HL Structural Engineers

EARTHWORKS SPECIFICATION

PROJECT: NEIGHBOURHOOD, ROCHDALE

CLIENT: WILLMOTT DIXON CONSTRUCTION LTD

JOB NO: 0872

REPORT REFERENCE: RNHD-HLE-XX-XX-SP-C-00001

DOCUMENT ISSUE HISTORY

Revision	Date Issued	Author	Checker	Approver
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Issued in support of the Planning Application for Enabling Works

CONTENTS

Introduction 1
Safety 2
Method Statements & RAMs 2
Specification For Highway Works 3
General Requirements 4
Drainage (Temporary) 4
Explosives and Dangerous Substances 4
Control of Construction Noise 4
Protection from Damage 5
Protection of Existing Services 5
Protection against Dust, Mud, Dirt and Other Debris 6
Tidiness of Site 7
Preservation of Trees, Hedges and Other Plants 7
Interfaces with Existing Accesses 7
Existing Ground Levels 8
Preparation and Surface Treatment of Formations 8
Soft Material / Soft-Spots 8
Construction and Compaction of Capping, Sub-bases and Base Layers 9

INTRODUCTION

This specification has been prepared for the earthworks elements of the enabling works at the proposed Neighbourhood development in Rochdale.

This specification should be read in conjunction with the Civil Engineering contract drawings and other Civil Engineering specifications. The specification should also be read in conjunction with other contract documents, including the ground investigation reports and Architect drawings.

SAFETY

The Contractor shall throughout the duration of the Works have full regard for the safety of all persons and shall provide for the appropriate measures to ensure safety of all concerned.

The Contractor and all Sub-Contractors employed by him shall comply fully with the Health and Safety at Work, etc., Act, 1974 and with all relevant Acts, Regulations and approved Codes of Practice relating to Health and Safety, including the provision of a COSHH Assessment.

The Contractor shall provide, erect and maintain such traffic signs, road markings, lamps, barriers and traffic control signals and such other measures as may be necessitated by the construction of the Works in accordance with the recommendations contained in Chapter 8 of the Traffic Signs Manual published by Her Majesty's Stationery office and any amendments thereof.

Where necessary signs shall be illuminated in accordance with the recommendations contained in Chapter 11 of the Traffic Signs Manual.

Compliance with this Clause shall not relieve the Contractor of any of his other obligations and liabilities under the Contract and under the relevant provisions of the Highways Acts.

METHOD STATEMENTS & RAMS

The Contractor shall submit to the Engineer and the Principal Designer risk assessments and method statements for all earthwork operations before work commences.

SPECIFICATION FOR HIGHWAY WORKS

The current edition of the Department for Transport's (DoT) Specification for Highway Works (SHW) is to be adopted as the specification for all earthworks.

This specification provides project specific requirements.

Specification for Earthworks is included within Series 600 of the SHW.

Other series will also be applicable to the earthworks. In particular:

- Series 200: Site Clearance
- Series 500: Drainage & Service Ducts
- Series 700: Pavements – General
- Series 800: Pavements – unbound, cement, & other hydraulically bound materials
- Series 900: Pavements – bituminous bound materials
- Series 1000: Pavements – concrete materials
- Series 1100: Kerbs, footways and paved areas
- Series 3000: Landscaping & Ecology

GENERAL REQUIREMENTS

DRAINAGE (TEMPORARY)

The Works shall be maintained free of water. All surfaces of excavations and fill shall be formed to provide adequate drainage falls at all times.

The Contractor shall provide at his own cost any temporary drains, sumps and pumping required during the execution of the Works.

EXPLOSIVES AND DANGEROUS SUBSTANCES

No explosive or other dangerous substance shall be brought onto the Site of Works or used for any purpose unless the Contractor has previously obtained the written acceptance of the Engineer.

CONTROL OF CONSTRUCTION NOISE

The Contractor shall employ the 'best practical means' to minimise noise and vibration produced by his operations and shall comply with the recommendations of BS 5228

Without prejudice the generality of the Contractor's obligations under the preceding paragraph, the Contractor shall comply in particular with the following requirements:

a) All vehicles, and mechanical plant (including pumps) used for the purpose of the Works shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order for the duration of the Works.

b) All compressors shall be "Sound Reduced" models fitted with properly lined and sealed acoustic covers, which shall be kept closed whenever the machines are in use. All ancillary pneumatic percussive tools shall be fitted with mufflers or silencers of the type recommended by the manufacturers.

c) Machines in intermittent use shall be shut down in the periods between work or throttled down to a minimum.

d) Pumps and mechanical static plant shall be enclosed by acoustic sheds.

The Contractor shall remove from the Works any item of plant which in the opinion of the Engineer is ineffectively silenced.

The Contractor shall organise his operations with regard to the positioning of plant and the location of haul routes, etc., so as to minimise construction noise to adjacent properties.

Piling including temporary piling shall be carried out by a recognised noise reduced system. Piling shall be carried out at times specified by the Local Authority.

PROTECTION FROM DAMAGE

General

The Contractor shall take all reasonable precautions to protect paved and unpaved surfaces, street furniture, adjacent properties and other features during the currency of the Contract.

Any damage which does occur shall be made good by the Contractor at his own expense. Damage to buildings and other third-party owned properties shall be rectified as agreed with the Engineer and at a time agreed with both the Engineer and the third-party owner. Any remedial works required shall include the reinstatement of surfaces to their original condition as appropriate.

The Contractor shall carefully cover up or otherwise protect all work liable to damage from the weather, stormwater, or any other cause during construction.

The Contractor shall allow for any contingencies or extra temporary works which may be necessitated by adverse site conditions or which may be required by the Engineer for the protection of the Works.

Fires

No materials shall be disposed of by burning in the area of the Works.

Statutory Undertakings

Any damage to the Permanent Works caused by Statutory Undertakings or Authorities who are working on Site in connection with the Works shall be reported immediately to the Engineer.

Other Contractors

Any damage caused by other contractors engaged in other Works adjacent to or within the Site Boundary shall be reported immediately to the Engineer.

Winter Maintenance

The Contractor's attention is drawn to the practice of the Highway Authority to use de-icing materials during winter maintenance of public roads.

The Contractor shall take measures to prevent the ingress of de-icing materials, whether as solid, in solution or as a spray, into the Works, in addition to the particular requirements of the Contract.

All parts of the Works in progress which have become contaminated shall be decontaminated to the satisfaction of the Engineer before further work will be permitted.

PROTECTION OF EXISTING SERVICES

The Contractor shall be entirely responsible for locating the positions of all services and apparatus which are likely to be affected by the Works.

The Contractor shall consult all relevant Utilities Companies, Statutory Undertakings and service owners before commencing any excavations, and shall satisfy himself as to the exact position of existing services which may affect or be affected by the construction of the Works.

The Contractor shall make his own arrangements for any diversions or removal of services which he may require for his own convenience or because of his proposed method of working, and shall, in all cases, inform the Engineer in advance of his proposals.

Should any services be found to exist which is not shown in the Contract, the Contractor shall at once give written notification to the Engineer.

Where any portion of the Works is close to, across, or under any existing apparatus of Utilities Companies, Statutory Undertakings or other parties, the Contractor shall temporarily support and work round, under or adjacent to all apparatus in a manner designed to avoid damage, leakage or danger and to ensure uninterrupted operation.

Should any leakages or damage be discovered, the Contractor shall at once notify the Engineer and the Utility Company, Statutory Undertaking or Authority or other owner concerned, and the Contractor shall afford every facility for the repair or replacement of the apparatus affected.

Any damage to the Permanent Works caused by Utilities Companies, Statutory Undertakings or Authorities or their sub-contractors who are working on the Site in connection with the Works shall be reported immediately to the Engineer.

PROTECTION AGAINST DUST, MUD, DIRT AND OTHER DEBRIS

General

The Contractor shall take all reasonable steps to minimise nuisance caused by dust, mud, dirt and other debris during construction of the Works.

Dealing with Dust

The Contractor shall adopt measures to minimise air-borne dust nuisance from dry and fine materials during construction of the Works. Such measures shall include:

Dampening of surfaces of the source of such nuisance to prevent dusting when required or as instructed by the Engineer.

Soiling and seeding areas as nearly concurrent with earthworks and filling operations as possible, and also keeping these surfaces dampened as necessary.

Protection of fill material on embankment surface where necessary for longer periods by placing of a protective layer of surface dressing or bituminous spray or dampened suitable cohesive material as defined in the project geotechnical specification. Such protective layer to be removed only immediately prior to the recommencement of further filling operations.

Ceasing work in areas at times when climatic conditions prevail such that the previous three measures prove to be unsatisfactory in the opinion of the Engineer.

Road Cleaning

All existing highways used by vehicles of the Contractor or any of his sub-Contractors or suppliers of materials or plant and similarly any new or diversion ways which are part of the Works or in the vicinity of the Works shall be kept clean of all dust, mud, dirt and other debris. Any such matter spreading onto these areas shall be immediately cleared by the Contractor by manual sweeping or shovelling or by the use of mechanical sweeping and clearing equipment. Additionally if so directed by the Engineer such areas shall be thoroughly cleaned by hosing or watering.

Access within, and to and from the Site across any public highway, diversion road or any other way used by public traffic shall be strictly limited as approved by the Engineer. Vehicles and plant shall enter onto such public traffic ways only after thorough cleaning.

Wheel Washing

The Contractor shall provide vehicle washing plants as part of the temporary accommodation for himself. Such washing plants shall be utilised for thoroughly cleaning all vehicles and plant prior to its entrance onto any public highway, diversion road or any other way used by public traffic.

Each washing plant shall include hard standings, adequate drainage facilities and an approved mechanical wheelwash.

TIDINESS OF SITE

The Contractor shall be responsible for the proper upkeep and maintenance of the Site. Materials and equipment shall be positioned stored and stacked in an orderly manner.

The Contractor shall keep the Site clean and tidy by removing all rubbish from the Site as work proceeds or as necessary and when required to do so by the Engineer.

Immediately on completion of any part of the Contract Works and when specifically instructed to do so, the Contractor shall remove and dispose of at his own expense any surplus excavated or imported materials, constructional plant and materials, rubbish and other things connected with the Works.

PRESERVATION OF TREES, HEDGES AND OTHER PLANTS

The Contractor shall take all precautions including the provision of fences to ensure that any trees and hedges which are not required to be taken down under the Contract shall remain undisturbed and undamaged. If the Contractor considers it essential to trim branches or to carry out work adjacent to roots he shall first obtain the permission of the Engineer.

The Contractor shall take all necessary precautions on the Site to curtail the growth of weeds, as prescribed under the Weeds Act 1959, which may be injurious or constitute a nuisance to land adjacent to the Site until the expiry of the relevant Period of Maintenance.

The Contractor shall not contaminate any watercourse with the use of weed killers.

INTERFACES WITH EXISTING ACCESSES

Before interfering with an existing access to any property, or other Contractor's compound or commencing any Accommodation Works, the Contractor shall notify the Engineer in writing 14 days in advance of any such interference.

Where the interference with an existing access is required to suit the proposed working methods the Contractor shall provide a detailed statement, with sketches if appropriate, of the arrangements he proposes to make for alternative access or routings; barriers and bollards; signing and lighting.

The Contractor's notice to the Engineer shall include a confirmation of the arrangements agreed with the Owner, or occupier or contractor concerned.

EXISTING GROUND LEVELS

The Contractor shall satisfy himself that the existing ground levels as described in the Contract are correct. Should the Contractor find any discrepancies with the levels, he shall submit to the Engineer a schedule of the position of the levels considered to be in error and a set of revised levels.

The existing ground relevant to the disputed levels shall not be disturbed before the Engineer's decision as to the correct levels is given.

PREPARATION AND SURFACE TREATMENT OF FORMATIONS

Preparation and surface treatment of the formation shall be carried out only after completion of drainage, services or ducts beneath or within the formation. Trenches for drainage services and ducts shall be reinstated in accordance with respective clause of this Specification immediately prior to laying the sub-base or base, where no sub-base is required.

The formation shall be sprayed with an all purpose weed killer, safe for use near water courses.

SOFT MATERIAL / SOFT-SPOTS

All surfaces shall be proof-rolled.

For repair of soft materials the following requirements shall apply:-

- The surface of the sub-formation shall, after reinstatement using similar materials of any soft areas and trimming, be cleaned free of mud and slurry.
- The surface of the sub-formation shall be compacted by 4 passes of a smooth wheeled roller having a mass per metre width of roll of 4,400 to 6,000kg.
- The sub-formation and formation shall be trimmed to required tolerances in accordance with this Specification.
- The trimmed formation shall be rolled with 1 pass of a smooth wheeled roller having a mass per metre width of roll not less than 2,100kg
- Areas of completed sub-formation shall be limited to suit the rate of deposition of capping
- Areas of completed formation shall be limited to suit the rate of deposition of sub-base.
- Cohesive material shall not remain exposed to rain causing degradation, and shall not be left uncovered overnight.

Formations in Rock

Where the required tolerances cannot be achieved with formations of rock, the formation shall be blinded with approved fine material. Surface irregularities under formation shall be regulated in accordance with respective clause with capping material, or Grade 7.5 or mix ST1 concrete.

Assumed CBR at Sub-formation Level

Approximate anticipated CBR values may be given in the earthworks specification, site investigation report or other similar documentation in the Contract. These are intended for guidance only and not the basis for design.

The Contractor is responsible for establishing the CBR value for each area of the proposed pavement construction subject to vehicle loading and any other pavement required by the Engineer. The CBR is to be confirmed by the Contractor by in-situ testing on a 20m x 20m grid.

The CBR test required is outlined in DOT Design Manual for Roads and Bridges, Volume 7 : Pavement Design and maintenance, Part 2 - IAN 73/06 Design Guide for Road Pavement Foundations.

The testing is to be carried out following proof rolling of the sub-formation.

UNEXPECTED GROUND CONDITIONS

Any unexpected conditions or unstable conditions encountered during construction or during the maintenance period shall be reported to the Contractor's Designer and Employer's Representative within 24 hours.

Proposed solutions to unexpected or unstable conditions shall be submitted to the Employer's Representative under the Review Procedure and the Design and Certification Procedure.

EMBANKMENTS

Where embankments are formed on a subgrade with a gradient steeper than 1v:5h, the filling shall be benched into the subgrade in lifts not higher than 0.5m. The surface of each bench shall be shaped to shed water to the edge of the earthworks at a gradient of at least 1v:40h. This may require the introduction of sub-surface drainage to convey any such water to the edge of the earthworks.

Prior to undertaking any filling works the Contractor shall undertake compaction trials to demonstrate the effectiveness of those types of compaction plant and for each of those additional subclasses of fill. The results of all trials shall be submitted to and be accepted by the Contractor's Designer and Employer's Representative before commencing any filling.

CONSTRUCTION AND COMPACTION OF CAPPING, SUB-BASES AND BASE LAYERS

General

The Contractor shall have regard to the nature of the subgrade and the need to protect it from deterioration due to the ingress of water, the adverse effects of weather and the use of constructional plant. The Contractor shall programme the laying and compaction of the sub-base and the subsequent pavement courses and take such other steps as may be considered necessary, to afford protection to the base, sub-base and subgrade.

Transporting

Plant-mixed material shall when mixed be removed at once from the mixer, transported directly to the point where it is to be laid and protected from the weather both during transit from the mixer to the laying site and whilst awaiting tipping.

Laying

All material shall be placed and spread evenly. Spreading shall be undertaken either concurrently with placing or without delay.

Unbound & cement bound base shall be spread using a self-propelled paving machine.

Except where otherwise specified unbound material up to 225mm compacted thickness shall be spread in one layer so that after compaction the total thickness is as specified. Unbound material of compacted thickness greater than 225mm shall be laid in two or more layers and the minimum compacted thickness of any such layer shall be 110mm. Where the layers of unbound material are of unequal thickness the lowest layer shall be the thickest layer.

Compaction

Compaction shall be completed as soon as possible after the material has been spread and in accordance with the requirements for the individual materials.

Special care shall be taken to obtain full compaction in the vicinity of both longitudinal and transverse joints.

Compaction of unbound materials shall be carried out by a method specified in Table 8/10, unless the Contractor demonstrates at site trials that a state of compaction achieved by an alternative method is equivalent to or better than that using the specified method. The procedure for these trials shall be subject to approval by the Engineer.

The surface of any layer of material shall on completion of compaction and immediately before overlaying, be well-closed, free from movement under compaction plant and from ridges, cracks, loose material, pot holes, ruts or other defects. All loose, segregated or otherwise defective areas shall be removed to the full thickness of the layer, and new material laid and compacted.