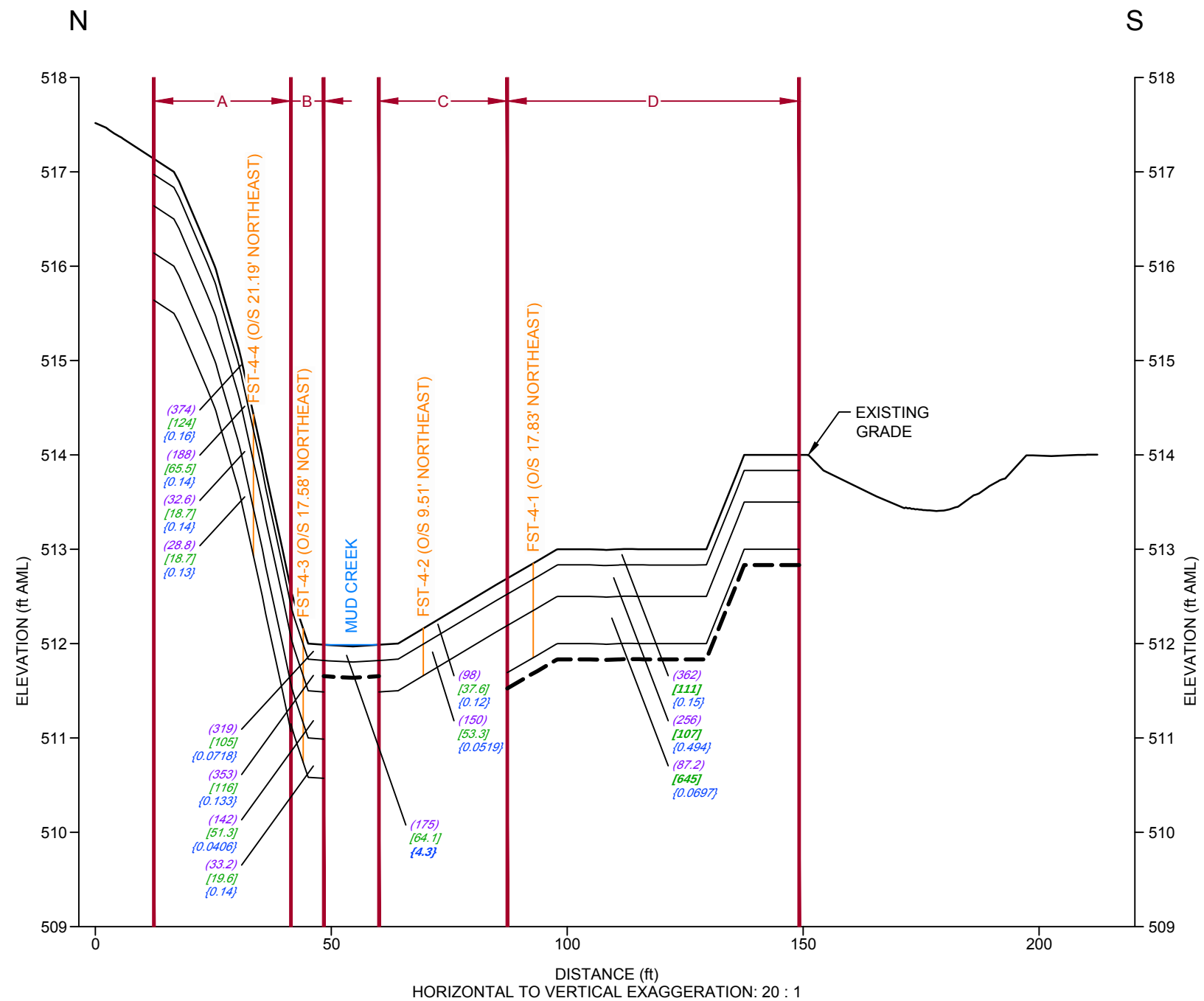
{4.3} EXCEEDANCE (BOLD)

SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 4 - SITE SPECIFIC (WITHOUT CONSIDERATION)
CROSS-SECTION D-D'

86188-00
Nov 29, 2017

FIGURE 4-D



LEGEND

--- EXCAVATION LIMIT

(374) NICKEL (mg/kg)

[124] CHROMIUM (mg/kg)

{0.16} PCBs (mg/kg)

{4.3} EXCEEDANCE (BOLD)

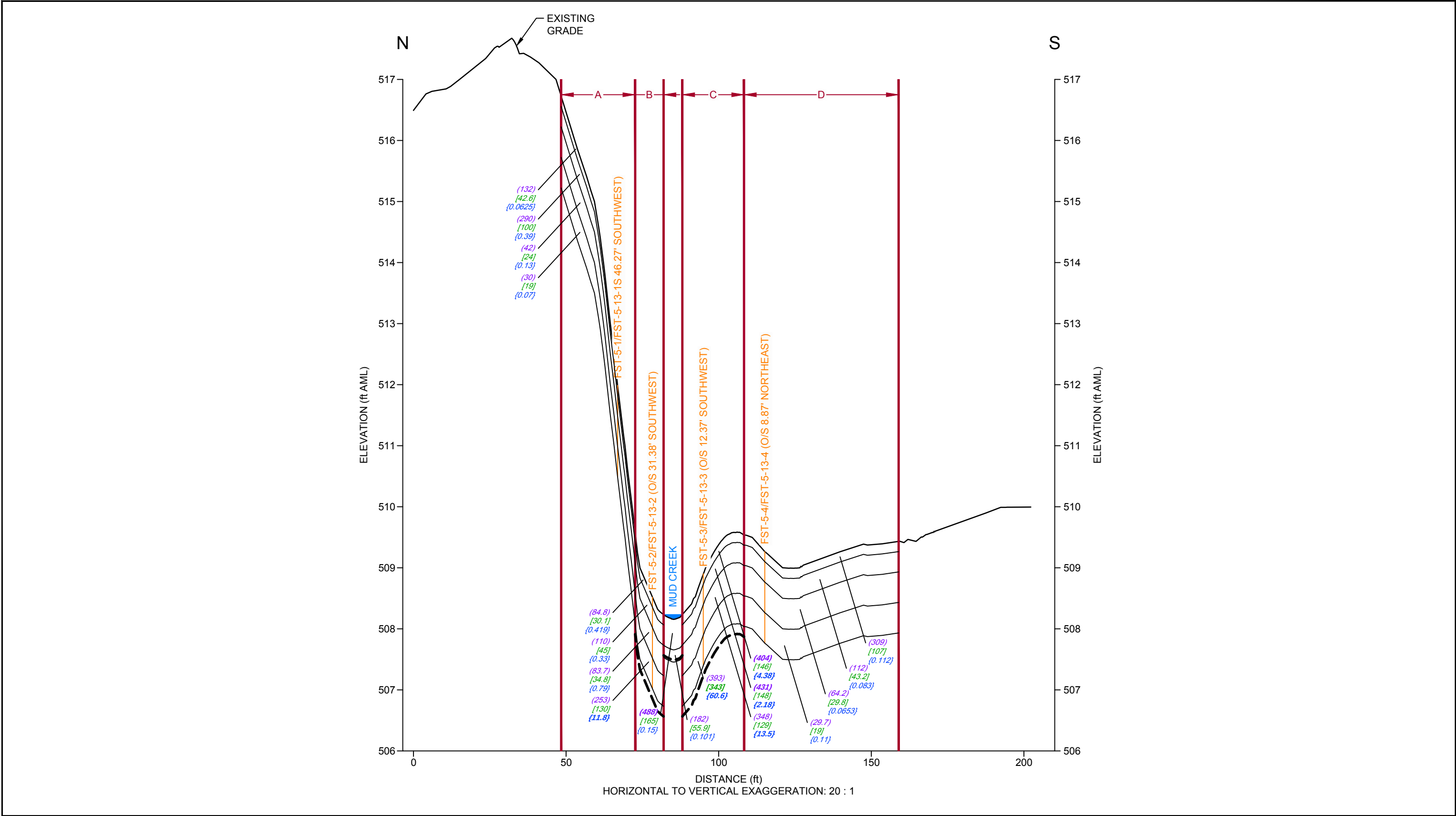


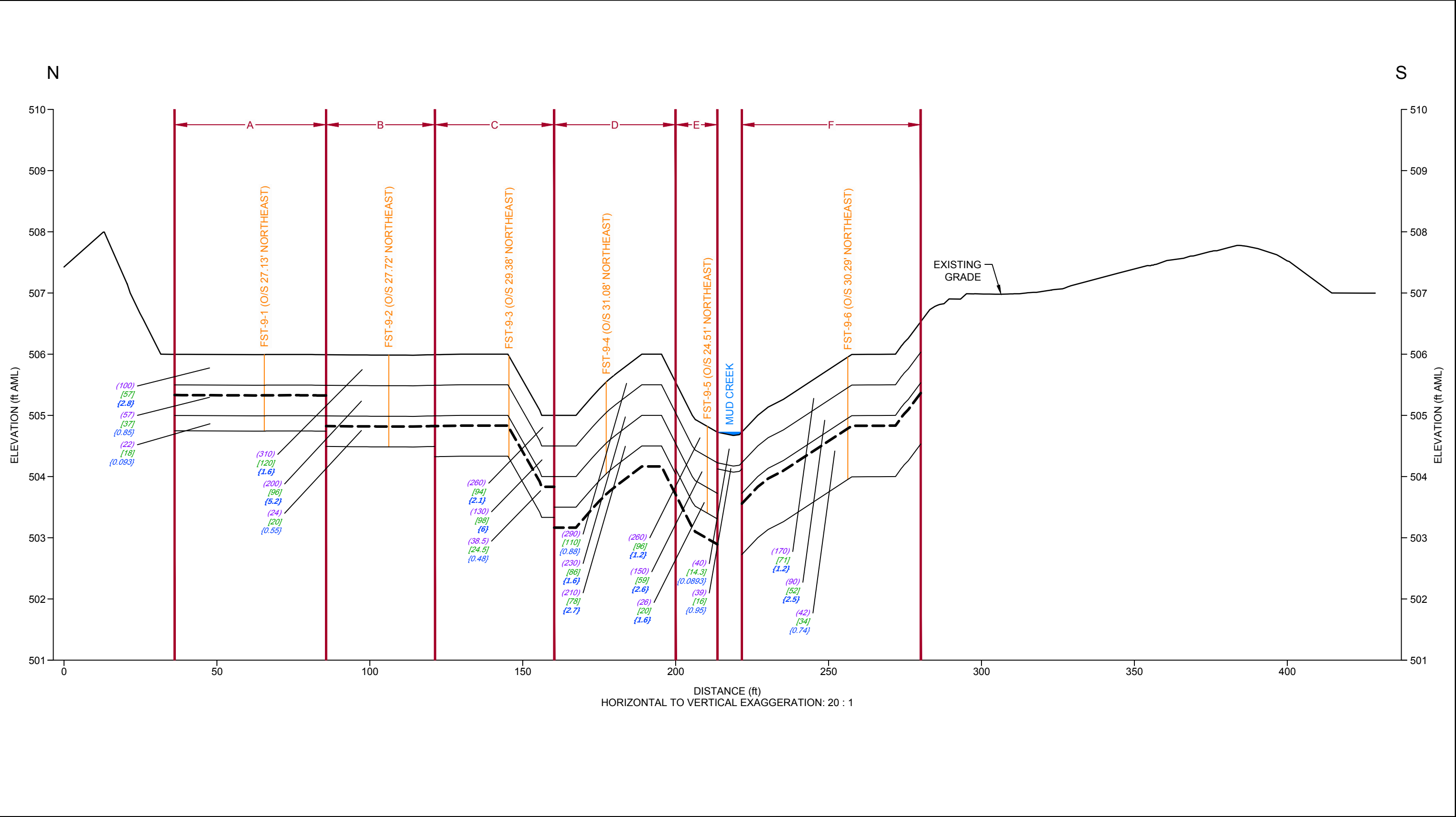
SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 4 - SITE SPECIFIC (WITHOUT CONSIDERATION)
CROSS-SECTION E-E'

86188-00
Nov 29, 2017

FIGURE 4-E





LEGEND

--- EXCAVATION LIMIT

(431) NICKEL (mg/kg)

[148] CHROMIUM (mg/kg)

{2.18} PCBs (mg/kg)

{2.18} EXCEEDANCE (BOLD)

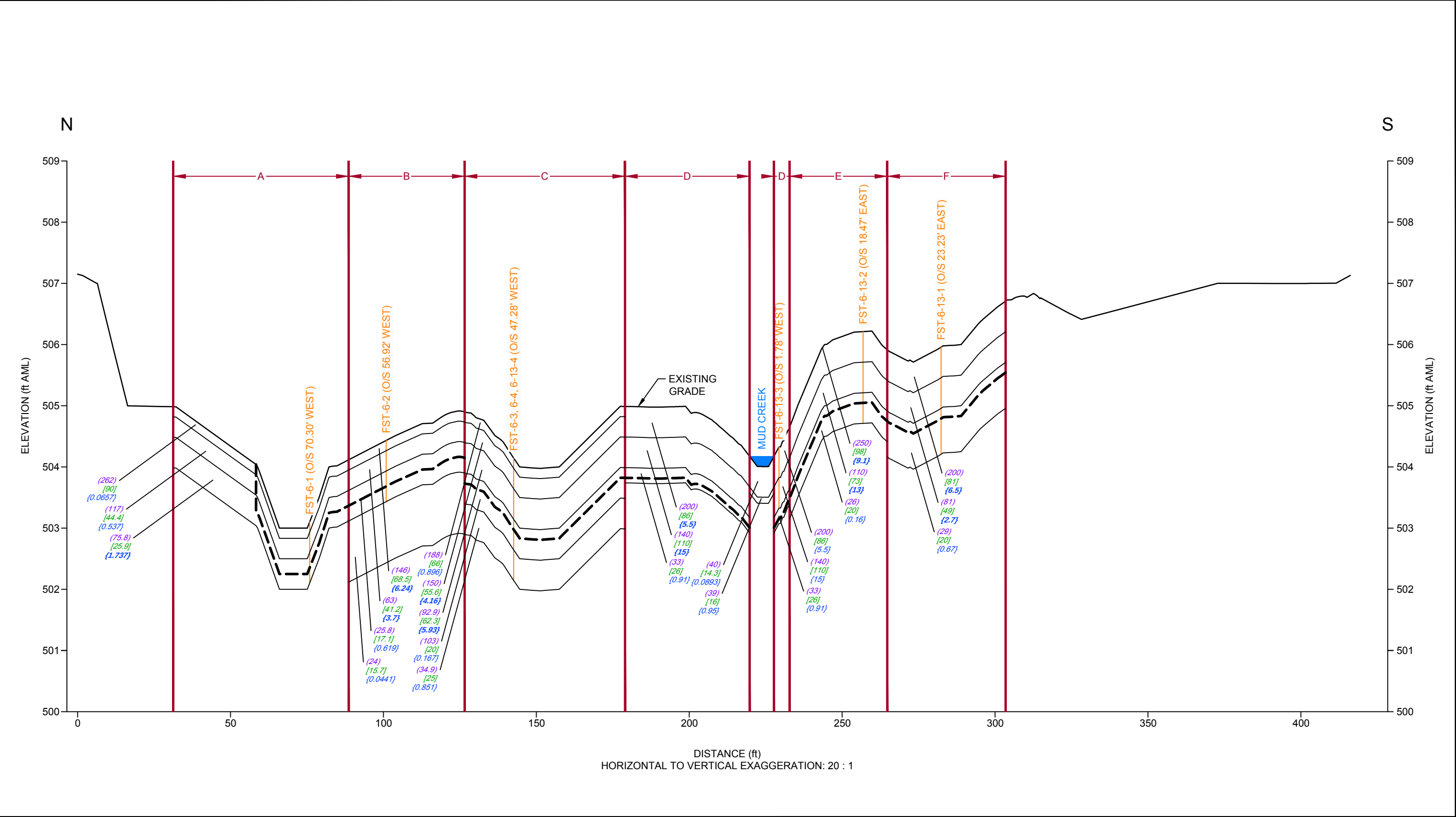


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 4 - SITE SPECIFIC (WITHOUT CONSIDERATION)
CROSS-SECTION H-H'

86188-00
Nov 29, 2017

FIGURE 4-H



LEGEND

--- EXCAVATION LIMIT

(150) NICKEL (mg/kg)

[55.6] CHROMIUM (mg/kg)

{4.16} PCBs (mg/kg)

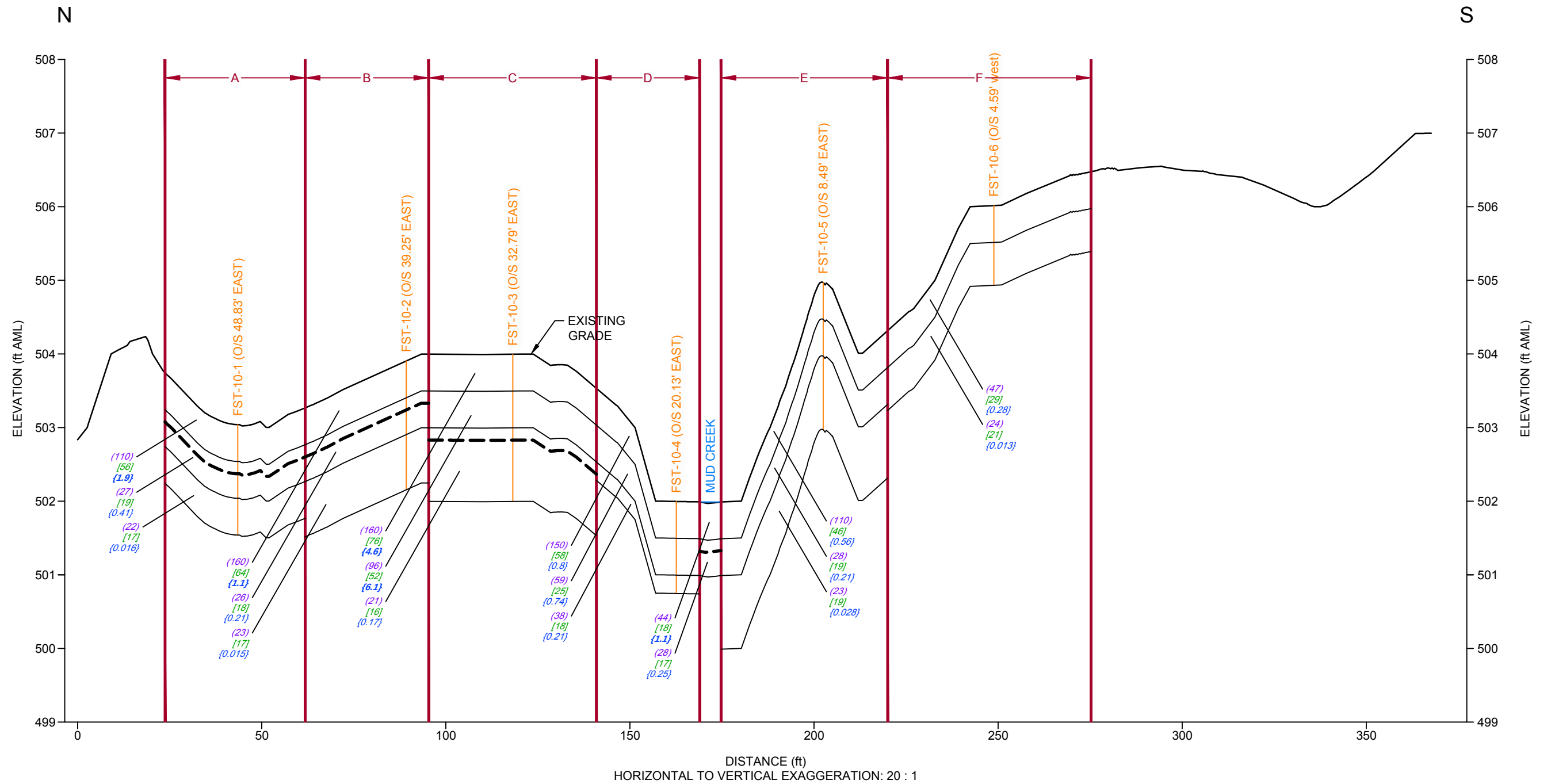
{4.16} EXCEEDANCE (BOLD)

SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 4 - SITE SPECIFIC (WITHOUT CONSIDERATION)
CROSS-SECTION I-I'

86188-00
Nov 29, 2017

FIGURE 4-I



LEGEND	
	EXCAVATION LIMIT
(180)	NICKEL (mg/kg)
[76]	CHROMIUM (mg/kg)
{4.6}	PCBs (mg/kg)
{4.6}	EXCEEDANCE (BOLD)

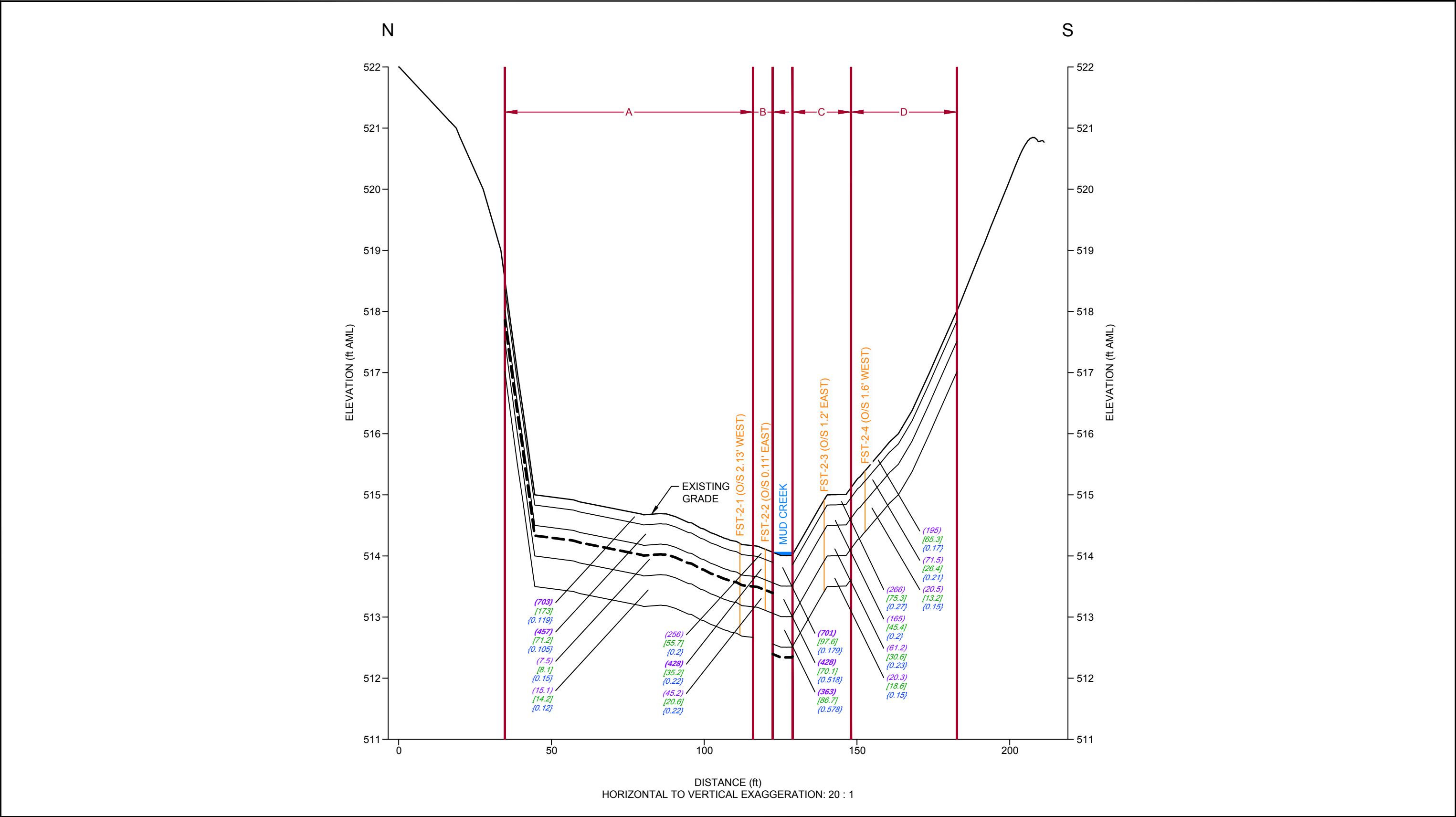


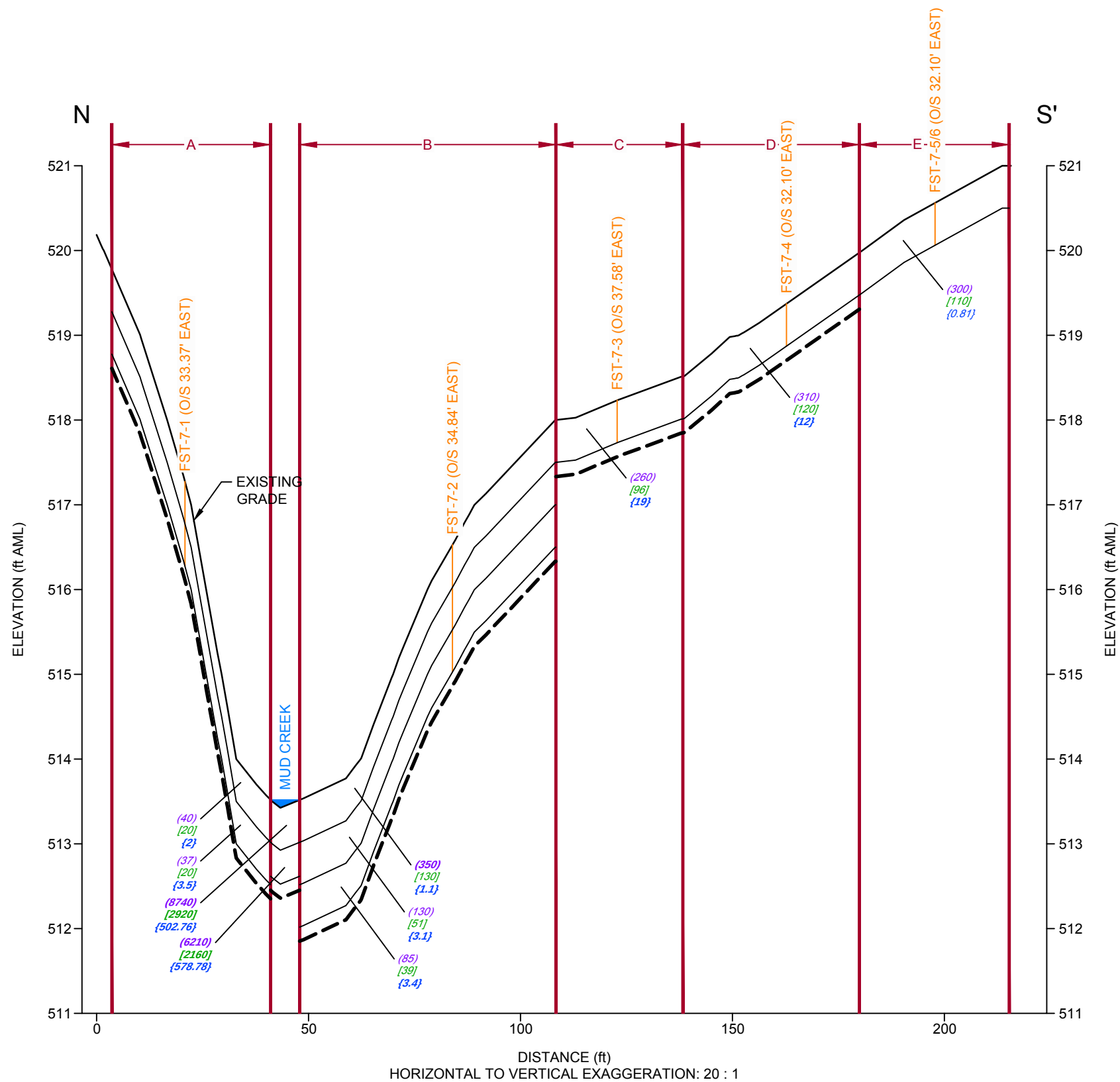
SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 4 - SITE SPECIFIC (WITHOUT CONSIDERATION)
CROSS-SECTION J-J'

86188-00
Nov 29, 2017

FIGURE 4-J





LEGEND

- EXCAVATION LIMIT
- (8740) NICKEL (mg/kg)
- [2920] CHROMIUM (mg/kg)

- {502.76} PCBs (mg/kg)
- (8740) EXCEEDANCE (BOLD)

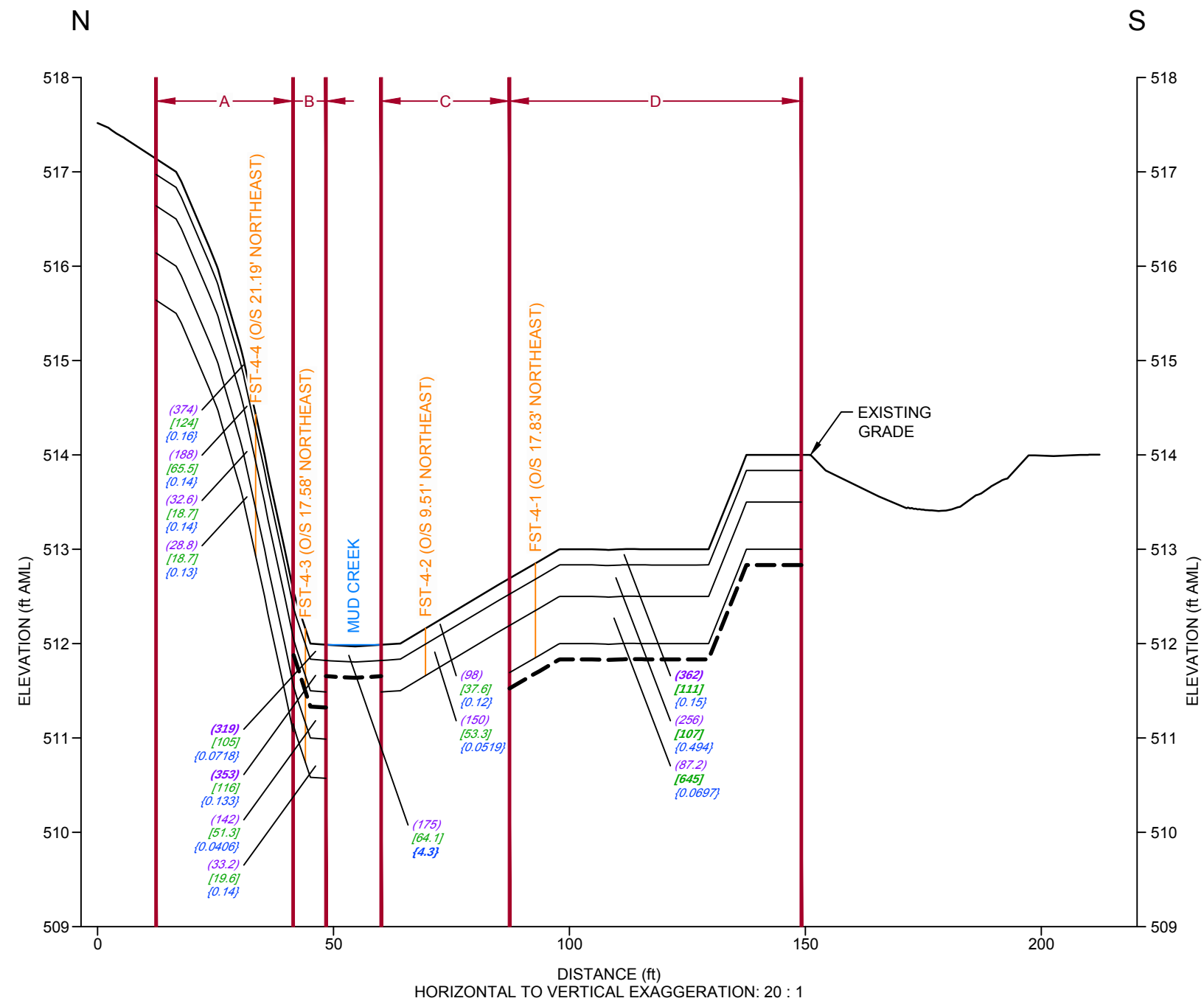


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 5A - RESTRICTED RESIDENTIAL
CROSS-SECTION C-C'

86188-00
Mar 9, 2018

FIGURE 5A-C



LEGEND			
---	EXCAVATION LIMIT	{0.16}	PCBs (mg/kg)
(374)	NICKEL (mg/kg)	(4.3)	EXCEEDANCE (BOLD)
[124]	CHROMIUM (mg/kg)		

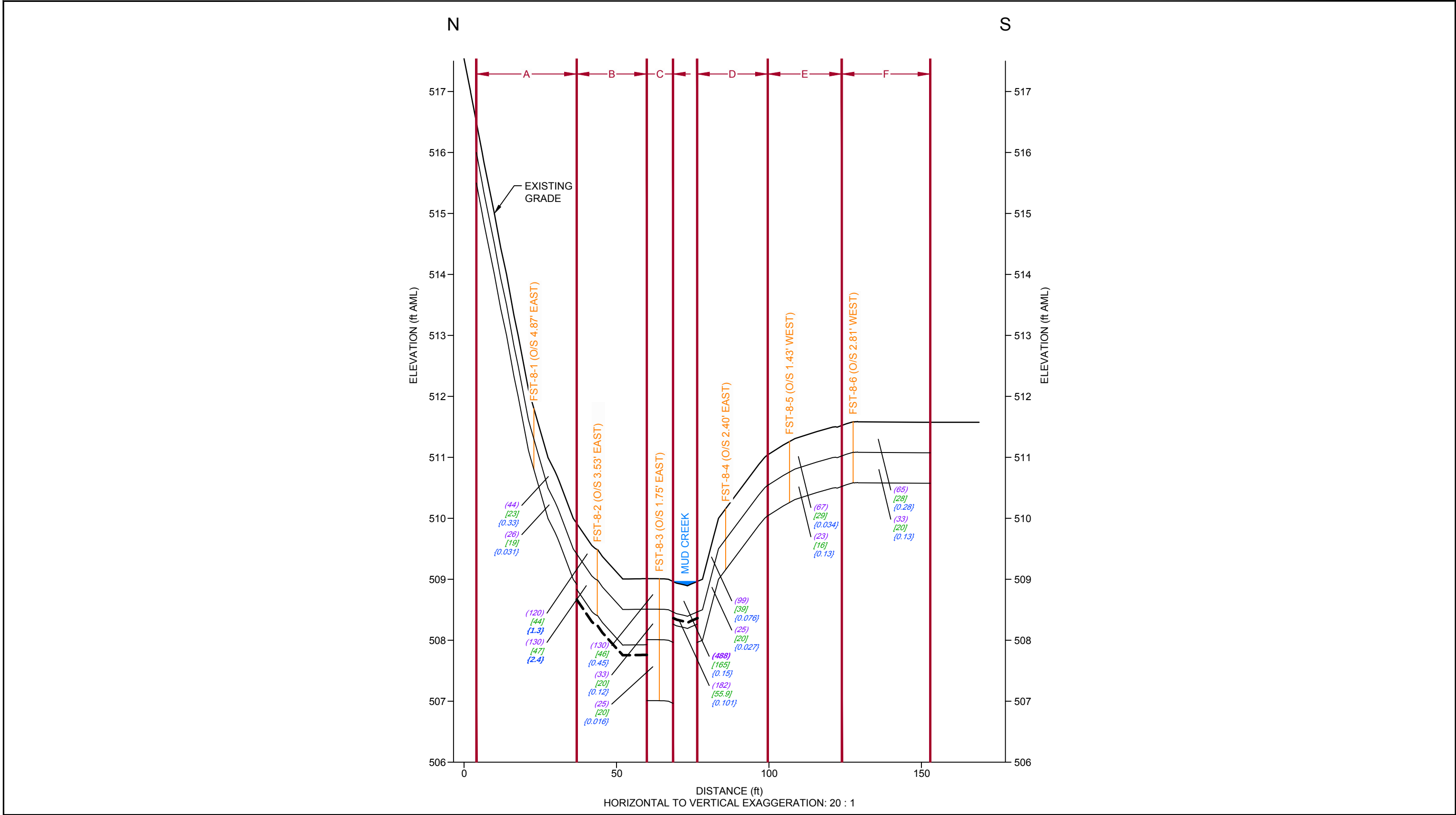


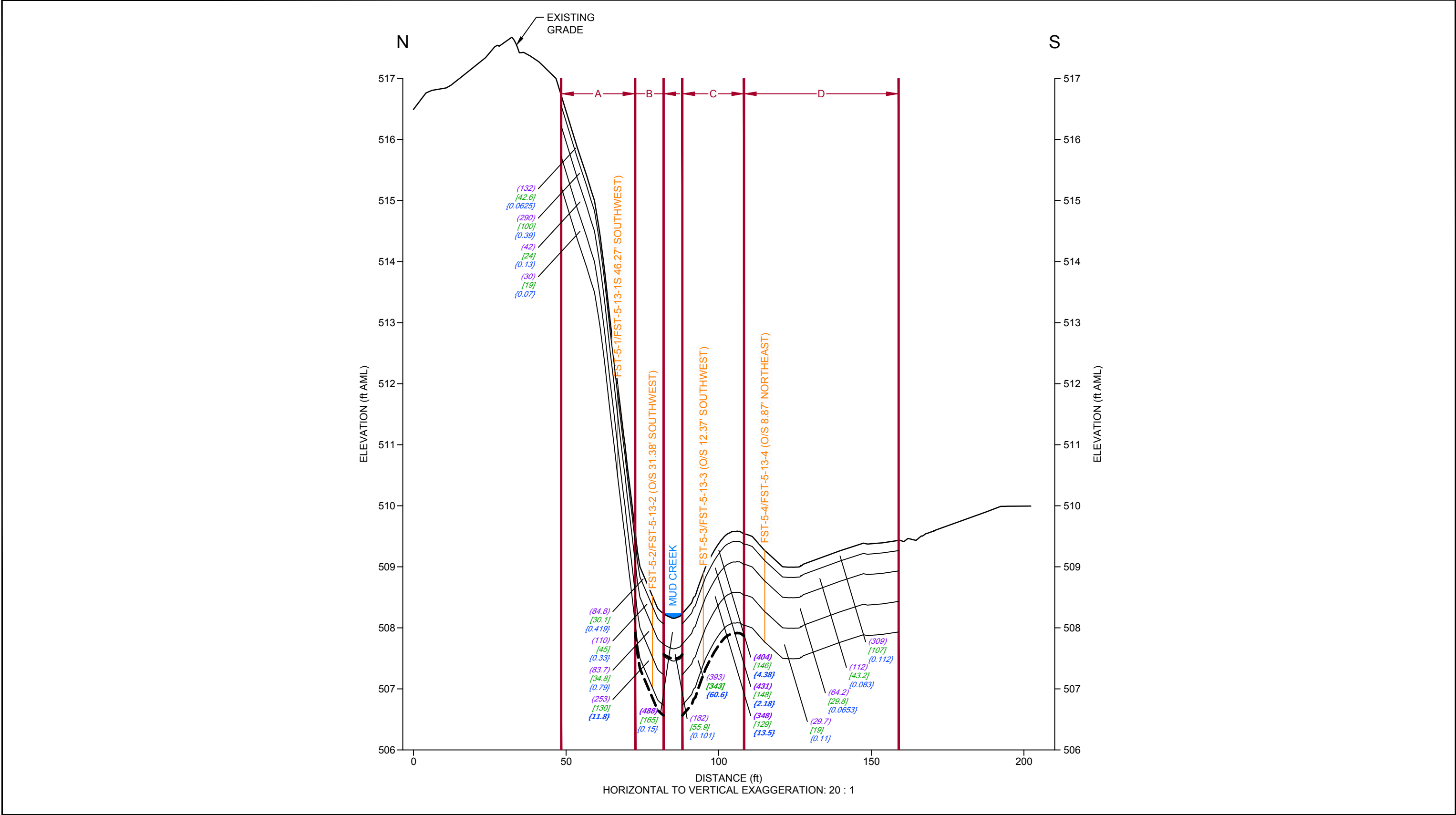
SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 5A - RESTRICTED RESIDENTIAL
CROSS-SECTION E-E'

86188-00
Mar 9, 2018

FIGURE 5A-E





LEGEND

--- EXCAVATION LIMIT

(132) NICKEL (mg/kg)

[42.6] CHROMIUM (mg/kg)

{0.0625} PCBs (mg/kg)

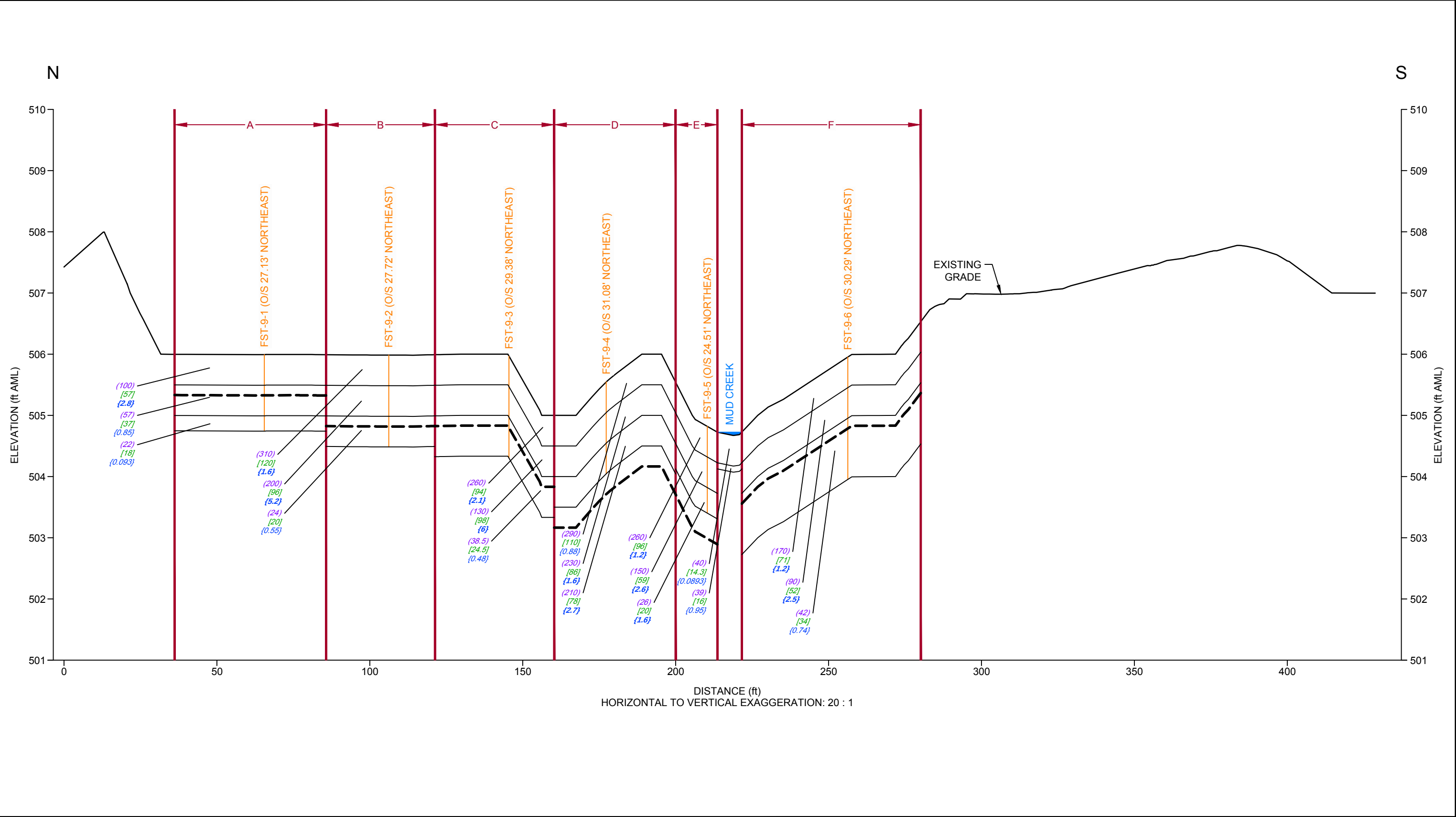
(492) EXCEEDANCE (BOLD)

SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 5A - RESTRICTED RESIDENTIAL
CROSS-SECTION G-G'

86188-00
Mar 9, 2018

FIGURE 5A-G



LEGEND

--- EXCAVATION LIMIT

(431) NICKEL (mg/kg)

[148] CHROMIUM (mg/kg)

{2.18} PCBs (mg/kg)

{2.18} EXCEEDANCE (BOLD)

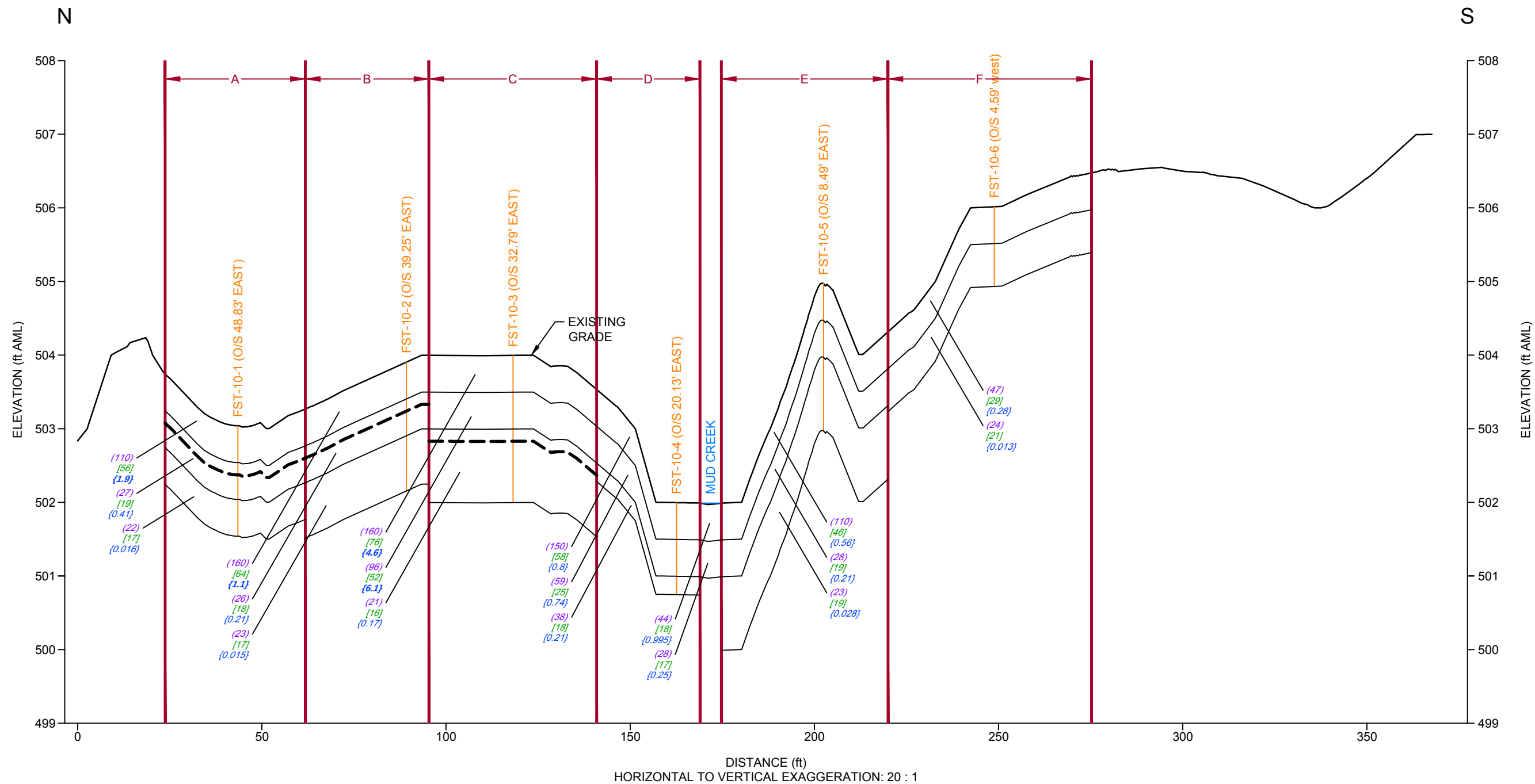


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 5A - RESTRICTED RESIDENTIAL
CROSS-SECTION H-H'

86188-00
Mar 9, 2018

FIGURE 5A-H



LEGEND			
	EXCAVATION LIMIT		PCBs (mg/kg)
	NICKEL (mg/kg)		EXCEEDANCE (BOLD)
	CHROMIUM (mg/kg)		

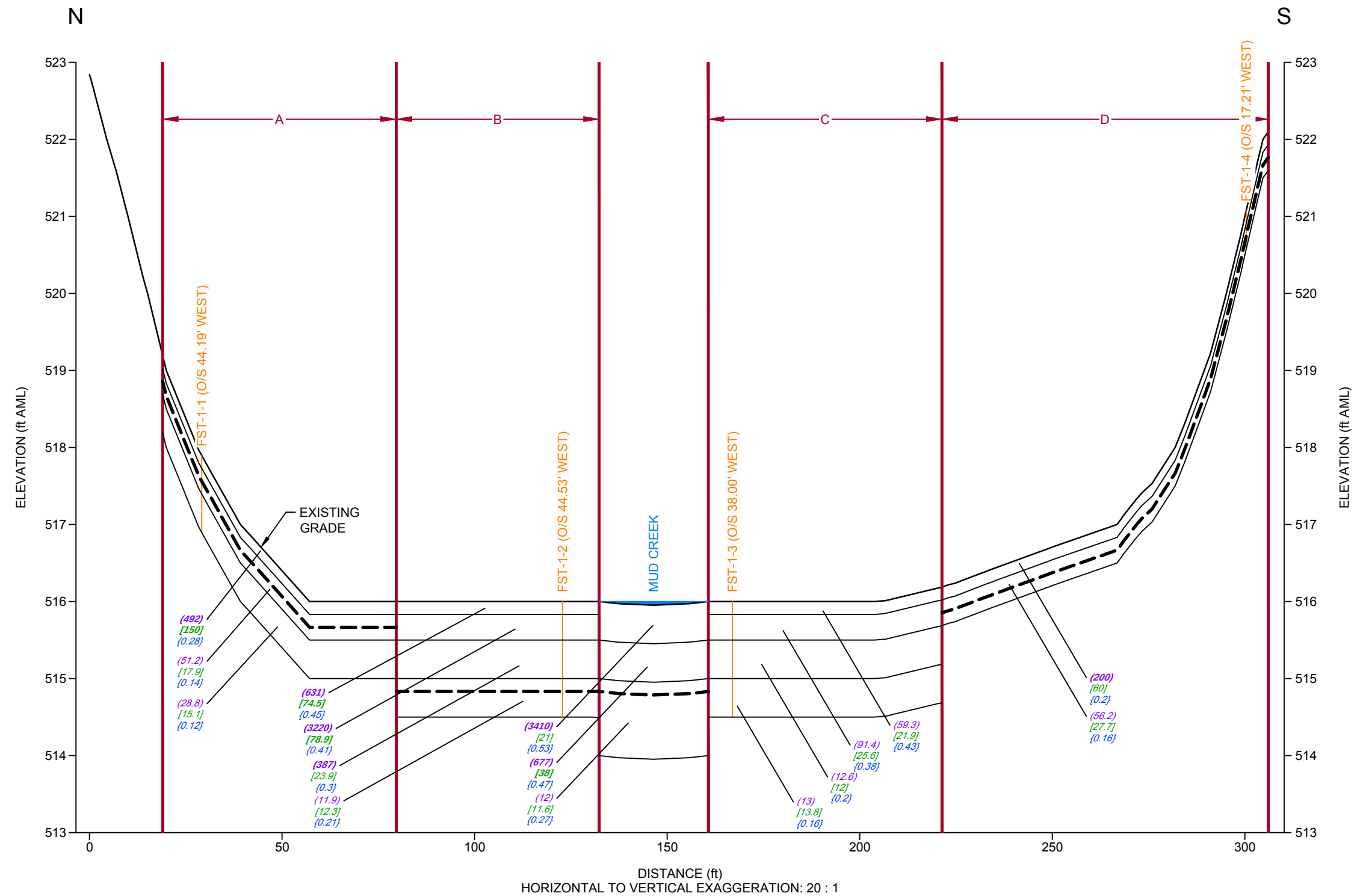


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 5A - RESTRICTED RESIDENTIAL
CROSS-SECTION J-J'

86188-00
Mar 9, 2018

FIGURE 5A-J



LEGEND	
---	EXCAVATION LIMIT
(12)	NICKEL (mg/kg)
[11.6]	CHROMIUM (mg/kg)
{0.27}	PCBs (mg/kg)
(492)	EXCEEDANCE (BOLD)

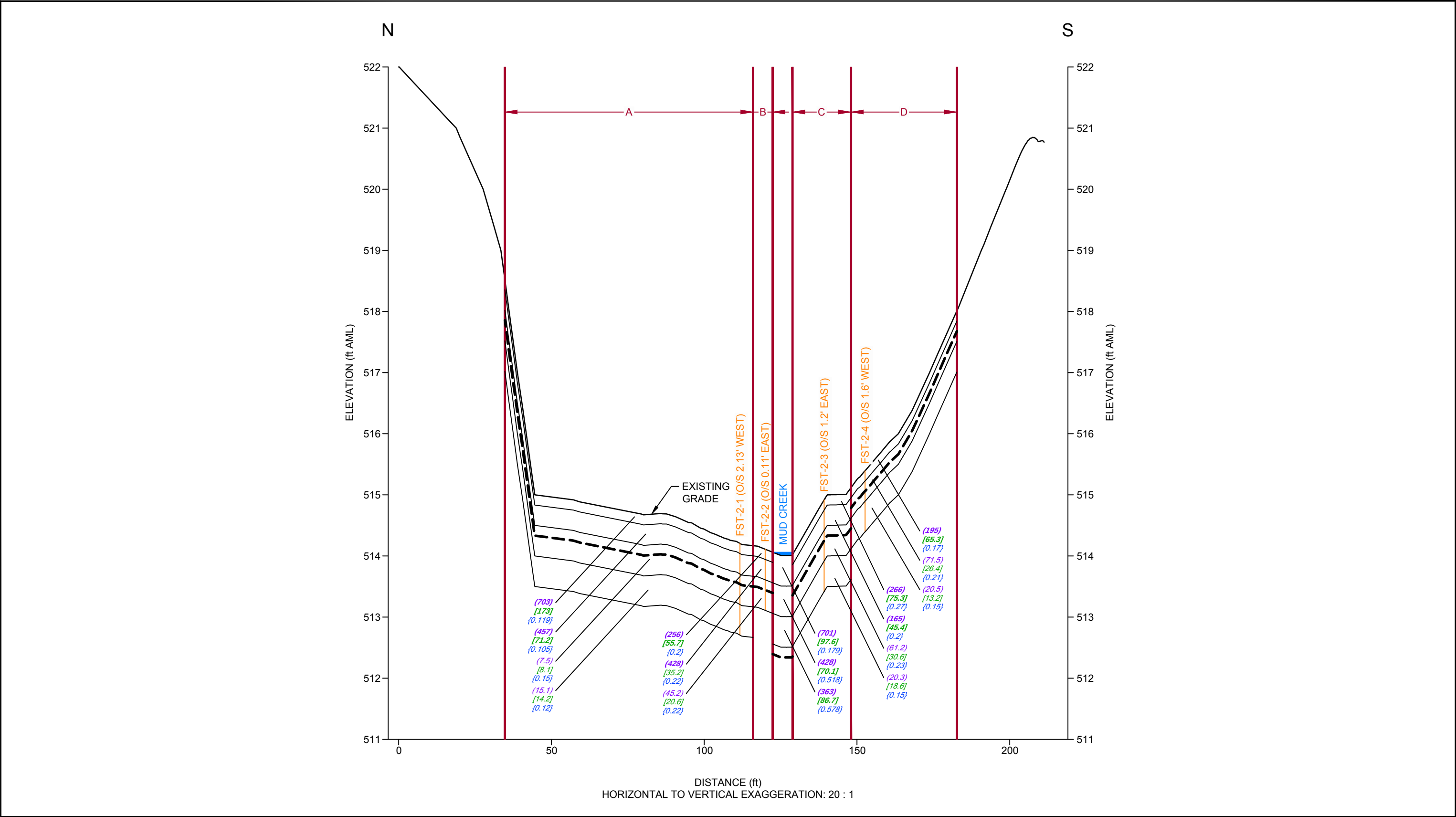


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 5B - CLASS C/RESIDENTIAL
CROSS-SECTION A-A'

86188-00
Mar 9, 2018

FIGURE 5B-A



LEGEND

--- EXCAVATION LIMIT

(7.5) NICKEL (mg/kg)

[8.1] CHROMIUM (mg/kg)

{0.15} PCBs (mg/kg)

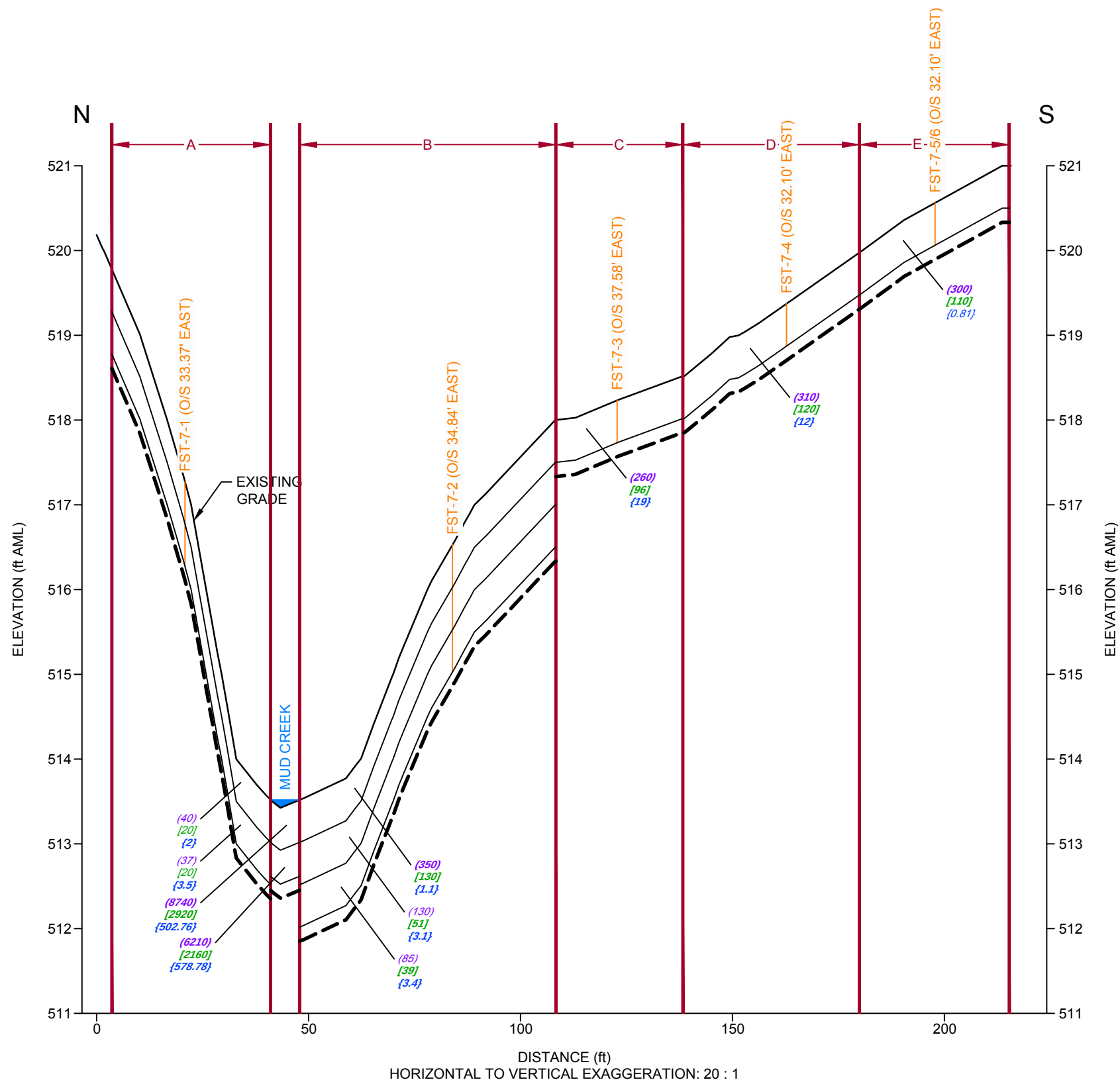
(492) EXCEEDANCE (BOLD)

SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 5B - CLASS C/RESIDENTIAL
CROSS-SECTION B-B'

86188-00
Mar 9, 2018

FIGURE 5B-B



LEGEND			
---	EXCAVATION LIMIT	{502.76}	PCBs (mg/kg)
(8740)	NICKEL (mg/kg)	(8740)	EXCEEDANCE (BOLD)
[2920]	CHROMIUM (mg/kg)		

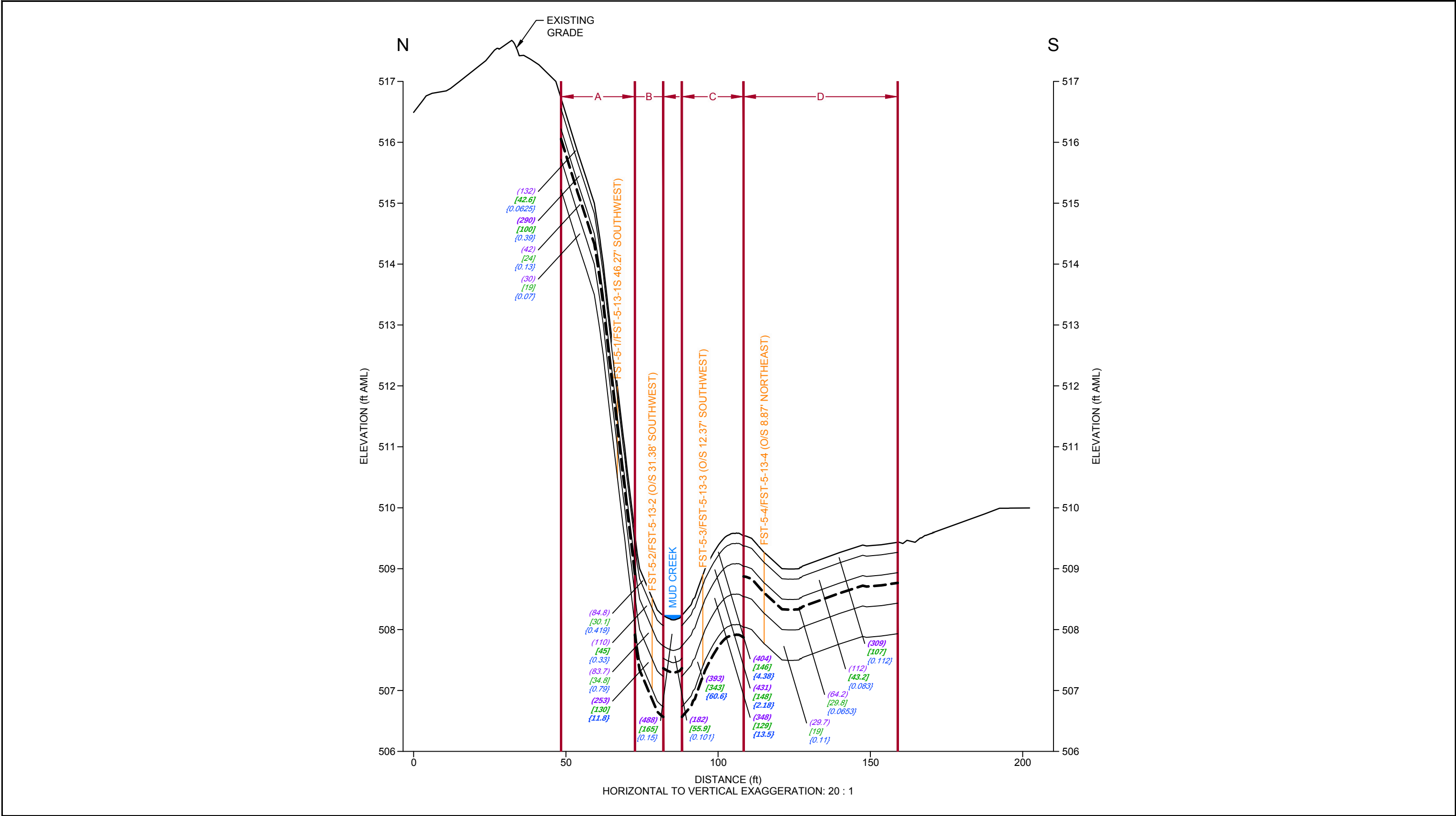


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 5B - CLASS C/RESIDENTIAL
CROSS-SECTION C-C'

86188-00
Mar 9, 2018

FIGURE 5B-C



LEGEND

--- EXCAVATION LIMIT

(132) NICKEL (mg/kg)

[42.6] CHROMIUM (mg/kg)

{0.0625} PCBs (mg/kg)

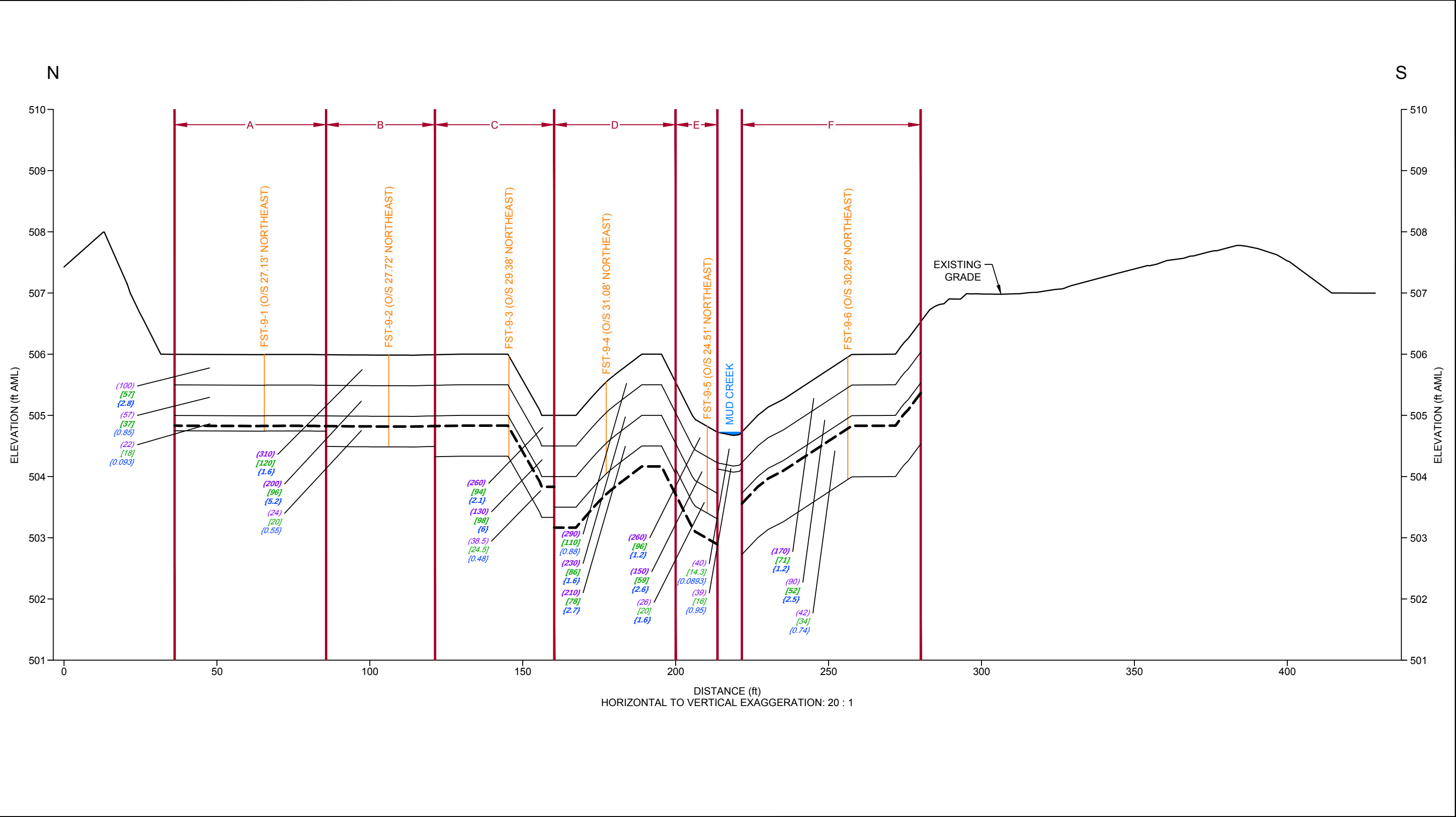
(492) EXCEEDANCE (BOLD)

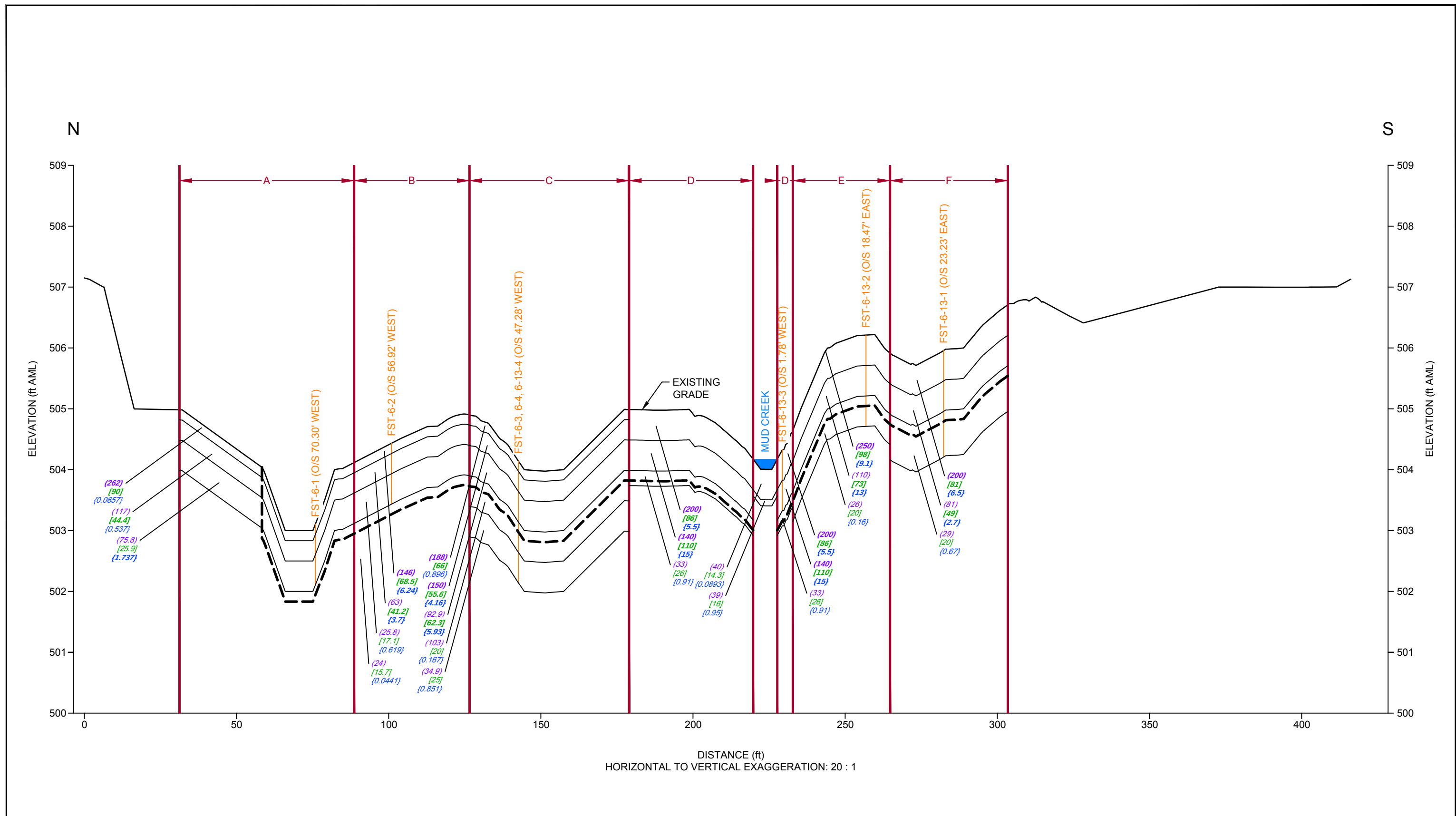
SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

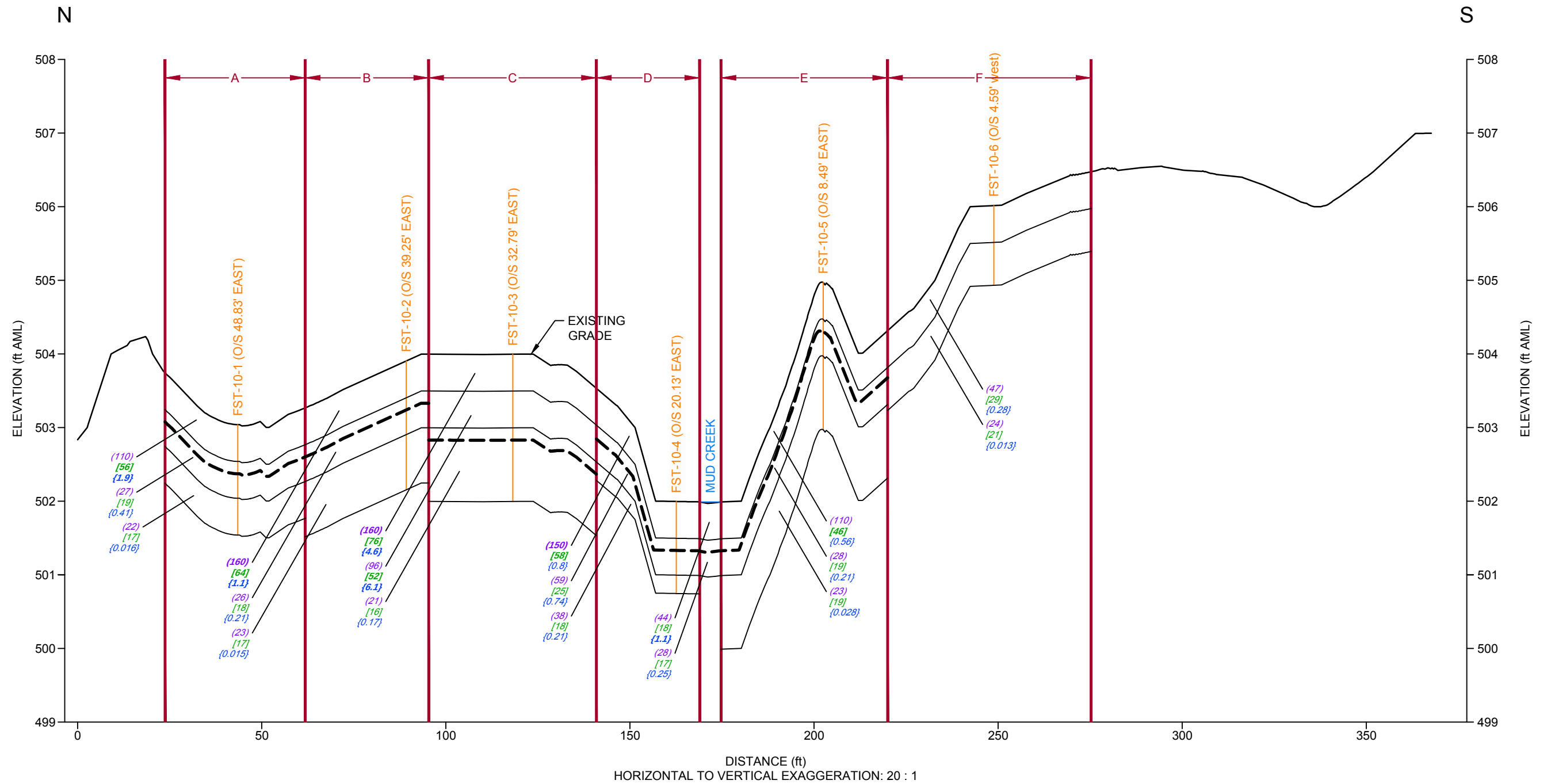
ALTERNATIVE 5B - CLASS C/RESIDENTIAL
CROSS-SECTION G-G'

86188-00
Mar 9, 2018

FIGURE 5B-G







LEGEND	
---	EXCAVATION LIMIT
(180)	NICKEL (mg/kg)
[76]	CHROMIUM (mg/kg)
{4.6}	PCBs (mg/kg)
{4.6}	EXCEEDANCE (BOLD)

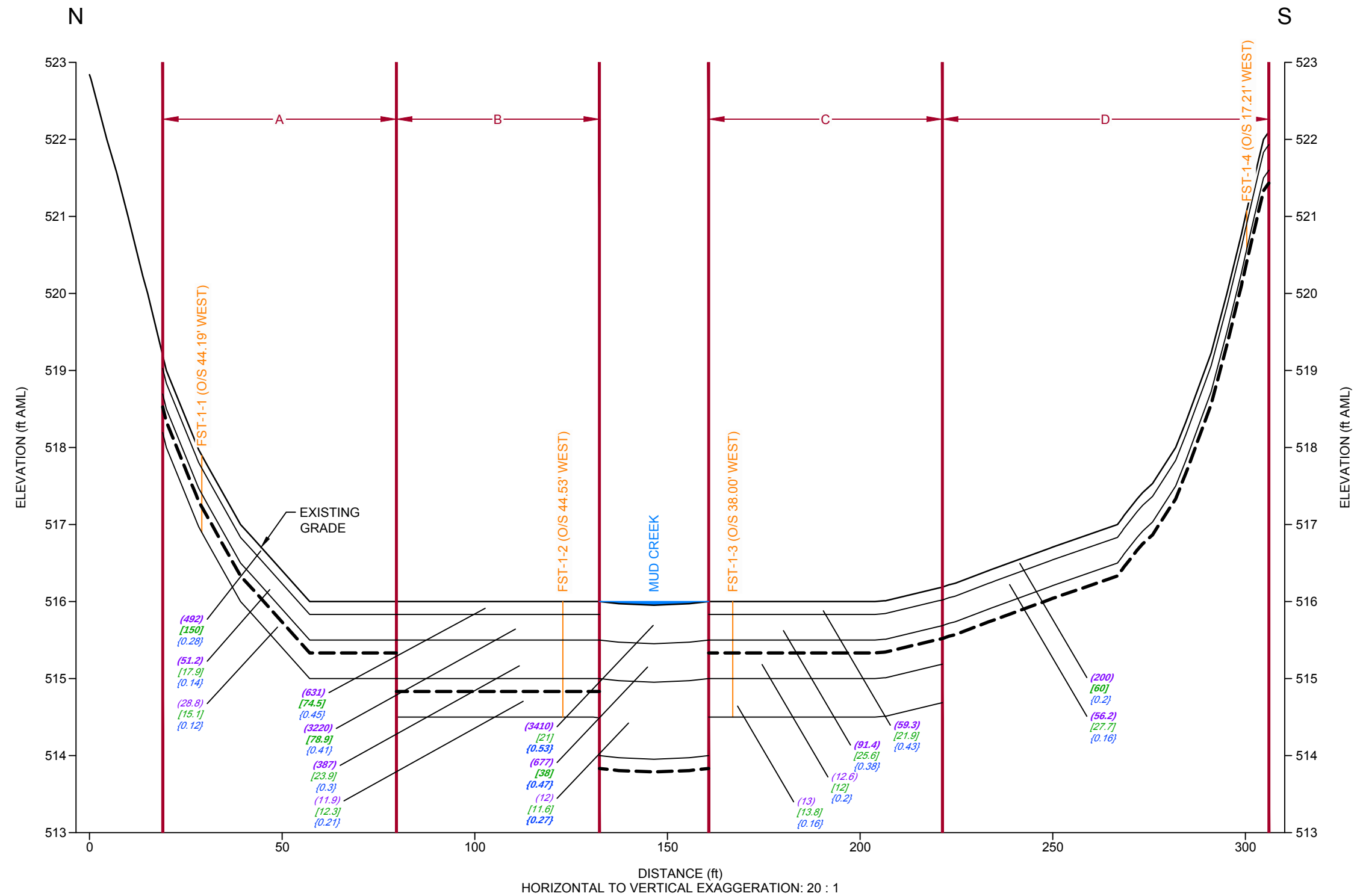


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 5B - CLASS C/RESIDENTIAL
CROSS-SECTION J-J'

86188-00
Mar 9, 2018

FIGURE 5B-J

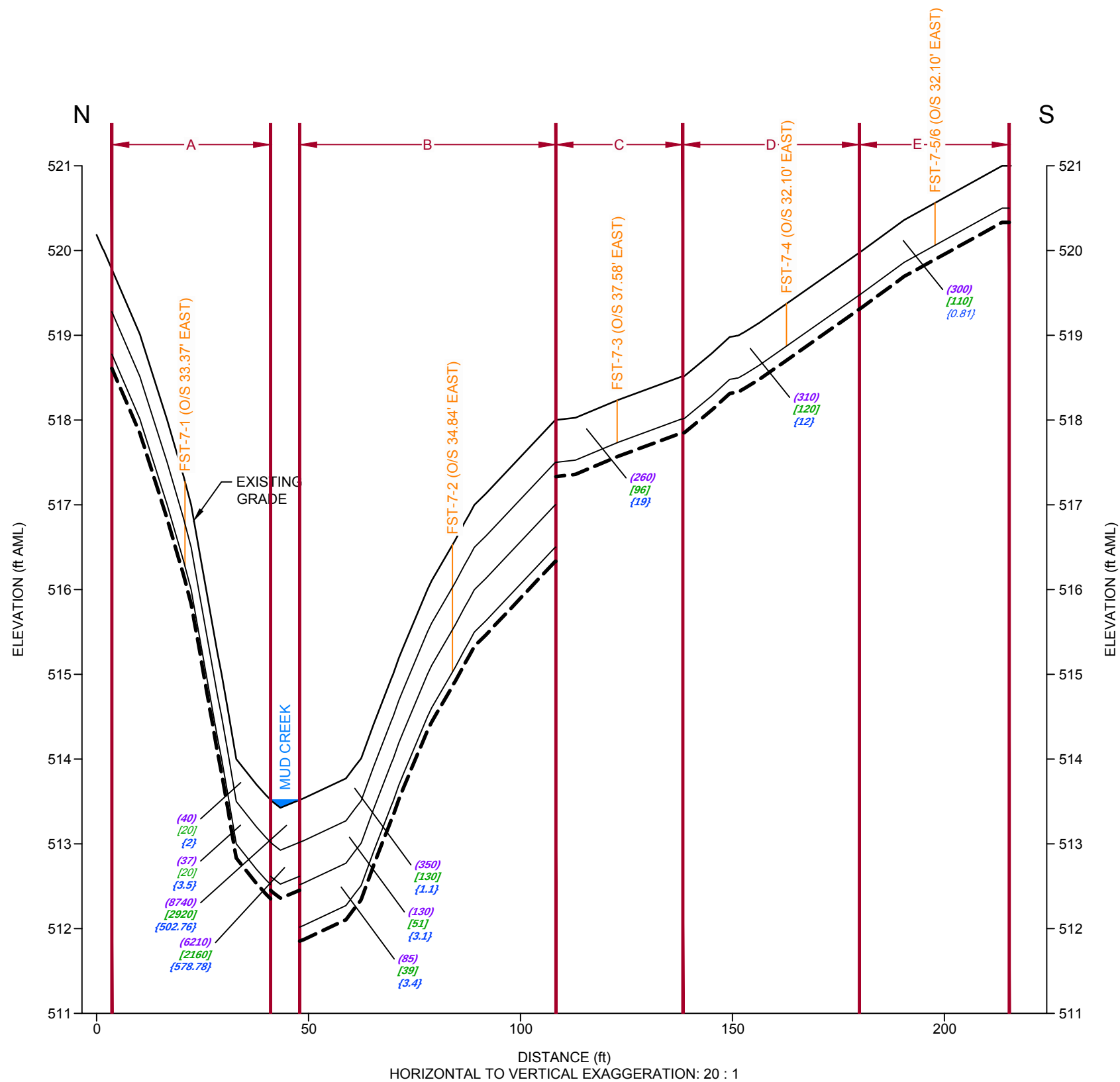


LEGEND	
---	EXCAVATION LIMIT
(12)	NICKEL (mg/kg)
[11.6]	CHROMIUM (mg/kg)
{0.27}	PCBs (mg/kg)
(492)	EXCEEDANCE (BOLD)



SPECIAL METALS CORPORATION
 NEW HARTFORD, NEW YORK

ALTERNATIVE 6 - CLASS A/RESIDENTIAL - ECOLOGICAL
 CROSS-SECTION A-A'



LEGEND

- EXCAVATION LIMIT
- (8740) NICKEL (mg/kg)
- [2920] CHROMIUM (mg/kg)

- [502.76] PCBs (mg/kg)
- (8740) EXCEEDANCE (BOLD)

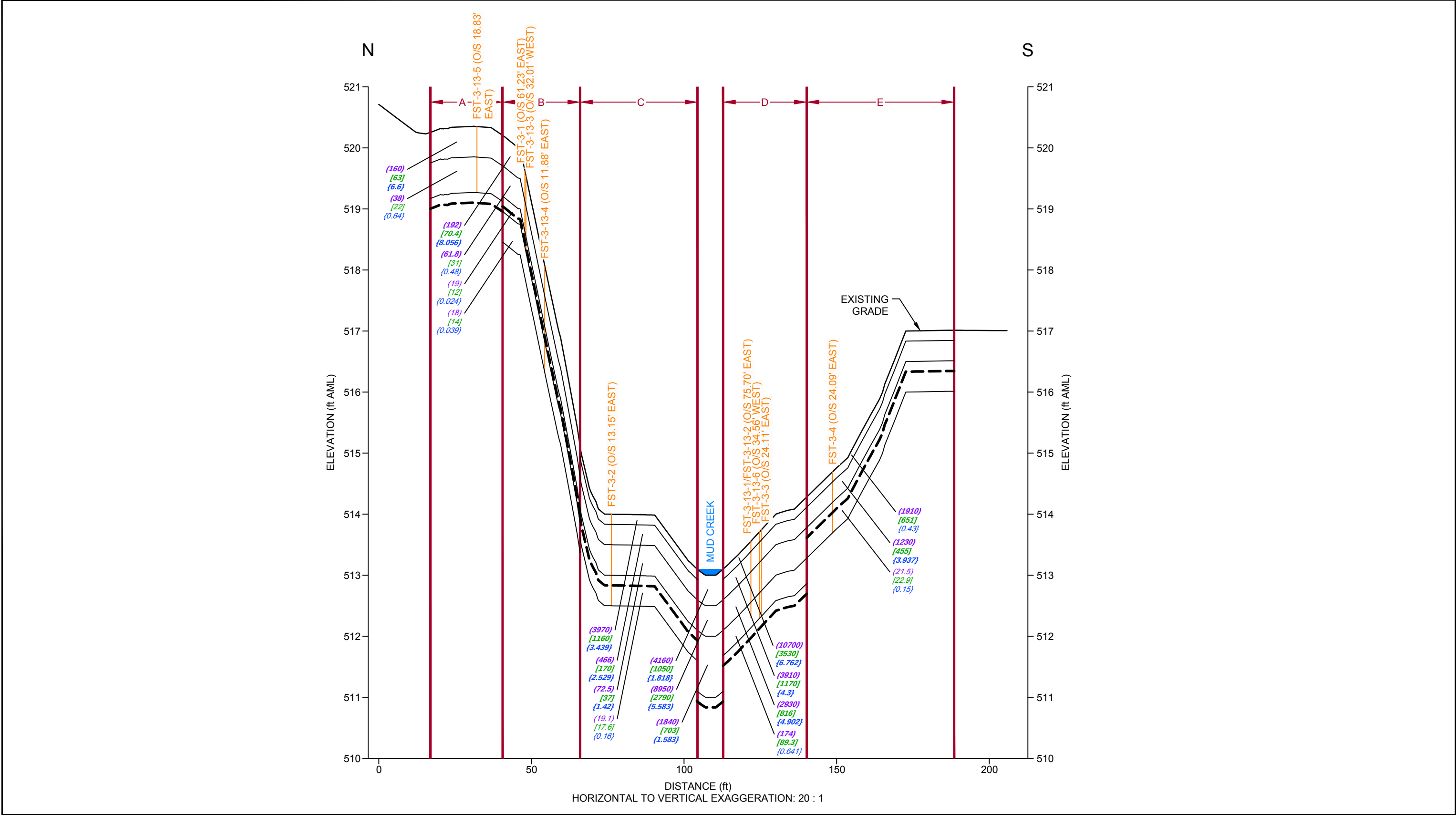


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 6 - CLASS A/RESIDENTIAL - ECOLOGICAL
CROSS-SECTION C-C'

86188-00
Nov 29, 2017

FIGURE 6-C



LEGEND

--- EXCAVATION LIMIT

(374) NICKEL (mg/kg)

[124] CHROMIUM (mg/kg)

{0.16} PCBs (mg/kg)

(4.3) EXCEEDANCE (BOLD)

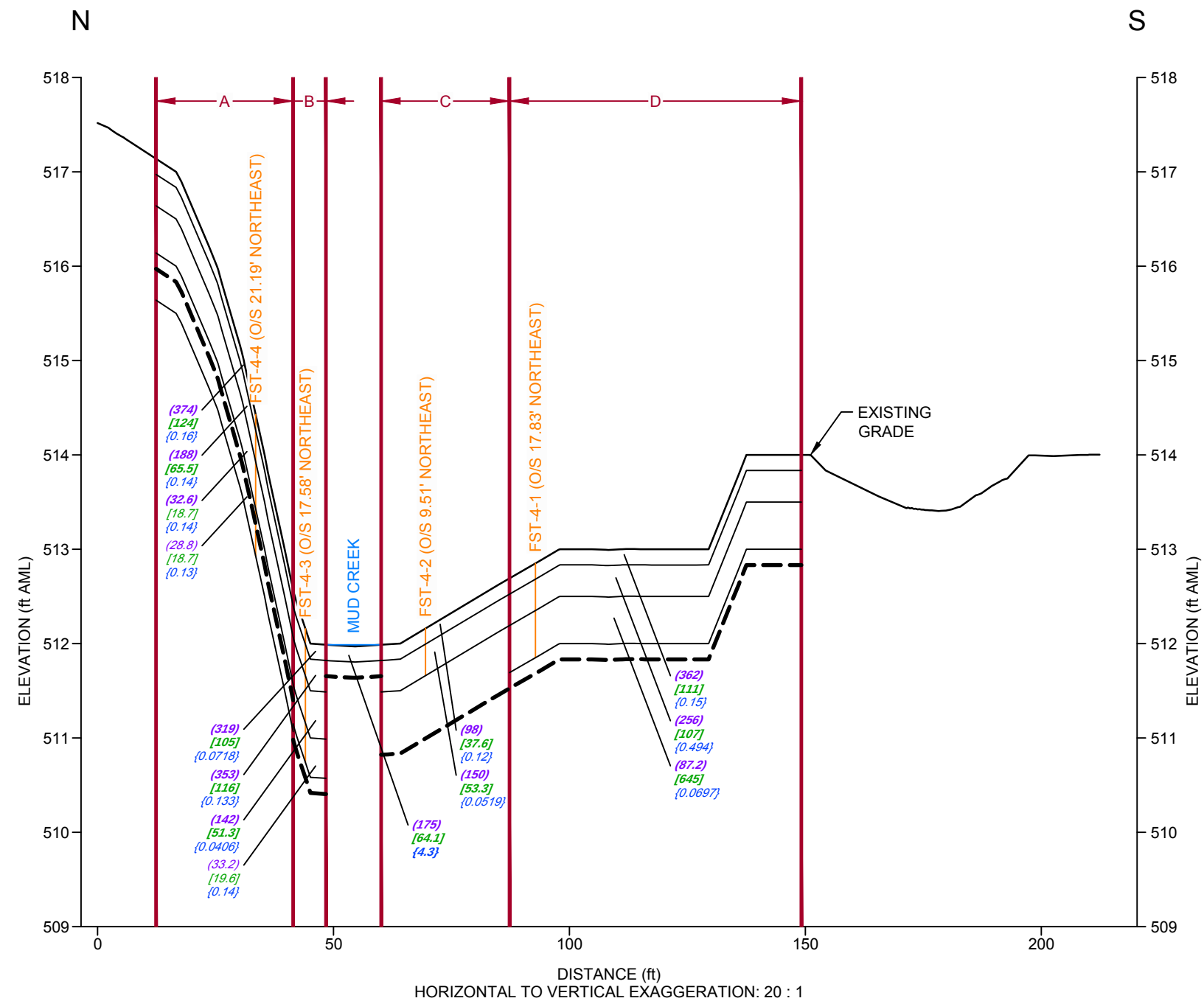


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 6 - CLASS A/RESIDENTIAL - ECOLOGICAL
CROSS-SECTION D-D'

86188-00
Nov 29, 2017

FIGURE 6-D



LEGEND

- EXCAVATION LIMIT
- (374) NICKEL (mg/kg)
- [124] CHROMIUM (mg/kg)

- {0.16} PCBs (mg/kg)
- {4.3} EXCEEDANCE (BOLD)

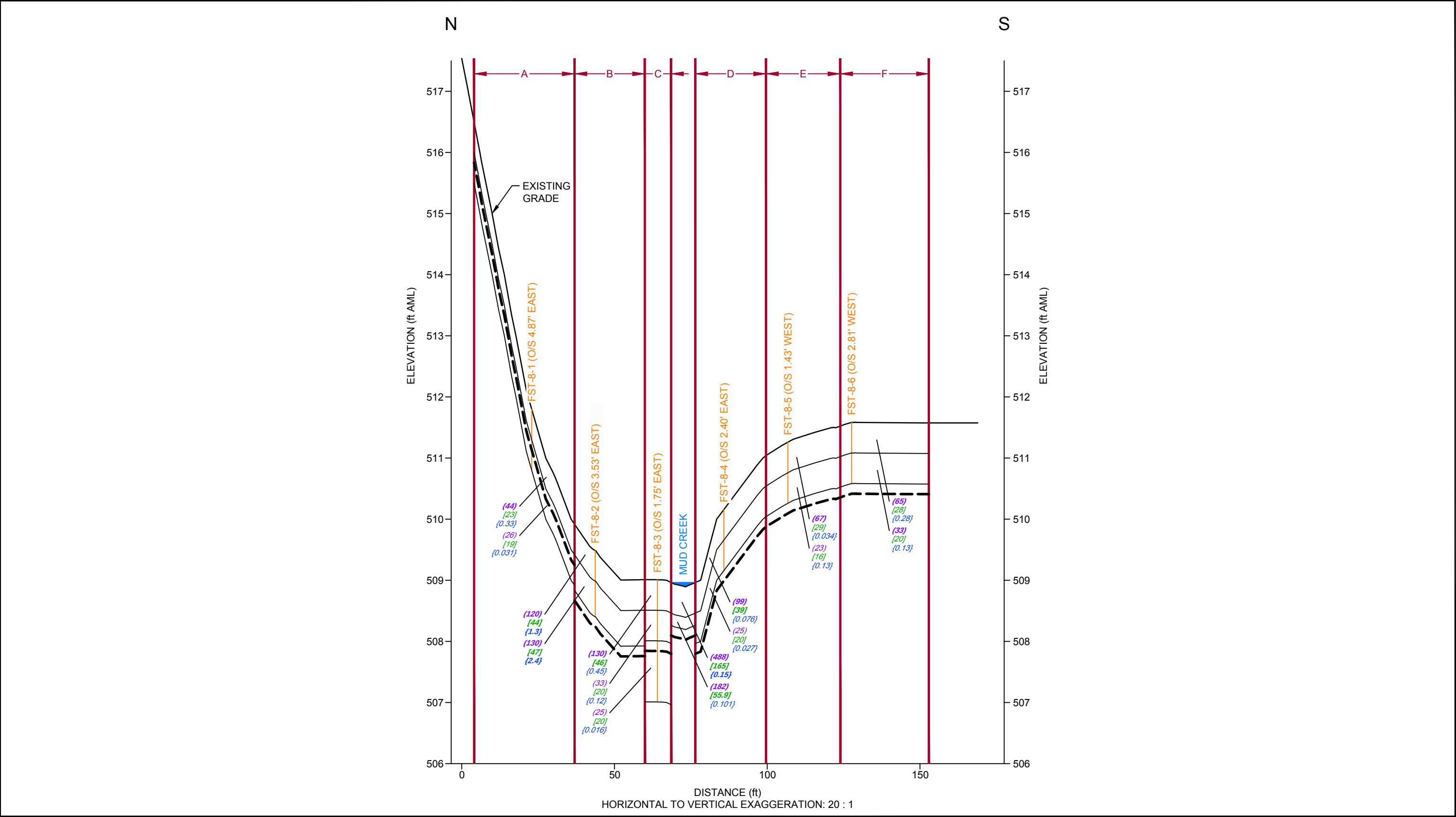


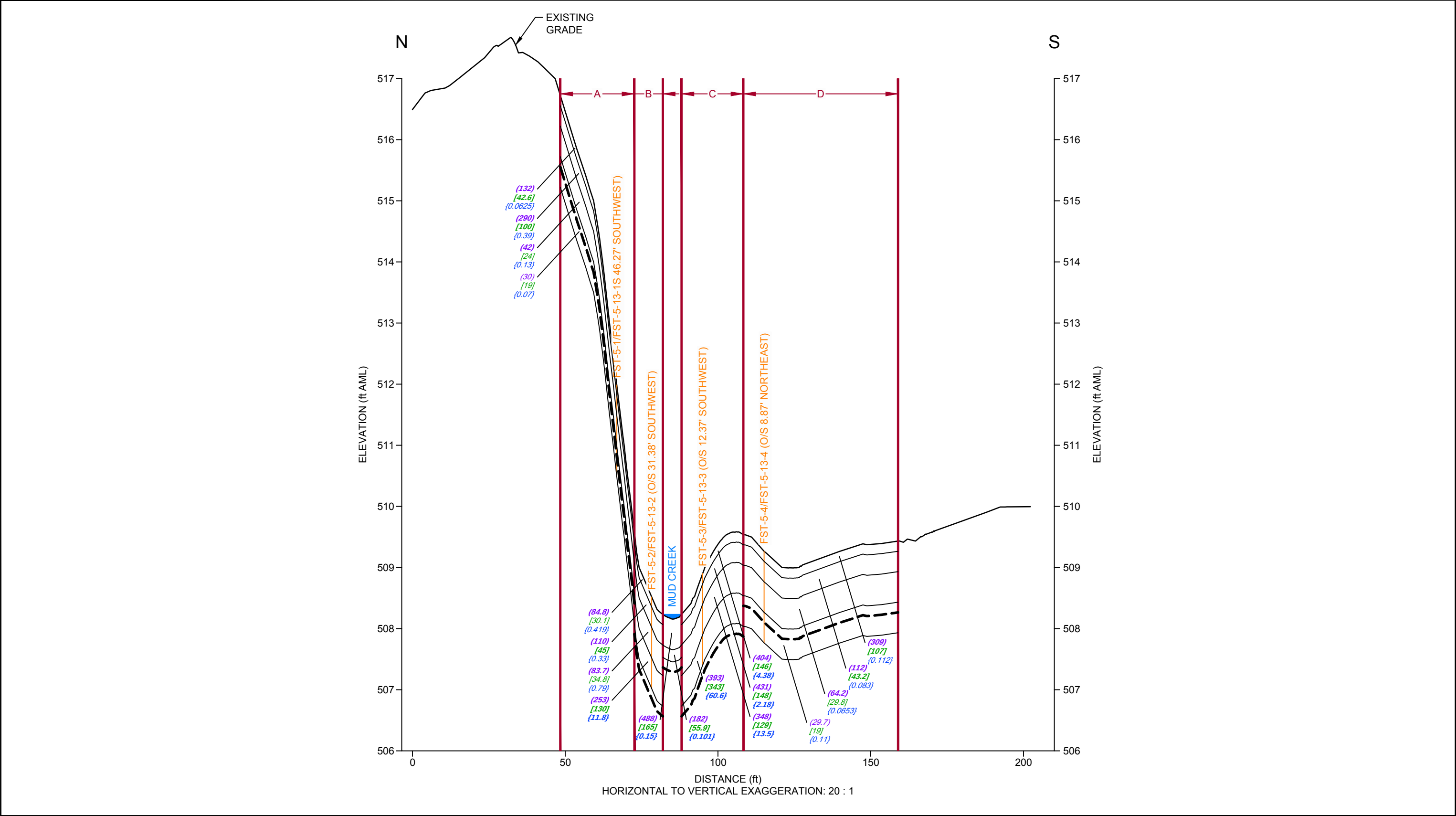
SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

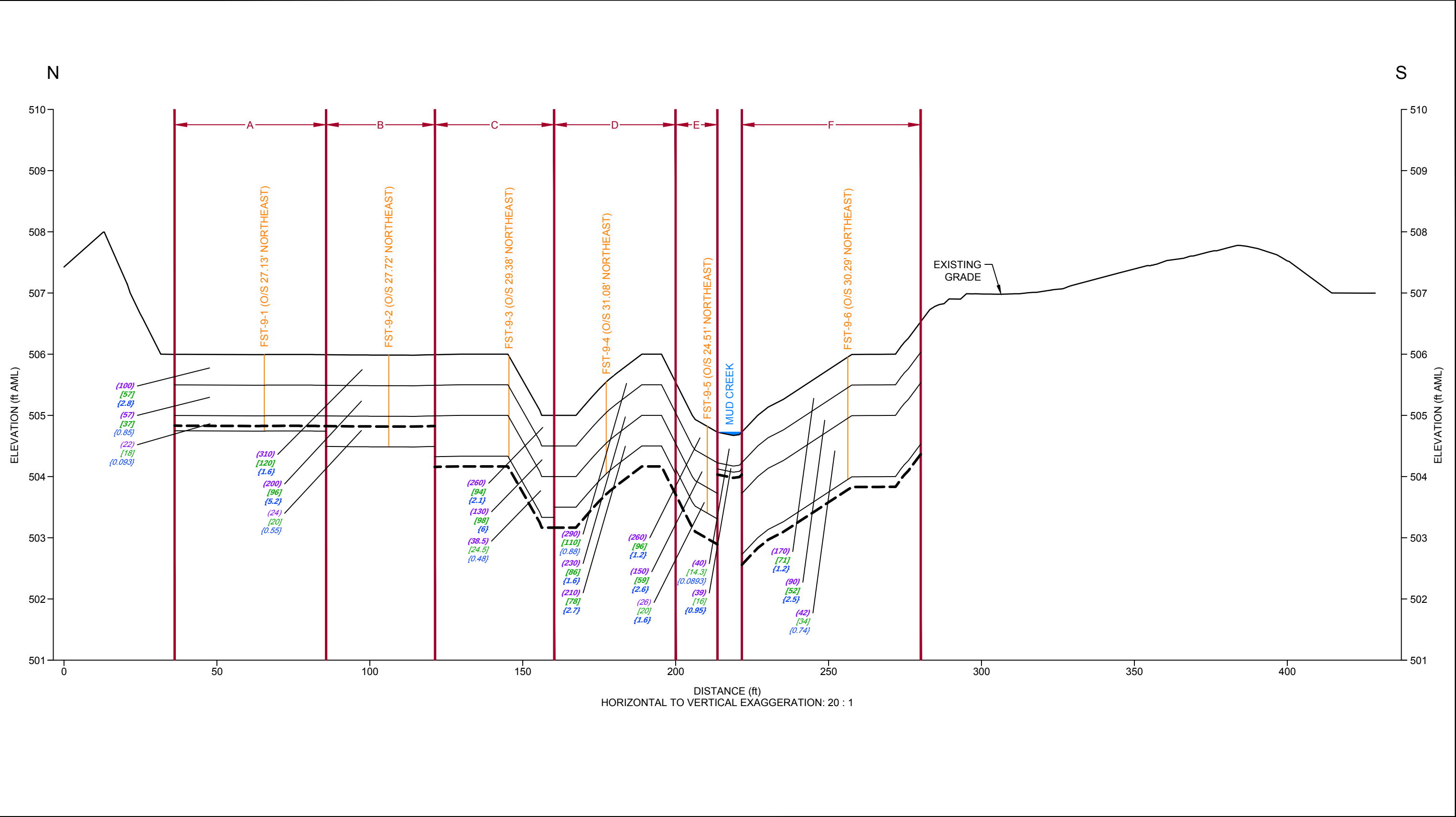
ALTERNATIVE 6 - CLASS A/RESIDENTIAL - ECOLOGICAL
CROSS-SECTION E-E'

86188-00
Nov 29, 2017

FIGURE 6-E







LEGEND

--- EXCAVATION LIMIT

(431) NICKEL (mg/kg)

[148] CHROMIUM (mg/kg)

{2.18} PCBs (mg/kg)

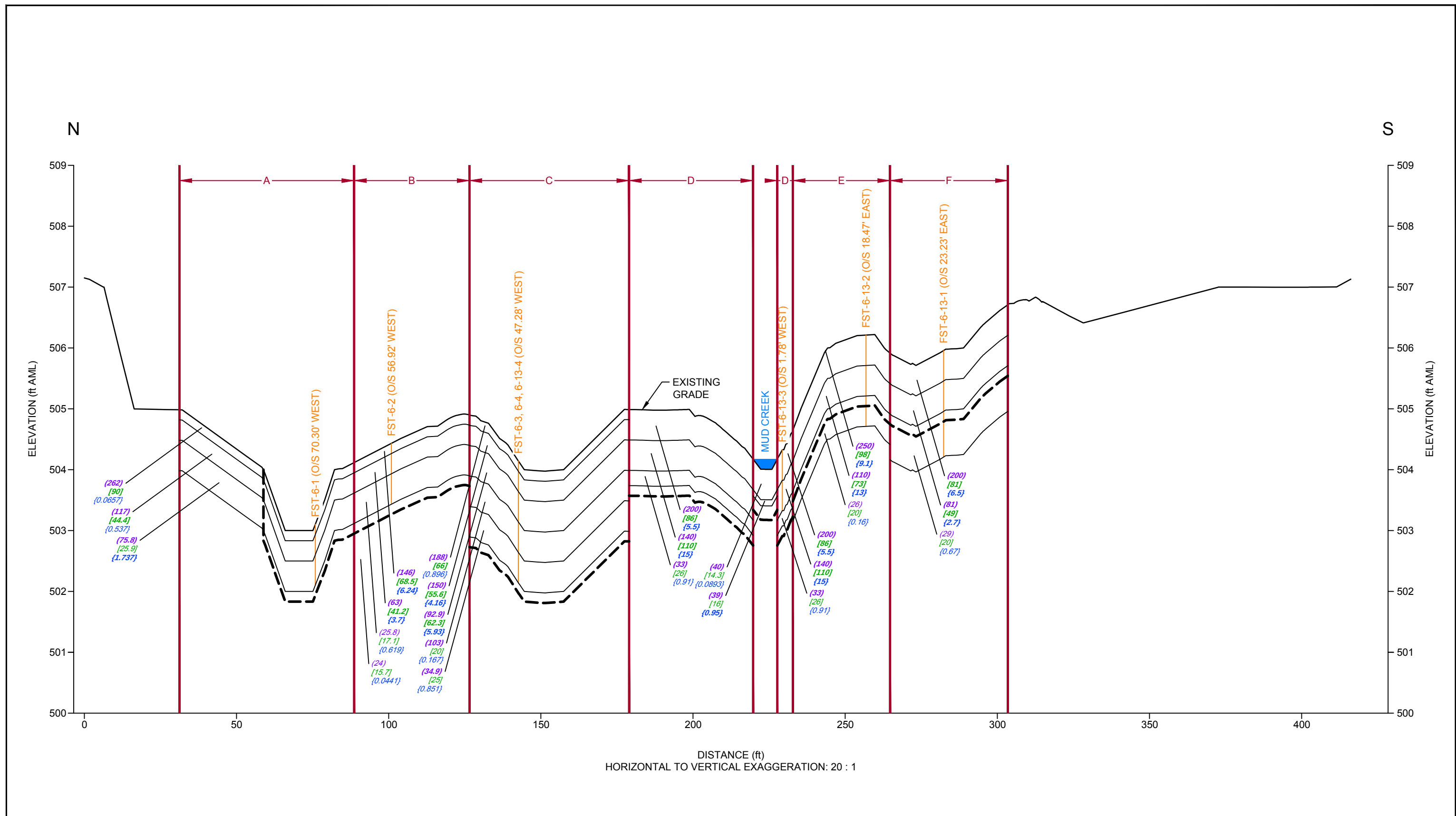
{2.18} EXCEEDANCE (BOLD)

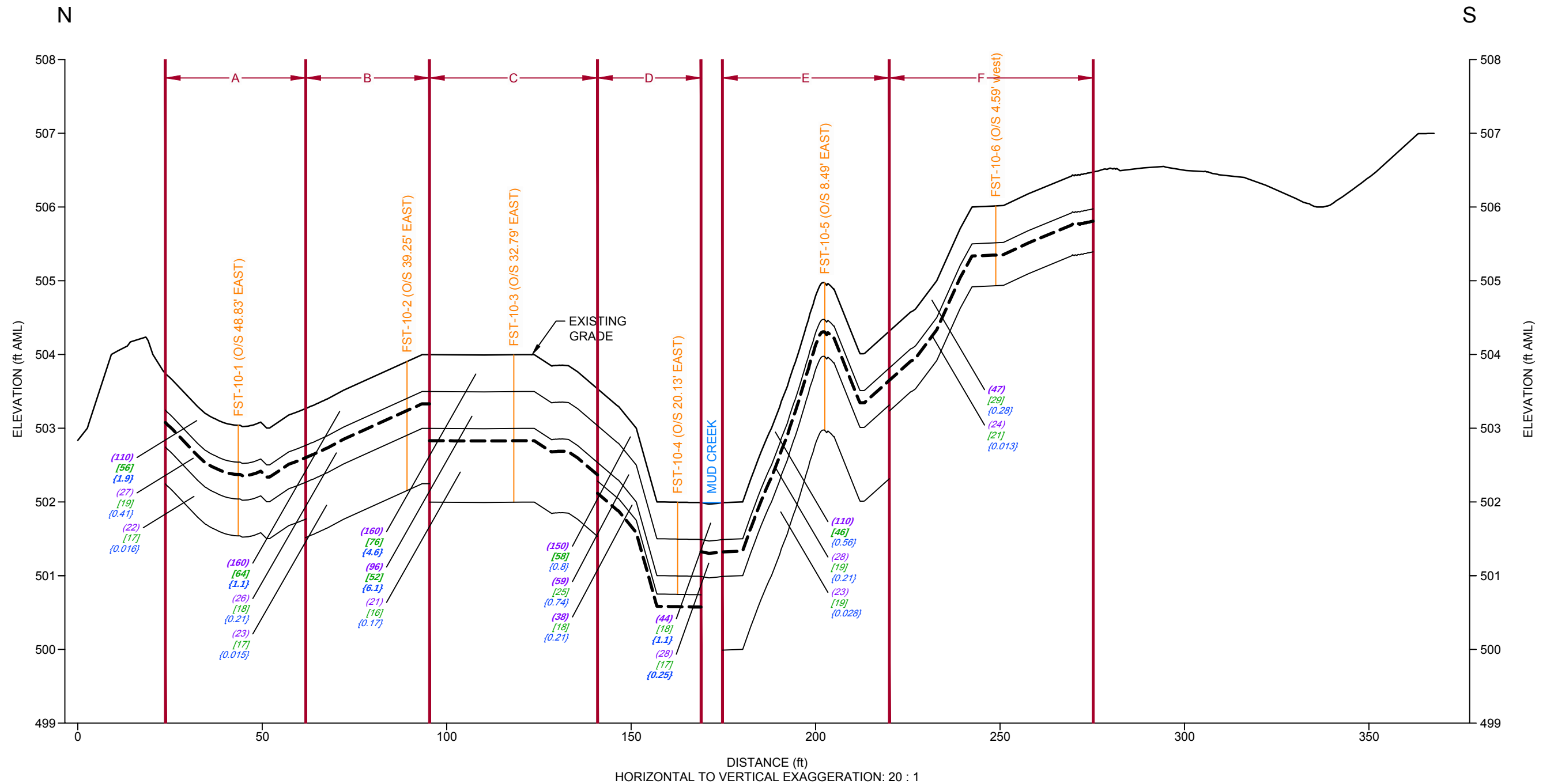
SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 6 - CLASS A/RESIDENTIAL - ECOLOGICAL
CROSS-SECTION H-H'

86188-00
Nov 29, 2017

FIGURE 6-H



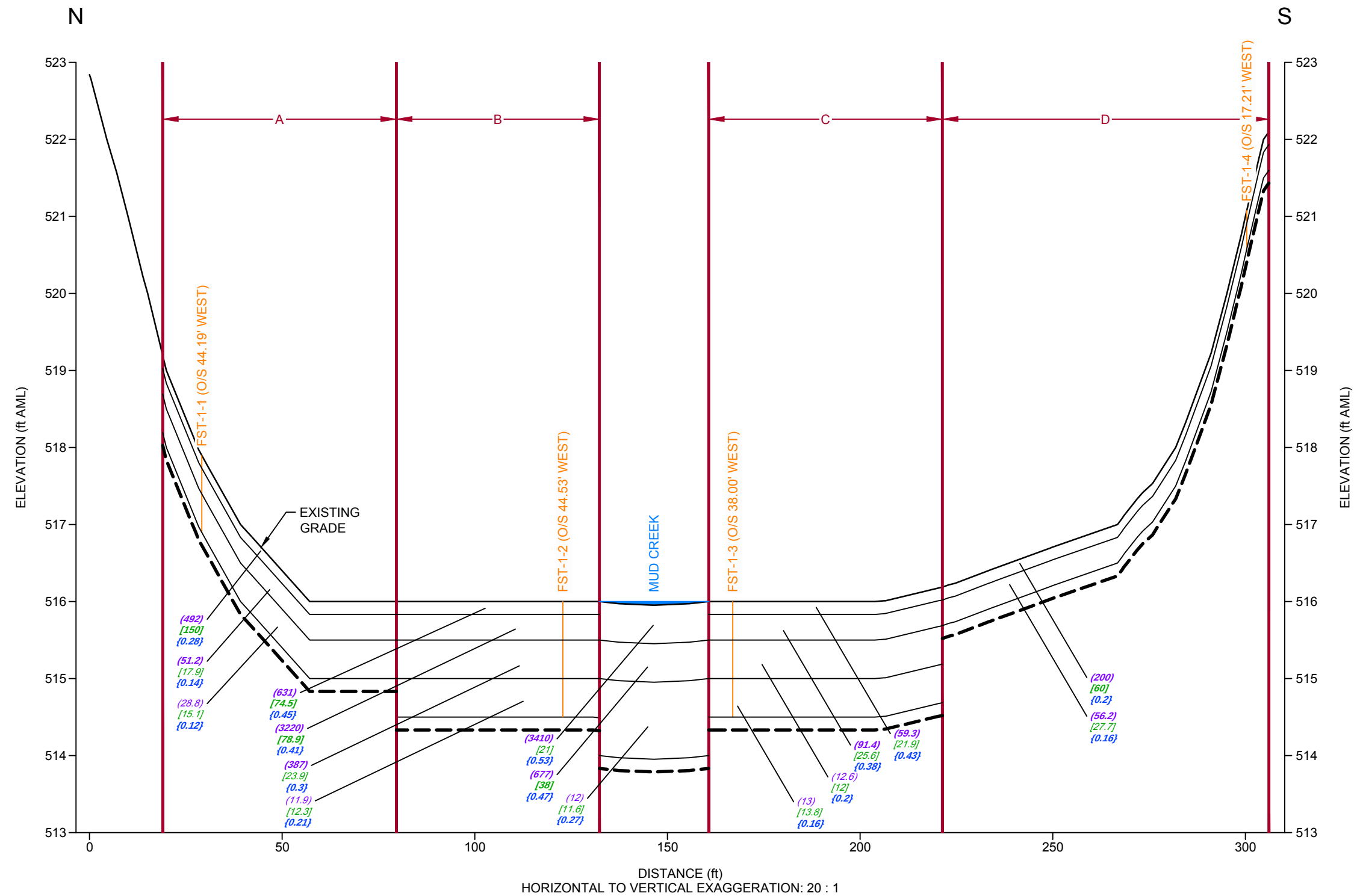


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 6 - CLASS A/RESIDENTIAL - ECOLOGICAL
CROSS-SECTION J-J'

86188-00
Nov 29, 2017

FIGURE 6-J



LEGEND			
---	EXCAVATION LIMIT	{0.27}	PCBs (mg/kg)
(12)	NICKEL (mg/kg)	(492)	EXCEEDANCE (BOLD)
[11.6]	CHROMIUM (mg/kg)		

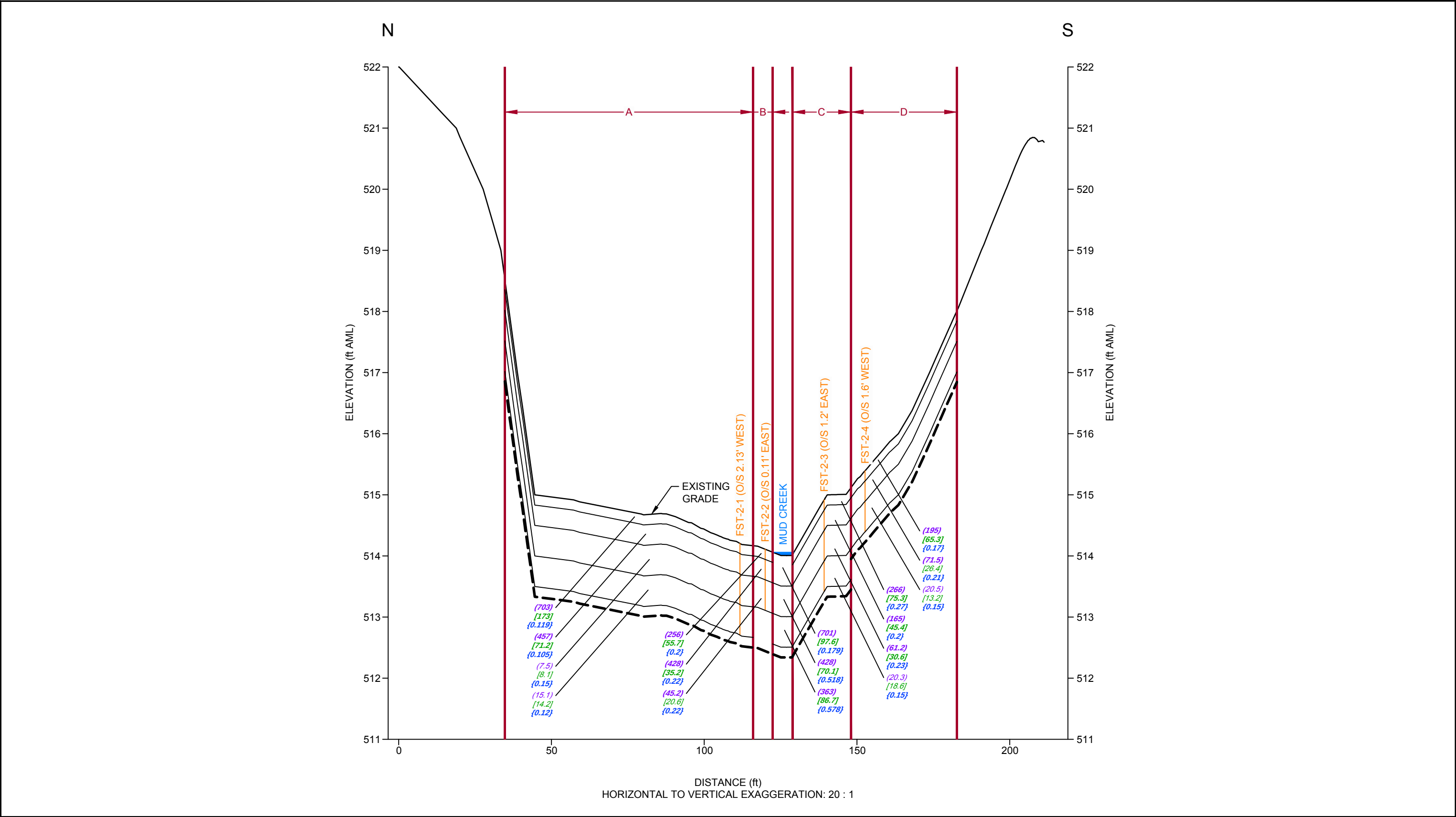


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 7 - CLASS A/UNRESTRICTED
CROSS-SECTION A-A'

86188-00
Nov 29, 2017

FIGURE 7-A



LEGEND

--- EXCAVATION LIMIT

(7.5) NICKEL (mg/kg)

[8.1] CHROMIUM (mg/kg)

{0.15} PCBs (mg/kg)

(492) EXCEEDANCE (BOLD)

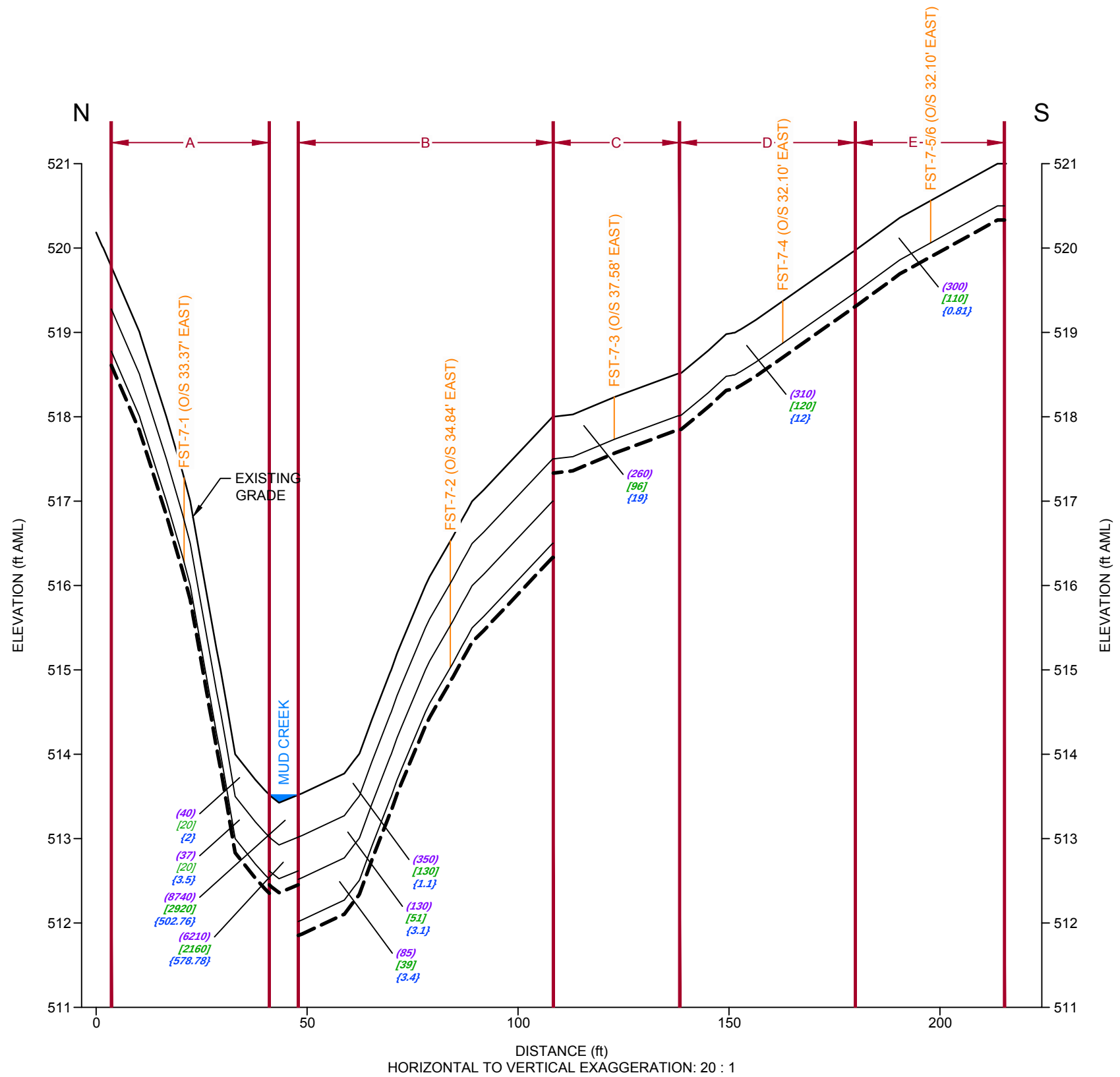


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 7 - CLASS A/UNRESTRICTED
CROSS-SECTION B-B'

86188-00
Nov 29, 2017

FIGURE 7-B



LEGEND	
---	EXCAVATION LIMIT
(8740)	NICKEL (mg/kg)
[2920]	CHROMIUM (mg/kg)
{502.76}	PCBs (mg/kg)
(8740)	EXCEEDANCE (BOLD)

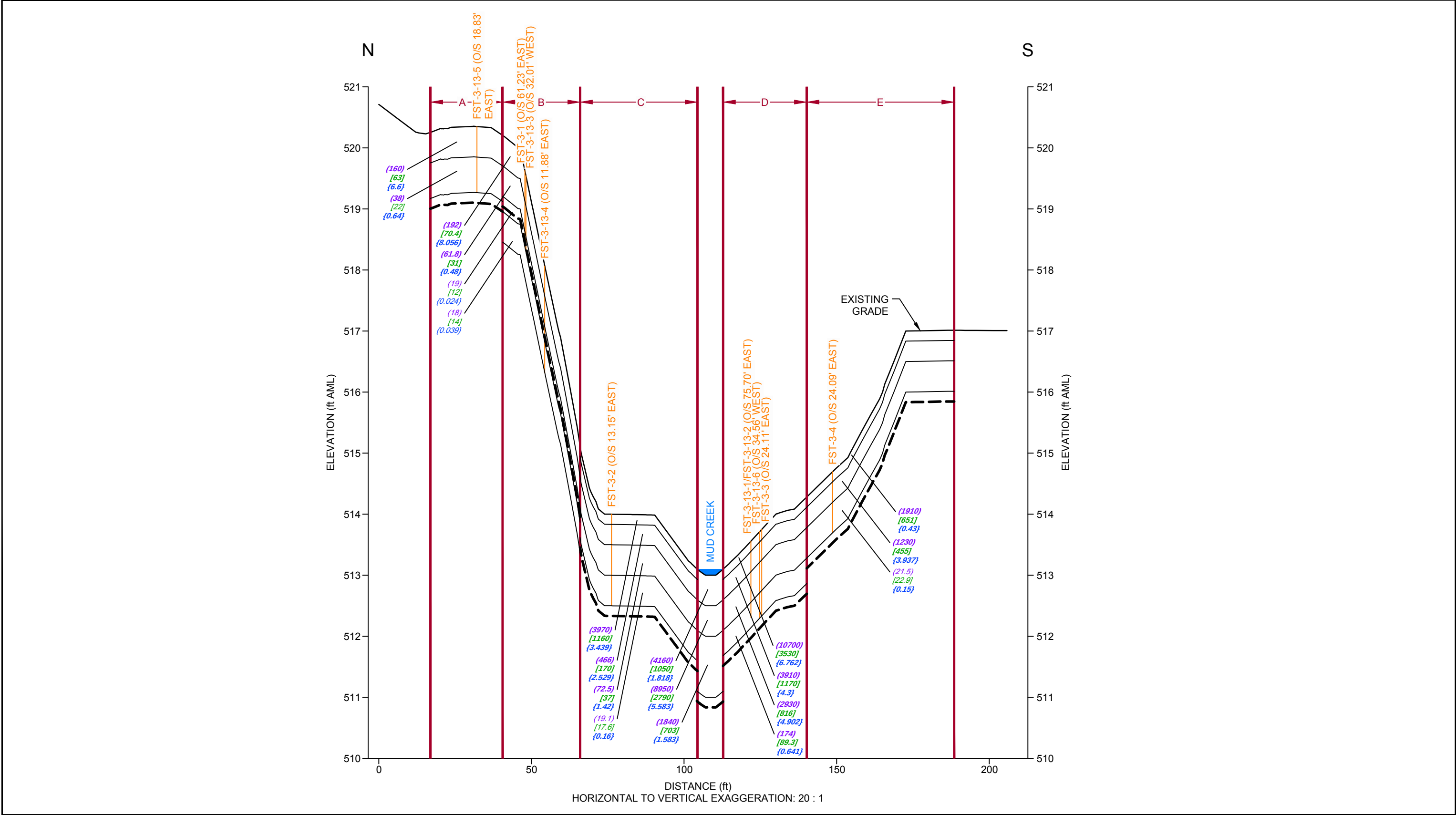


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 7 - CLASS A/UNRESTRICTED
CROSS-SECTION C-C'

86188-00
Nov 29, 2017

FIGURE 7-C



LEGEND

--- EXCAVATION LIMIT

(374) NICKEL (mg/kg)

(124) CHROMIUM (mg/kg)

(0.16) PCBs (mg/kg)

(4.3) EXCEEDANCE (BOLD)

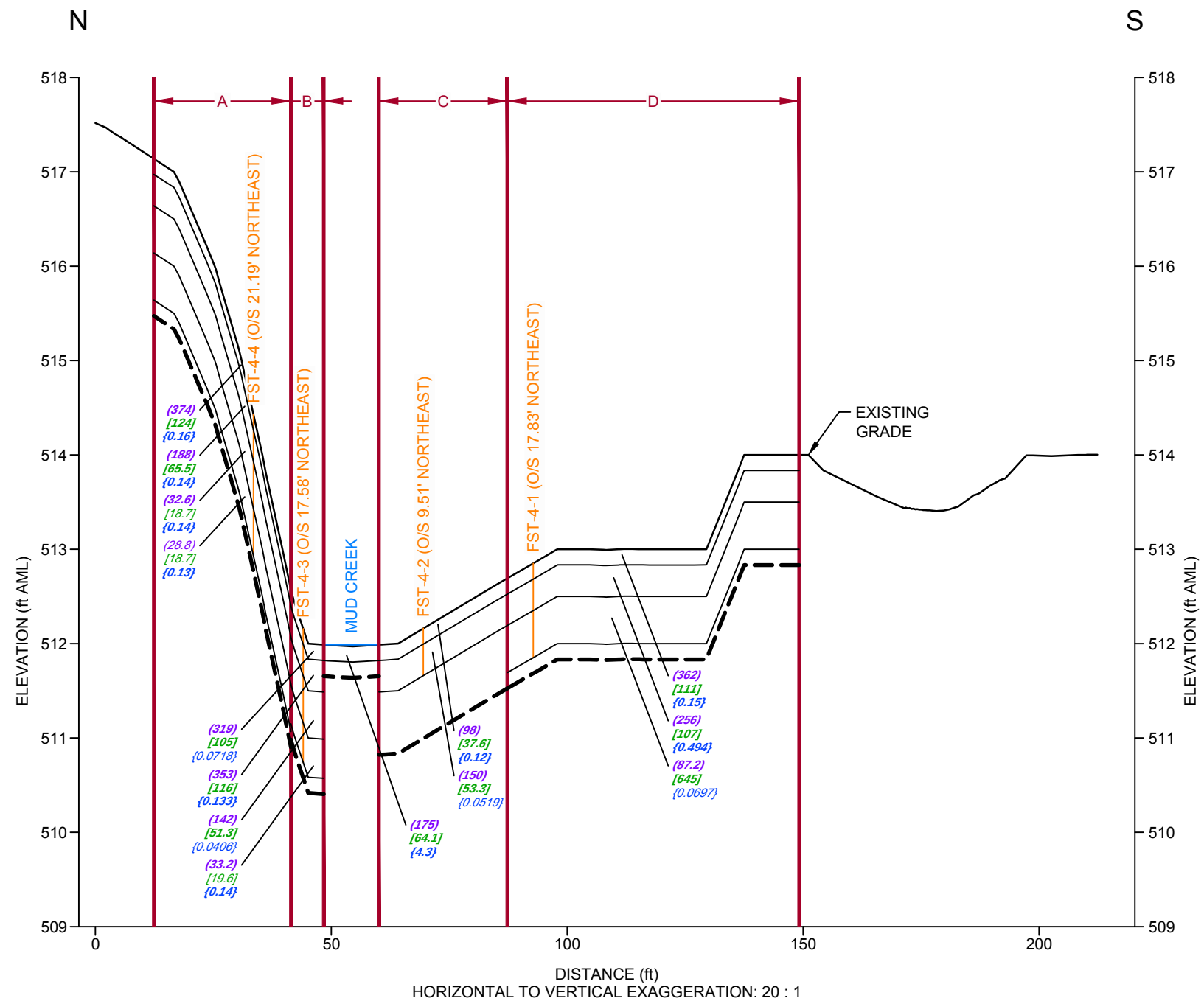


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 7 - CLASS A/UNRESTRICTED
CROSS-SECTION D-D'

86188-00
Nov 29, 2017

FIGURE 7-D



LEGEND			
---	EXCAVATION LIMIT	{0.16}	PCBs (mg/kg)
(374)	NICKEL (mg/kg)	{4.3}	EXCEEDANCE (BOLD)
[124]	CHROMIUM (mg/kg)		

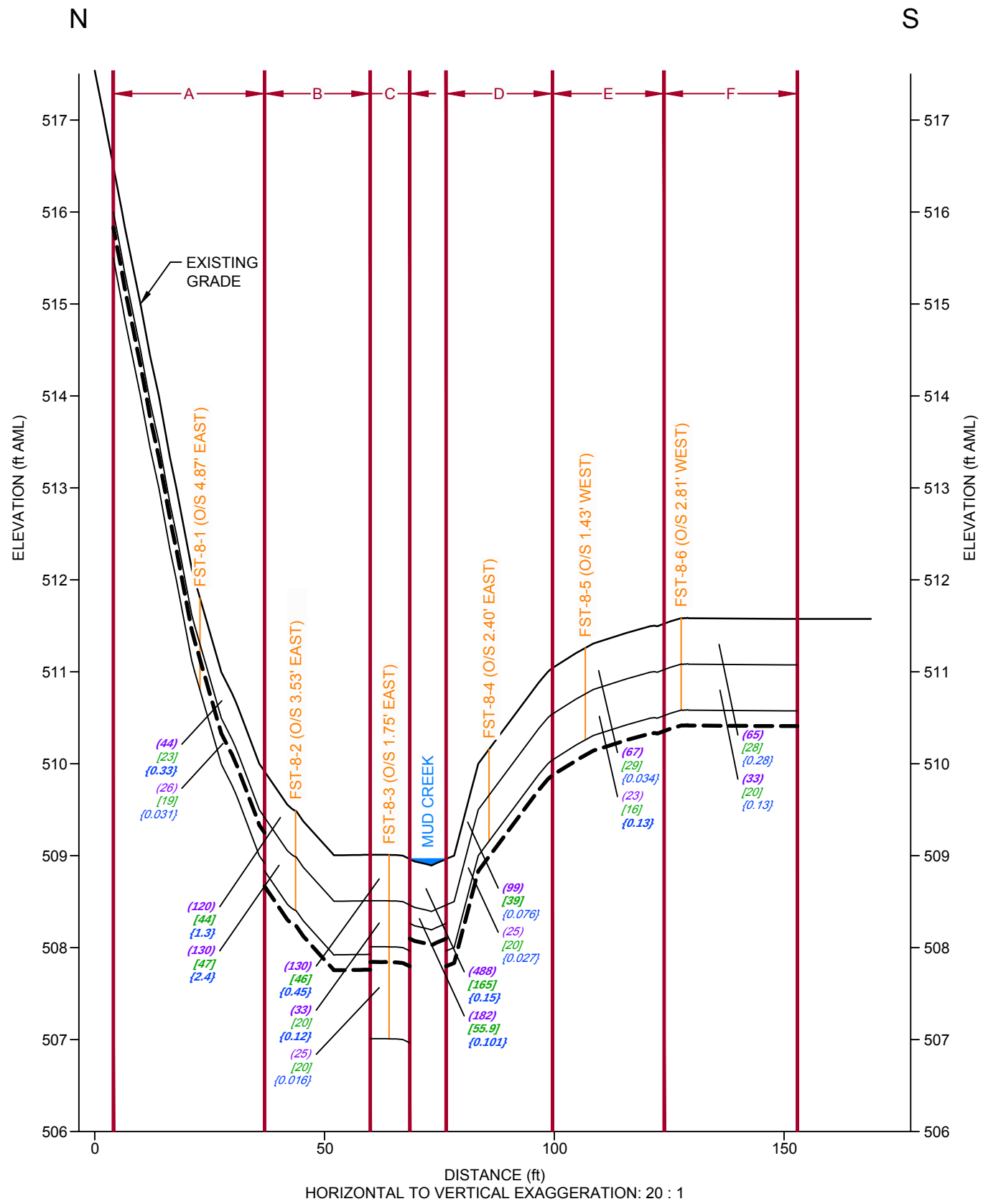


SPECIAL METALS CORPORATION
NEW HARTFORD, NEW YORK

ALTERNATIVE 7 - CLASS A/UNRESTRICTED
CROSS-SECTION E-E'

86188-00
Nov 29, 2017

FIGURE 7-E



LEGEND	
---	EXCAVATION LIMIT
(44)	NICKEL (mg/kg)
[23]	CHROMIUM (mg/kg)
{0.33}	PCBs (mg/kg)
(492)	EXCEEDANCE (BOLD)

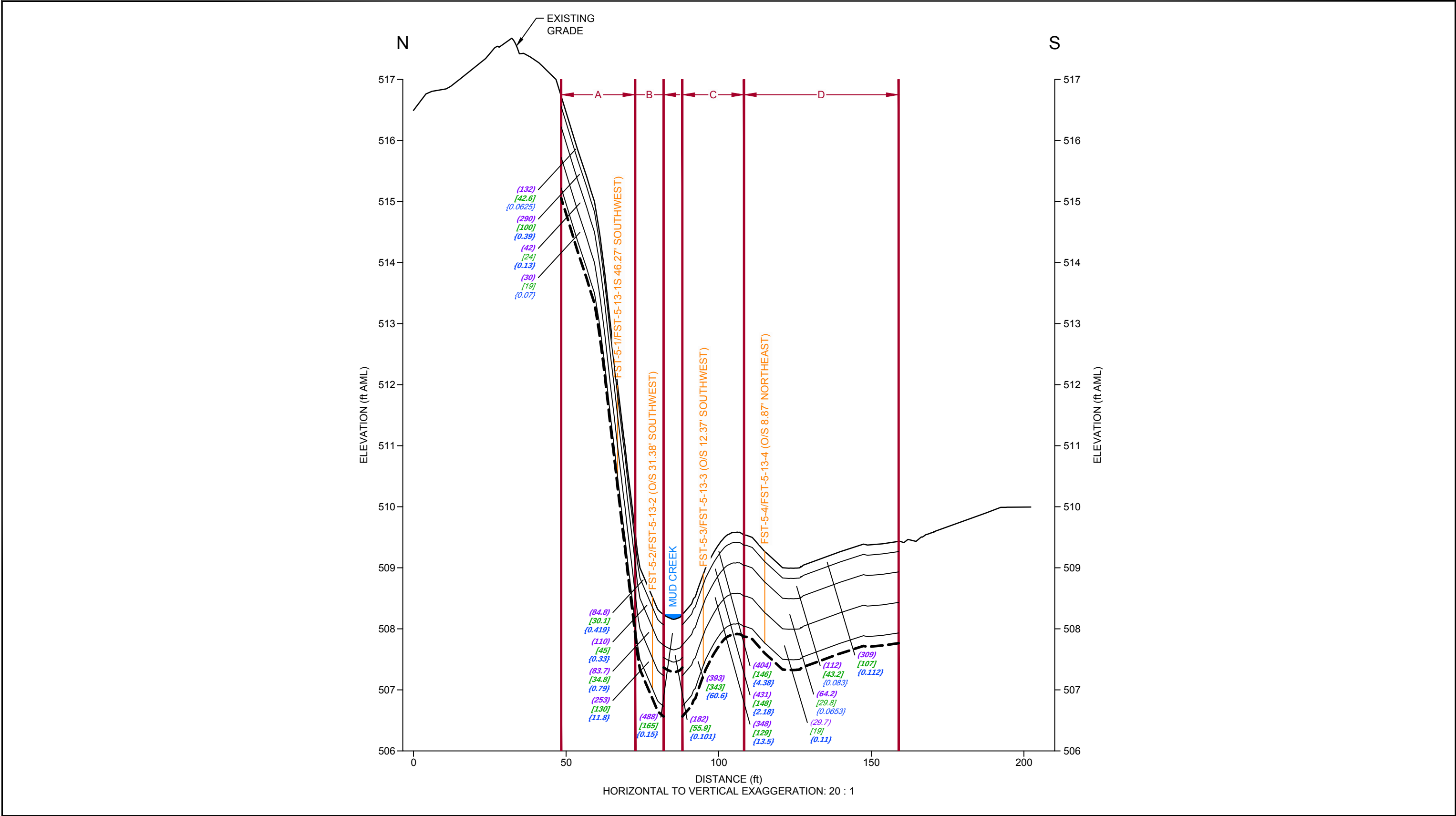


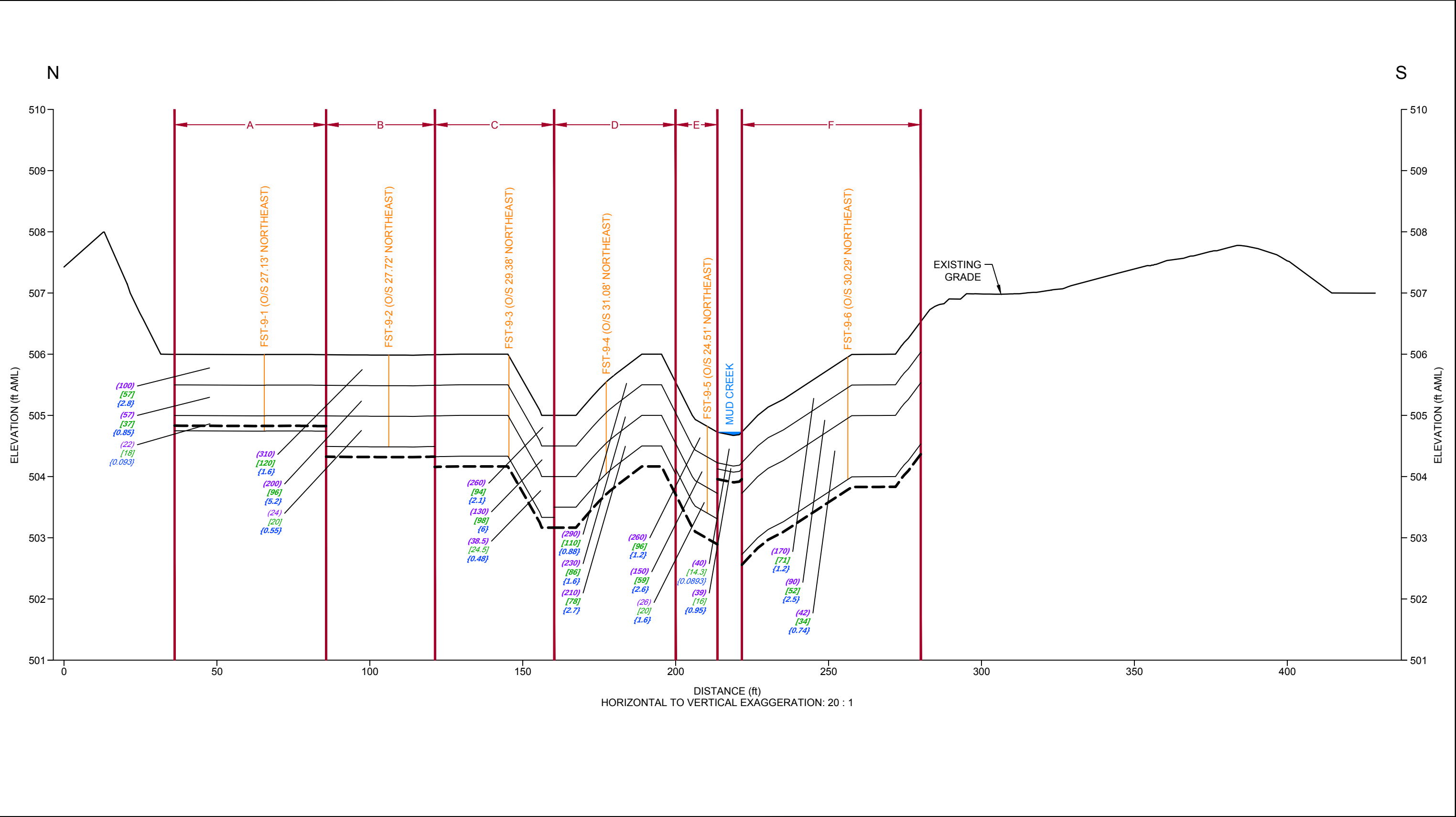
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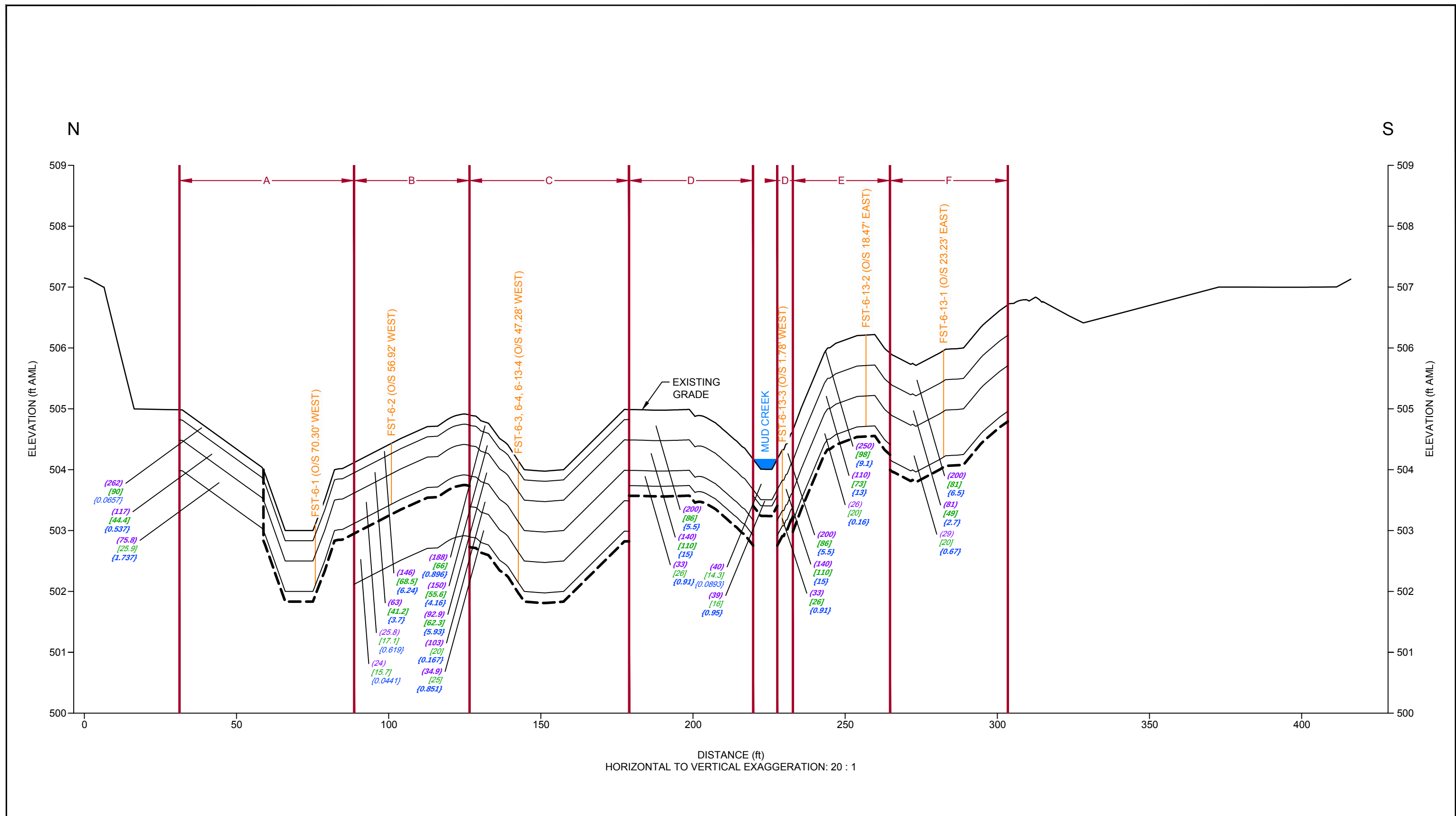
ALTERNATIVE 7 - CLASS A/UNRESTRICTED
CROSS-SECTION F-F'

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FIGURE 7-F







LEGEND

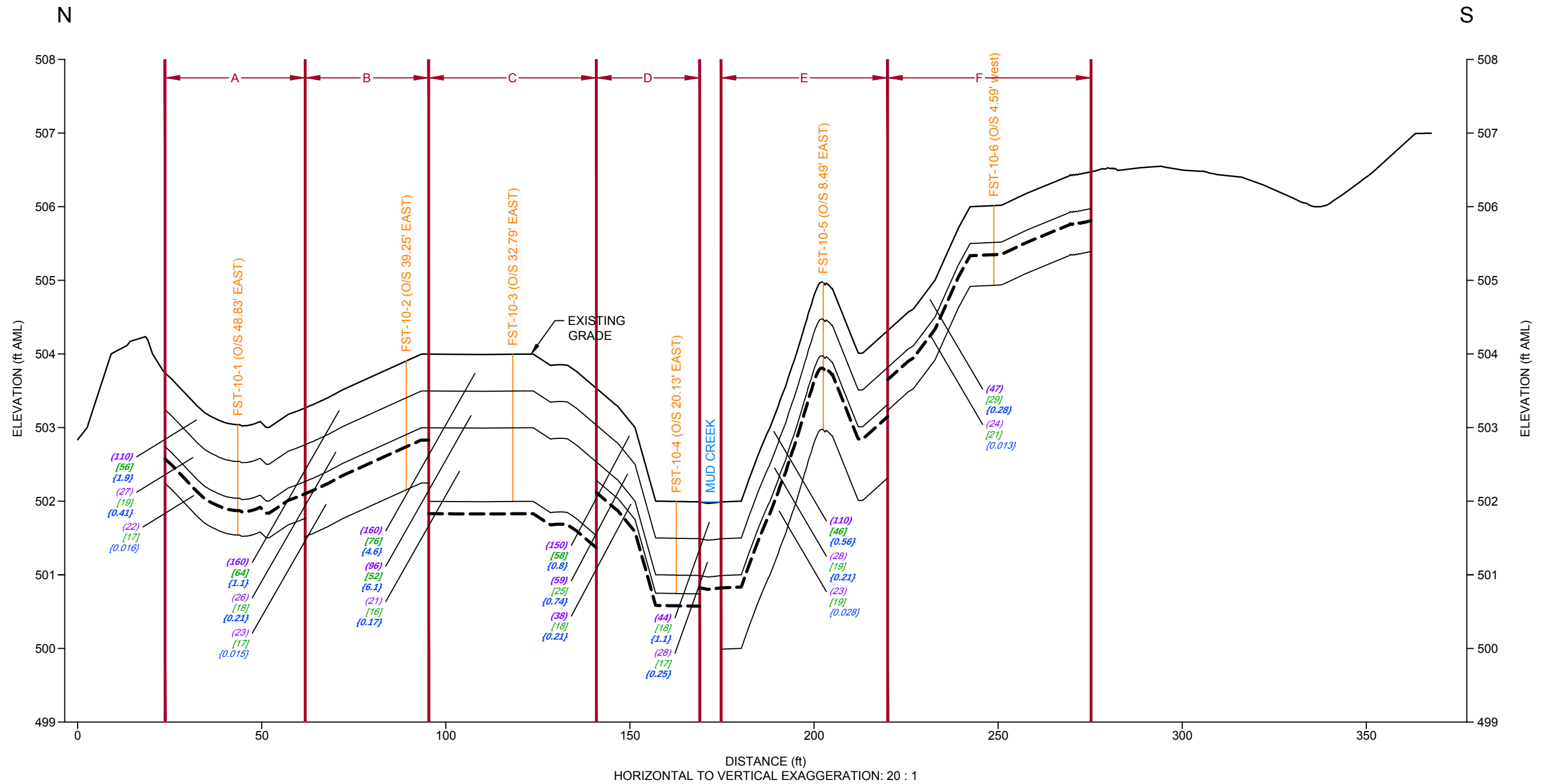
- EXCAVATION LIMIT
- (150) NICKEL (mg/kg)
- [55.6] CHROMIUM (mg/kg)
- {4.16} PCBs (mg/kg)
- {4.16} EXCEEDANCE (BOLD)

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FIGURE 7-I



LEGEND			
---	EXCAVATION LIMIT	{4.6}	PCBs (mg/kg)
(180)	NICKEL (mg/kg)	{4.6}	EXCEEDANCE (BOLD)
[76]	CHROMIUM (mg/kg)		



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FIGURE 7-J

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