NYC SPECIFICATION 2025
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01-00- Preliminaries

01-01 General

a. This specification applies to all Developers when constructing estate roads within North Yorkshire. North Yorkshire Council (NYC) highway standard details are broadly based on the Department for Transport (DfT), Specification for Highway Works (SHW) and on the requirements of the Design Manual for Roads and Bridges (DMRB) including any subsequent amendments.

b. The Specification applies to Residential Estates, Industrial Estates, Commercial Estates and Private Street works.

c. Any points not fully covered shall be determined by North Yorkshire Council (NYC) as Local Highway Authority (LHA). In any cases of ambiguity between the Specification and the Drawings, the Specification shall take precedence unless it has been specifically agreed otherwise in writing by the Engineer.

d. In conservation areas or areas covered by National Parks alternative materials may be permitted, this will be subject to securing formal written approval of the LHA who may require a commuted sum to cover additional maintenance costs. Information on commuted sums can be found in the Interim Guidance on Commuted Sums available on the NYC web site, Road adoption | North Yorkshire Council.

e. In accordance with DMRB the "verbal forms used in the DMRB" as set out in GG101 shall have the following meanings where used in this Specification:

MUST	Indicates a statutory or legislative requirement
SHALL	Indicates a requirement of NYC as Overseeing Organisation
SHOULD	Indicates advice expressed as a recommendation
MAY	Indicates advice expressed as a permissible approach

f. This Specification shall apply to any carriageway, footpath, verge, hard margin, surface water highway drainage system, service provisions and street lighting which is being constructed or installed as part of any development to be adopted by the LHA as highway maintainable at the public expense within North Yorkshire.

g. Within this Specification, words of the masculine gender shall include the feminine and neutral genders and shall be taken as interchangeable.

01-02 NYC Contacts

a. In the first instance, contact should be made to the Development and Adoptions Team to reach the appropriate officer by calling 01609 780780 or sending an email to development.control@northyorks.gov.uk.

b. Other relevant contacts are as follows:

Area 1 – Richmond Office
Area1.Richmond@northyorks.gov.uk

Area 2 – Thirsk Office
Area2.Thirsk@northyorks.gov.uk

Area 3 – Whitby Office
Area3.Whitby@northyorks.gov.uk

Area 4 – Pickering Office
Area4.Kirbymoorside@northyorks.gov.uk

Area 5 – Skipton Office
Area5.Skipton@northyorks.gov.uk

Area 6 – Boroughbridge Office
Area6.boroughbridge@northyorks.gov.uk

Area 7 – Selby Office
Area7.Selby@northyorks.gov.uk

Structures (Bridges)
Bridges@northyorks.gov.uk

Road Lighting Department
Roadlighting@northyorks.gov.uk

c. The map indicates the areas of responsibility for the Area Highways Depots**.** Please note that the Development and Adoption Team are responsible for the development management schemes for the whole county.

01-03 Definitions

The Council:	Means North Yorkshire Council (NYC)
The Engineer:	Means NYC's Corporate Director of Business and Environmental Services and their appointed Representative or Agent.
The Developer:	Means the person or company by or on whose behalf the works are being carried out.
The Works:	Means all construction under, forming part of, or servicing the street to be adopted as a highway maintainable at public expense.
HAPAS:	Highways Authorities Product Approval Scheme.

01-04 Construction Drawings

a. The developer shall ensure that all planning permissions are in place for any proposed highway works. The construction drawings must be in in strict accordance with any planning conditions attached to the planning permission.

b. The developer shall have all construction drawings related to highway works approved before commencing work. Any work started off the public adopted highway before drawings are approved, will be wholly at the risk of the developer, and subject to change solely at the developer's cost.

c. The work shall be carried out in conformity with the plans, sections and detailed drawings approved by the Engineer. No amendment shall be made to the approved drawings except with the prior written agreement of the Engineer. A copy of the latest approved drawings and this specification shall be available on site at all times.

01-05 Design of the Works

The design of the works shall be the responsibility of the Developer, who should have due regard to the advice in this document, the current Department of Transport and Transport Research Laboratory recommendations and reports, and to the current practices of the Engineer's Department. If in doubt as to the standard to be applied in any particular case, the Developer is advised to consult the Engineer at an early stage of design. Residential Developments shall be laid out in accordance with the NYC Design Guide.

01-06 Design of Road Lighting

Developers are to ensure that any road lighting design shall comply with NYC Road lighting. The Developer should consult with NYC Road Lighting Engineer at an early stage. NYC offer a design service to Developers this is at a cost to the Developer. Using this service will save time on getting the design right first time. Section 13.0 gives general guidance on specifications of equipment, electrical supply and arrangements for road lighting.

01-07 Dimensions

Unless stated to the contrary, the thickness of the material described, in this Specification, shall mean the finished or compacted thickness.

01-08 Standards

a. Works, goods and materials shall comply with the standards specified in this document.

b. In all cases the European and British standards referred to in this Specification shall be the respective editions current at the date of Commencement of construction Incorporating all British Standard's institution amendments current on that date.

c. Where appropriate, materials shall be marked with the licence number. BSI or EN number. Any requirement for goods or materials to comply with the specified standard shall be satisfied by compliance with: -

- A relevant standard or code of practice of a national standards body, or equivalent body, of any member state of the European Communities; or

- A relevant international standard recognised for use in Highways, or have written technical description sufficiently detailed to permit assessment of the goods or materials for the use specified; or

- Provided that the proposed standard, code of practice, specification, technical description. Complies with current UK technical approval. In use, levels of safety, suitability and fitness for purpose equivalent to those required by the specified standard.

01-09 Quality Assurance Schemes

a. Where any work, goods or materials to be used in the works are the subject of a quality management scheme, or product certification scheme listed in Appendix B only work, goods or materials conforming to such a scheme shall be used. The Developer shall, in each case, submit to the Engineer a copy of the certificate of conformity affirming compliance with the scheme unless the goods or materials bear a prescribed certification mark.

b. The requirement for any goods or materials to be manufactured, or supplied subject to a quality management scheme, or product certification scheme listed in Appendix B, shall be satisfied by compliance with an equivalent quality management scheme, or product certification scheme of the EU. Provided that the proposed scheme is to ensure in levels of use and safety, suitability and fitness for purpose equivalent to those provided for by the scheme specified, this sub-clause also applies to works only in so far as the means of carrying out such works are indivisibly associated with the goods, or materials for which an alternative quality management scheme, or product certification scheme is proposed.

01-10 Bridges and Structures; British Board of Agrément Roads and Bridges Certificates

a. Where any work, goods or materials are required to have a British Board of Agrément Roads and Bridges Certificate, only works, goods or materials so certified shall be used and the Developed shall in each case submit to the Engineer a copy of the certificate. Types of work, goods and materials subject to such requirements are listed Appendix C.

b. The requirement for types of goods or materials listed in Appendix C to have a British Board of Agrément Roads and Bridges Certificate shall be satisfied by goods or materials having an equivalent Agreement certificate issued in any member state of the European Union, provided that the goods or materials covered by such a certificate

offer in use levels of safety, suitability and fitness of purpose equivalent to those incorporated in the British Board of Agrément Roads and Bridges Certificate. This sub-clause applies also to works only insofar as means of carrying out such works are indivisibly associated with the goods or materials for which an alternative Agrément Certificate is proposed.

01-11 Samples

a. Before commencing the works, the Developer shall deposit samples of any materials that the Engineer may require. The Developer shall obtain the Engineer's written approval of the samples before commencing the work, or during the course of the works prior to the materials being used. The materials used must be at least equal in every respect to the approved samples. From time to time, the Engineer may require the Developer to provide material samples free of charge for testing.

b. Materials with a BS or EN mark will not generally require initial or routine sampling or testing. See appendix B for certified materials.

01-12 Testing

a. The Developer shall be responsible for the payment of all charges for tests on materials and, in the event of failure they shall replace any faulty materials.

b. A copy of the Engineers required testing schedule is available on request.

c. The Engineer may request testing on site of materials and workmanship if they believe the contractors work to be substandard, or materials used to be below standard.

01-13 Condemned Materials

Any materials condemned by the Engineer, as unfit for use in the works, shall be removed from site immediately.

01-14 Facilities for Tests on Materials

a. The Developer, shall when required, grant every facility to the Engineer for taking such samples, cores, specimens and carrying out any other test on site. They shall provide all attendance and samples, cores and specimens and make good after the test. Testing and the results shall be made available to the Engineer free from charge.

b. The Developer shall, at their own expense, provide any on site testing as required by the Engineer.

01-15 Statutory Undertakers Apparatus

a. Before commencing any works on or in the Highway the Developer shall, by means of test holes and or ground surveying using radar, locate all apparatus that is within the location of the works. Any relocation of said apparatus shall be done prior to works starting or be scheduled by agreement with the Engineer to be done at the same time as the works. NYC may, at its discretion, fine the developer £200 a day, for work delayed on the Highway that extends the time taken to complete the works.

b. The Developer shall take all necessary measures required by the Engineer or the Statutory Undertaker for the protection of existing mains, pipes, cables and other apparatus during the progress of the works, and shall ensure that all requisite notice is given, and all payments are made to the Statutory Undertaker for the protection concerned.

c. Where new Services are to be laid within the works, the relative positions in footpaths verges and roads are to be in accordance with the recommendations set out in the National Joint Group Publication, provision of Mains and Services by Public Utilities on Residential Estates (see standard detail D1, D1A) and NJUG Guidelines on the positioning and colour coding of underground utilities which can be found online.

01-16 Cleanliness of the Highway and Site Set-up

a. Prior to the first use of the Development access for construction traffic, the Developer must provide a Construction Method Statement for approval, the statement shall include all the measures to be put in place to ensure mud is not carried out of the site by construction vehicles. The information provided shall also include details of the temporary warning signage required which shall be approved in writing by the Engineer and in place/or available prior to first use of the development access.

b. Generally, a Developer will require a S278 Agreement to be entered into with NYC to gain vehicular access to a site from the adopted public highway on which planning consent has been secured. At the Engineers discretion, a licence under S184 of the Highways Act 1980 as amended, could be utilised to enable a Contractor to gain access to a site for the purpose of setting up the Site Compound; undertaking investigatory work or constructing a temporary haul route in advance of the main works where the temporary access is separate from the site access. The principal purpose of a S184 licence however, is to facilitate works to a minor access for example the construction of a vehicular driveway over an adopted footway or grassed verge to a single private dwelling and therefore a S184 licence should not be used as a means of bypassing a S278 Agreement. Any Section 184 licence that is sanctioned shall be in place prior to the commencement of any works on site and will only be valid for the construction of a temporary vehicular crossing. Removal of the temporary access and reinstatement of the land shall be undertaken at the discretion and to the satisfaction of the Engineer.

c. All public highways including carriageways, footways, footpaths, cycle routes, bridleways, and verges used by the Developer, shall be kept clean and free from dust, mud and debris of any description. This must be done to the satisfaction of the LHA and/or North Yorkshire Police.

d. The Developer shall employ such equipment, mechanical or otherwise, as is necessary to maintain the highway in a clean state for the duration of construction works on site. The Developer shall provide and use appropriate wheel washing facilities on site as a matter of course to reduce the chance of mud or other detritus being deposited on the Highway.

e. The Developers attention is drawn to Sections 148 of the Highways Act 1980 as amended & 149 Updated November 2000 and the Corporate Manslaughter Act 2007.

f. Where required by the Engineer, suitable approved temporary warning signs must be exhibited whilst works are in progress. All temporary signs and barriers used in the highway must comply with Chapter 8 of the Traffic Signs Manual.

g. The Developer shall also ensure that all highway drains and ditches etc., within the adopted highway or the construction site, are kept clear of any spoil, mud, slurry or other material likely to impede the free flow of water therein. If requested to do so by the Engineer, or any authorised representative of the LHA, the Developer shall clean all highway drains and ditches, roadside grips and any other drainage features so that they run freely.

01-17 Prohibition of Use of the Highway

a. The existing public highway or Public Rights of Way must not be used as site access roads or sites for stockpiling and storing plant, materials or equipment. The Developer shall be liable for the cost of reinstatement if any damage caused to the adopted highway or Public Rights of Way. Developers are not permitted to put any signage, including “A boards” or flags for their site within carriageways, footways or verges or other areas which form part of the adopted highway without planning permission and a licence from NYC.

b. NYC can and will remove any signs flags or other items put in the highway without permission. The Developer will be charged a fee for removal of each item, a storage and administration charge will also apply. The Developer may also be charged for the disposal of items removed by NYC, should they not be collected in a timely manner.

c. The Developers attention is drawn to the need to provide visibility splays, in accordance with the relevant standards prior to the use of any access.

01-18 Notification of Emergency Telephone Numbers

The Developer shall erect and maintain for the duration of the construction of the estate roads, a board or sign, within the site boundary, but clearly visible from the adopted highway, indicating the name and contact telephone number of a responsible person for the site. The named person and contact telephone number shall be available 24 hours a day, seven days a week, should the Engineer or Engineer’s Representative or the Police need to advise the Developer and/or Contractor of a serious or dangerous situation.

01-19 Notification of Commencement or Recommencement of Works

a. The Developer shall comply with NYC's Street Permit notification system for works in the Highway. Typically, works within the public highway having a duration of more than 2 weeks (classed as major works) will require a 3-month notification period. Details on notification are available in Appendix A.

b. The Developer should also arrange a pre-start meeting one month before starting on site, or at a time agreed with the Engineer.

01-20 Notification of Works Requiring Inspection

a. The Developer's notice is drawn to NYC's weekly diary system, which requires the Contractor/ Developer to submit details each Friday morning of the following week's proposed works and inspections required to development.control@northyorks.gov.uk Details are available in Appendix G. The Developer shall give the Engineer at least 48 hours' notice of any inspections required.

b. As much notice as possible, but not less than a week shall be given to the Engineer of night or weekend working.

c. Failure to give such notice may result in the requirement for the later exposure of the work, at the Developers cost and the removal of the work done without inspection if considered necessary by the Engineer.

01-21 Quality of Workmanship

a. Industry standards, Codes of Practice and this Specification shall apply to the work; the most onerous standard shall be applied.

b. Where specific standards do not exist the workmanship throughout shall be of a "good standard" for the respective trade or class.

c. Contractors maybe required to satisfy NYC that they have appropriately skilled and experienced personnel and supervision on site to ensure the expected quality of workmanship can be achieved for all operations.

01-22 Quality of Materials

a. All materials for use in the works shall, unless otherwise specified, comply with the latest relevant BS or EN codes and Specifications as identified in the latest version of SHW and DMRB. They shall include relevant Quality Management Certification.

01-23 Temporary Traffic Signs

a. The Developer shall erect and maintain all necessary traffic signs and traffic control signals for the direction and control of traffic on the site and approaches to the site. The signs shall comply with current version of Chapter 8 of the Traffic Signs Manual and Traffic Safety Measures and Signs for Roadwork's and Temporary Situations 2020

published by HMSO ("The New Red Book") Signs and cones shall be reflective and kept clean, visible and appropriately located at all times.

b. The Developer shall be responsible for temporary lighting works where street lighting has been removed, or permanent lighting has not been commissioned at a new feature being constructed such as a roundabout, or for any traffic manoeuvres that the Engineer considers needs to be illuminated on grounds of highway safety.

c. The Developer is reminded that Chapter 8 states:

"*Highway Authority contractors and Statutory Undertakers have a civil law liability to warn road user of obstructions on the Highway, caused in connection with road works. This also comes under the corporate manslaughter Act 2007."*

d. In the event of temporary traffic control by means of single way working becoming necessary on the approaches to the site, the Developer shall submit his proposals for the control of the traffic to the Engineer for approval in writing; this shall be done no less than seven days before the start date. The Developer shall submit a Temporary Traffic Light Form as part of the process, two-way traffic must not be interrupted without formal written permission from NYC. The formal written approval of the Engineer shall be provided before the single way traffic management becomes operational on site.

01-24 Site Safety

a. The Developer or the principal contractor must take full responsibility for all aspects of health and safety on site. They must comply fully with all requirements of the Health & Safety at Work Act (1974) and other subsequent legislation including the Construction Design and Management Regulations 2015 and any subsequent amendments (CDM regulations).

b. The Developer or contractor shall ensure that all excavations on the site and on the approaches to the site are correctly signed, supported and fenced at all times. All temporary fencing in the Highway must fully comply with Chapter 8.

c. The Developer shall be responsible for any highway defects during the time they are vested any section of road or highway through an Agreement under Section 278 or 38 of the Highways Act 1980 as amended. They must undertake any repair works directed by the Engineer in the specified time scales. The Agreements allow the Engineer to undertake works himself and recharge the developer to ensure public safety. The Developer is advised to request a pre-works inspection of any section of public highway to be affected by the works or deliveries to the site.

d. If it is necessary for the Developer to put up hoardings or Heras type security fencing on the highway, NYC may charge a licence fee that is related to the time the fencing is in position; this is not applicable if the Developer has a signed Agreement under Section 278 of the Highways Act 1980 as amended.

01-25 Understanding the Specification

a. If the Developer or Contractor is unclear as to the meaning or intent of any item of this Specification, they should consult the Engineer and shall obtain a decision prior to work proceeding. A copy of the Specification should be made available on site by the Developer at all times.

b. An experienced Supervisor employed by the Developer, with a competency in roadworks and trench reinstatement and to whom instructions can be given, shall be present on the site during the construction phases of any Section 278 works and estate roads. All supervisors and operatives employed on any stages of the construction of Section 278 works and new estate roads shall be HAUC accredited, under the New Roads and Street Works Act 1991 and or CSCS (CITB) certified.

01-26 Setting out of the Works

The Developer shall be responsible for setting out the works to the correct line, level, widths and cambers. They shall be fully responsible for correcting works that have not been set out correctly at their own expense. The Developer shall ensure construction is within specified tolerances at every stage. It is recommended that a "binder layer stage survey" is undertaken and an as-built survey at the stage of asphalt base layer on both channel lines, crown levels, and gully positions prior to final surfacing.

01-27 Completion of the Works

a. The Developer shall inform the Engineer in writing when the works are completed. The Engineer and developer will then agree a date to hold a pre-maintenance inspection of the completed work. The Developer must arrange for any Road Safety Audit requested by the Engineer to be undertaken prior to the inspection. For the works to be considered complete the Developer shall ensure that the following information has been provided to NYC:

- CCTV recordings of any drainage to be adopted by NYC including gully leads and culverts;
- documentation from the relevant water authority confirming the drains have been placed on maintenance; and
- electrical testing certificates and inspection shall be provided to the Street Lighting team

b. Any remedial work found during the pre-maintenance inspection, shall be undertaken before the site can move onto Maintenance. The start date for Maintenance will be set by the Engineer.

01-28 Period of Maintenance

a. The Engineer will set the date for the commencement of the Maintenance period. The Maintenance period will normally be twelve months, but this may, in exceptional circumstances, be lengthened or shortened at the Engineer's discretion.

b. The Developer is responsible for making good at their own expense, any defects or damage arising during the period of maintenance.

01-29 Access to new Properties

a. Private driveways must be designed to provide a satisfactory connection to the highway (see Standard Details A1-A3).

b. Prior to the occupation of any building served by a new or amended road Developers are required to provide a carriageway and footpath constructed to at least basecourse or binder macadam level, or its equivalent. The road lighting must also be in and working from the existing Highway to the frontage of the completed property before occupation. This is a requirement of both planning conditions and Section 38 Agreements. NYC also require street nameplates to be displayed on streets where the properties are occupied.

01-30 Site Investigation

a. Where requested by the Engineer, the Developer shall undertake a site investigation; whilst this will be discretionary for most sites, it will be necessary on all brown field sites. This work shall be carried out by a competent site investigation company, with appropriate UKAS accreditation, to provide adequate information for the design of adoptable areas.

b. The Developer shall supply to the Engineer an analyst's report on the sulphate content of the sites sub grade and its classification in accordance with the BRE Digest 363. The Developer shall also provide the Engineer a list of all contamination on the site with a plan showing its location. The Developer must also inform the Engineer in writing of what actions are being undertaken to remediate any contamination.

01-31 Openings in the Highway

a. The Developer should note, that when making connections outside the site boundary and in the adopted highway for a utility connection, they are required to secure a Section 50 licence, New Roads & Street works Act 1991 (NRSWA) and paying the required fee. No service connections are covered by a Section 38 or 278 Agreement. A minimum of one-month notice to NYC Street Works section is required for a Section 50 licence application.

01-32 Condition of the Highway

a. Before any works start on site a highway dilapidation survey shall jointly be carried out by the Developer and the Engineer. The survey shall include as a minimum photograph's showing the state of the roads local to the site as identified by the Engineer.

b. When directed by the Engineer cores shall be taken on existing adopted highways leading to construction sites. The location of the cores shall be as identified by the Engineer. Any strengthening works required shall be undertaken before the site is opened to construction traffic.

c. The Developer shall excavate test holes or use ground Radar to locate all services in existing highways in the vicinity of construction works. These investigations shall be undertaken no less than 3 months before commencement of the works. The Developer shall ensure appropriate Streetworks permissions to work in the highway are in place and the appropriate traffic management is displayed as required by Chapter 8.

01-33 Road Safety Audits

a. The Developer will be expected to carry out Road Safety Audits in accordance with GG119 of DMRB and NYC's protocol for Road Safety Audits https://www.standardsforhighways.co.uk/dmrb

This shall apply to all Section 278 and S38 works. The stages of a Road safety Audit are:

Stage 1:	May be required on completion of the Preliminary design and before a planning permission is issued.
Stage 2:	Shall be undertaken on completion of the detailed design and before a Section 278 Agreement is signed.
Stage 3:	Shall be undertaken on completion of Construction.
Stage 4:	May be required prior to final adoption if directed by the Engineer due to ongoing issues being identified on site.

b. The audits shall be carried out by an Independent Audit Team at the Developer's expense. The Audit brief team and date shall be agreed in writing with the LHA before the audit is undertaken. The NYC Traffic Engineering Team must have first refusal tp undertake the audits and the Developer must make contact to find out if they wish to submit a Tender price for undertaking the RSA work. If not, auditor CV's must be approved and RSA brief agreed with the Engineer before carrying out an audit.

c. Any additional work identified by the Audit shall be carried out by the Developer at their expense. The Engineer may decide, at their discretion, that not all the audit recommendations are appropriate for the location. If this is the case, a formal Exemption Certificate shall be prepared by the Designers for approval by the Engineer.

01-34 Provisions for LHA Officers on Site

a. The developer shall make available for LHA officers visiting the site appropriate welfare and office facilities. These shall be regularly cleaned and maintained.

02-00- SITE CLEARANCE

02-01 Site Clearance

a. Where necessary, trees and hedges shall be removed from the site of the works, the roots shall be completely grubbed out, and the resultant hole filled and compacted to the satisfaction of the Engineer. Before starting this work the Developer must be mindful of the main bird nesting season (1st March to 31st August) as it is a criminal offence to interfere with nesting birds.

b. Before disturbing or removing any soils or vegetation, the Developer must take all steps to protect any areas of the site mentioned in the planning permission i.e., trees, wildlife or other plants.

c. It is the Developers responsibility to check whether any trees and/or hedgerows are subject to a Tree Preservation Order. Any protected or retained trees should be provided with a fenced off root protection area as agreed with the Authority.

02-02 Removal of Vegetation, Soil, Topsoil or Loam

a. Before depositing any filling, all turf, vegetation, soil, topsoil and roots bigger than your thumb under the works shall be excavated and removed to stockpiles.

02-03 Protecting the formation

a. When removing the topsoil, the contractor shall keep the formation covered wherever practicable to stop it from being exposed to the elements. Areas of formation that are exposed shall be rolled and covered in a layer of compacted 6F5.

02-04 Run off

a. When stripping the site, the Developer must take steps to prevent run off into ditches and water courses. The use of ponds and bunds should be considered at an early stage. Any runoff that occurs should be reported to the Environment Agency (EA) straight away. The Lead Local Flood Authority (LLFA) should also be informed along with the Engineer if any events occur.

02-05 Contamination found on site

a. The Developer must inform the Engineer of all hazardous contaminants or notifiable weeds found on site. They shall also inform the Engineer of what plans, and method of removal is planned for the contamination. Removal must comply with all relevant legislation and be carried out by a certified contractor. A map showing the location of all contaminants found shall be given to the Engineer.

02-06 Site Access

a. No Wagons shall access the site for clearance works without a properly constructed access being in place.

02-07 Disposal

a. Any materials taken off site shall be in covered wagons. The transportation and disposal of waste shall be in accordance with the Code of Practice under section 34(7) of the Environmental Protection Act 1990 and the section 34(1) duty of care.

02-08 Testing of the Formation

a. The developer shall arrange for the formation, as defined at Clause 7-02, to be tested every 20 metres by means of a California Bearing Ratio (CBR) test in accordance with Clause 06-05. The CBR testing shall at the Developer's expense. A copy of the CBR Testing Certificates shall be supplied to the Engineer

02-09 General Excavation

a. Where sub soil must be removed to reach the approved levels, it shall be excavated in a manner that minimises the disturbance to the formation. The formation for the roadworks shall be prepared for the widths shown below:

Residential Roads	full width of the carriageway PLUS 1.0m each side
Industrial Roads	full width of the carriageway PLUS 2.5 m each side

b. Wherever possible the sub-grade shall be compacted at its natural moisture content by four passes of a smooth-wheeled roller, the roller having a mass per metre width of roll of 4.4 tonnes or greater.

c. Separation membranes shall be provided when required by the Engineer, before filling on sub-grades that are wet or of low bearing strength. The membrane / geotextile will be positioned as directed by the Engineer and shall be below the level of all services ducts etc. to avoid subsequent damage. Any damage to the membrane shall be repaired to the approval of the Engineer.

d. The Developer shall ensure all excavations are kept free from water during the progress of the works and provide permanent land drainage if required to do so by the Engineer.

05-00- Drainage and Service Ducts

05-01 Pipes for Drainage

a. Drains to be adopted by North Yorkshire Council (NYC) shall all comply with the latest BS or EN code for drainage. NYC permit the use of Plastic Twin Wall pipes, Vitrified Clay & Concrete Pipes to BS 5911 & BS EN 1916, HAPAS approved or BBA & Kite Marked (ISO 9001 standards) for use in the highways.

TABLE 05-01

Pipes for Drainage			
Material	**Usage**	**Standard**	**Requirements**
Vitrified clay	Surface water	BS EN 295-1:2013 BS EN 295-2:2013	
	Filter drains	BS EN 295-1:2013 BS EN 295-2:2013	Open Joints
Concrete	Surface water	BS 5911-1:2021 BS EN 1916:2002	
PVC-U	Surface water	BS EN 13598-1:2020 BS EN 1401-1:2019	
	Filter drains	BS EN 13598-1:2020 BS EN 1401-1:2019	Open Joints
Plastic	Surface Water	BS EN 1852-1:2018 +A1:2022 HAPAS approved or BBA	
	Filter drains	BS EN 1852-1:2018 +A1:2022 HAPAS approved or BBA	Open Joints
	Field drains	BS 4962:1989	

b. Drainage pipes used in the highway (Roads, Paths & Verges) shall comply with the most onerous of this Specification and the Specification of any adopting Statutory Undertaker. The standard to be used shall be agreed with the undertaker before installation.

c. The Developer must contact the Lead Local Flood Authority (LLFA) who will review the design from a flood risk perspective. All drainage design information to be sent to Floodriskmanagement@northyorks.gov.uk. This will include land drainage, attenuation, culverts, drainage maintenance, connection to watercourses etc. Additional Land Drainage Consent may be required from the Environment Agency, LLFA or Internal Drainage Board.

d. The developer must ensure that any drainage conditions attached to planning permission are discharged accordingly. Drainage works must be undertaken in strict accordance with the approved details.

e. The Engineer's prior written approval shall be obtained for the use of any plastic pipes (PVC-U) greater than 300 mm diameter within the works. The application for approval shall be supported by a Quality Assurance certificate and conform to BBA - HAPAS Highway Authority Product Approval Scheme.

f. Clay pipes sizes 150 mm up to 300 mm maximum may be used.

g. Concrete pipe sizes 300 mm up to 900 mm maximum may be used.

h. As directed by the Engineer all drainage to be adopted by NYC shall be subject to air or water testing, and a CCTV recording. Records of all testing including CCTV recordings and accompanying written report shall be supplied to the Engineer. Slotted pipes shall only be subject to CCTV testing. In locations with limited cover, NYC may allow the use of Steel pipes that comply with the latest BS or EN code. This must be agreed in writing with the Engineer before works commence.

i. CCTV recording of highway drainage pipes must be undertaken prior to the surface course. Any defects identified as part of the report and remedials agreed in writing with the Engineer before the works commence. Further CCTV recording prior to adoption may be requested.

j. All drainage pipes used in the Highway, with the exception of filter drains, shall have the appropriate flexible seal fitted in accordance with the manufacturer's specification. The seal shall be free from any damage at time of fitting.

k. Slotted pipes shall only be used for ground drainage (French drains) and when used under the highway shall be backfilled with Type B filter stone and have a mat type geotextile e.g., "Terram" laid around the perimeter of the trench.

l. Protection of the drain or culvert during construction shall be considered during the design.

m. Where pipes for adoption by NYC are laid with less than 1.2 m of cover, they shall have a concrete bed and surround comprising of no less than 150 mm of ST 4 concrete with compressible "flex cell" type joint material at all bends and every 3 m of length.

n. Where pipes for adoption by Water Authorities are laid with less than 1.2 m of cover the pipe shall be laid with standard pipe bedding and surround together with a 150 mm thick concrete protection slab including A393 mesh. This detail shall be approved in writing by the relevant Water Authority prior to the pipes being laid on site. Further guidance on this matter can be found in the relevant Water Authority's advice.

05-02 Ducts

a. Ducts for use in the highway shall comply with the colour requirements of the end service user in accordance with NJUG guidance. They shall be laid straight to the correct line and level for the end service user.

b. Ducts shall be no less than 100 mm diameter and shall all be laid with a 100 mm concrete surround of ST4 concrete with a minimum slump of 30 mm, unless agreed otherwise in writing by the Engineer prior to installation.

c. Ducts shall be extended a minimum of 200mm beyond the kerb raft into the footway area. They shall have marker tape laid in sand on-top of the concrete surround which shall indicate

the service beneath and, if possible, the undertaker who is using the duct. In some locations the Engineer may request the use of Foam Concrete. This shall be free flowing and self-levelling and comply with the HAUC specification.

05-03 Jointing of Pipes

a. Jointing of pipes shall be undertaken in accordance with the manufacturer's guidance and TABLE 05-02 below.

TABLE 05-02

	Joining pipe Size (mm)							
Lateral pipe size (mm)	**150**	**225**	**300**	**375**	**450**	**525**	**600**	**Larger than 600**
150	Junction	Junction	Junction	Saddle	Saddle	Saddle	Saddle	Saddle
225	Not Applicable	Junction	Junction	Junction	Saddle	Saddle	Saddle	Saddle
300	Not Applicable	Not Applicable	Junction	Junction	Junction	Saddle	Saddle	Saddle
375	Not Applicable	Not Applicable	Not Applicable	Junction	Junction	Junction	Saddle	Saddle
450	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Junction	Junction	Junction	Saddle
525	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Junction	Junction	Saddle

b. Junctions shall be formed using purpose made 45° oblique junctions of appropriate size.

c. Where connections are to be made to an existing pipe, a purpose made saddle shall be used, these must not project more than 5mm into the pipe. The saddle shall have an ST4 concrete surround. Where this is not possible, a section of pipe should be removed and a Y junction fitted using band seals subject to the prior written approval of the Engineer.

d. Junction pipes that are laid but not immediately connected shall be fitted with temporary stoppers or seals. The position of all such junctions shall be marked with stakes or tracing wires. Saddles may be used to form junctions they shall be manufactured of the same type and class of material as the pipes in the run. They shall comply with the manufacturer's recommendations.

05-04 Pipe Bedding Material for Surface Water Drains

a. Materials for pipe bedding or surround shall be a granular material, crushed gravel or rock unless otherwise approved in writing by the Engineer

b. The aggregate size of pipe bedding material will depend on the diameter of the pipe in accordance with Table 05-03.

c. All pipes shall have 150 mm thickness of bedding under the barrel, and to both sides. The top of the pipe shall have a level layer of pipe bedding 150 mm thick above the spigot or collar.

d. All Pipe bedding & surround requirements for drainage works within the adoptable areas shall consist of natural or recycled coarse aggregates complying with BS EN 13242 unless otherwise agreed in writing by the Engineer prior to works commencing. For all standard bedding and surround details the aggregate shall meet the requirements of table 05-03 below.

e. All pipe bedding material shall have resistance to fragmentation in Category LA_{50} in accordance with BS EN 13242 Clause 5.2 and table 9.

f. All pipe bedding material shall have a water-soluble sulphate content of less than 0.2% Category $SS_{0.2}$ in accordance with BS EN 13242.

g. Where concrete is specified for pipe beds and surrounds, it shall be in accordance with BS EN 1916:2002. The concrete shall be made with Portland Cement or sulphate-resisting when required. Super sulphated cement shall not be used.

h. Recycled material for use as pipe bedding shall be tested and certificated in accordance with SHW Clause 710 and NYC Recycled Granular Materials Briefing Note.

TABLE 05-03

Coarse Aggregate for Pipe Bedding, Haunching and Surrounding Material to BS EN 13242		
Nominal pipe diameter (mm)	Graded Material	Single Size Material
Not exceeding 140mm	Not applicable	4/10
Exceeding 140 mm but under 400mm	2/14 or 4/20	4/10, 6/10, or 10/20
Exceeding 400mm	2/14, 4/20 or 4/40	4/10, 6/14, 10/20 or 20/40
Exceeding 600mm	Type B filter material	Not applicable

05-05 Backfilling Material for Sub-soil and Verge Drains

a. Sub soil and French drains should be laid with pipe bedding and have a mat type geotextile e.g., “Terram” laid around the perimeter of the trench. The trench shall be back filled with free draining material in accordance with the Specification for Highway Works (SHW). The Back fill shall be Type B filter material in accordance with Series 500 (SHW) and/or NYC standard detail unless agreed otherwise in writing by the Engineer prior to works commencing.

05-06 Sub Soil Drains

a. A trapped system for sub-soil drainage shall be constructed where; -

- The winter height of the water table is within 600mm of the formation level;
- The sub-soil is unstable or unsuitable e.g., because it is waterlogged or not permeable;
- Springs, drains or watercourses are encountered;
- There is the likelihood of water running off or out of adjacent land, particularly land at a higher level, where an approved filter drainage system (French Drain) shall be provided.

b. Sub-soil drains shall be laid to line and level. The gradients shall be sufficient to produce a self-cleansing velocity of 0.75 m/s with the pipe running at two thirds of the capacity of the pipe.

c. Drains shall be properly linked with junction pipes and discharged into trapped catchpits, sump-manholes or trapped road gullies with a minimum sump depth of 300 mm before discharging into the Surface Water drainage system.

05-07 Excavation for Drains

a. Trenches shall be excavated to sufficient depth and width to enable the pipes to be laid with the specified bedding or concrete surround, or protection slab. The width shall be a minimum of the collar width plus 300 mm.

b. Trench sides shall be adequately supported at all times and must comply with HSE requirements.

c. Soft spots or areas of poor ground shall be removed and backfilled with approved backfilling material. The re-engineered ground shall be satisfactory to take the applied loading without any movement.

05-08 Bedding, Laying and Backfilling of Pipes

a. As dug material shall not be used as trench fill in any circumstances.

b. Pipes shall be laid with the whole length of the barrel in contact with the pipe bedding. The bedding shall be removed from under the joint to prevent it weight bearing.

c. Bedding shall be in accordance with 05-04

d. Concrete surround shall be in accordance with 5-04.

e. Once the pipes have been laid the bedding shall be brought up evenly on both sides, followed by a level layer 150 mm above the collar.

f. Pipes shall be covered in pipe bedding in one of the materials from Table 5-03 which shall have the appropriate certification of compliance and brought up with Type 1 material as per the agreed construction depths detailed in Section 7.

g. All trenches within the adoptable highway including carriageways, footways cycle-tracks and verges within 2 metres of the carriageway shall be backfilled with Type 1 Granular Material (sub-base) shall comply with the requirements BS EN 13285 and with paragraph 803 of the Specification for Highway Works to Clause 07-04 of this Specification. Approved Type 1 Granular Material Sub Base shall be brought up in layers no more than 225 mm thick.

h. All Trench back fill operations shall be compacted in accordance with Table 6/4 of the SHW Series 600 and advisory notes of this specification.

i. Where the pipes are laid with a concrete surround care must be taken, especially with plastic pipes to make sure they do not move from line and level. The trench shall not be backfilled until the concrete has set.

j. Except for gully connections, pipes with concrete surround shall not encroach into the Type 1 Sub Base without the prior written approval of the Engineer.

05-09 Connecting into Existing Sewers, Drains & Manholes

a. Where required and appropriate, existing sewers and drains shall be properly extended, connecting and jointed to new sewers, culverts, drains or channels. All such connections shall be made during the construction of the new main sewer, drain or other work, and their position recorded by the Developer who shall include this information on the formal As Built Drawings provided to the Engineer on completion of the site.

b. Where pipe connections are made to a brick sewer, concrete culvert, stone built or lined channel or any other combination all damage done making the connection shall be made good to the satisfaction of the Engineer or relevant undertaker.

c. New connection channels shall be placed to discharge at an angle not greater than 60° to the direction of flow of the sewer, drain or channel. The end of the pipe shall be cut to the necessary angle. All special connecting pipes shall be true and properly jointed.

d. Before entering or breaking into an existing sewer or drain, the Developer or their Contractor shall give adequate notice of their intention to do so to the Owner of the apparatus.

e. Jointing of pipes using junctions or saddles shall be undertaken in accordance with the manufacturer's guidance and TABLE 5-02

05-10 Manhole / Inspection Chamber Construction

a. Manholes and inspection chambers shall be constructed to BS 5911-3 and standard details Series C. They shall be sized as indicated in TABLE 2-04.

TABLE 05-04

Nominal Bore of Sewer	**Chamber Diameter**	
Less than 375 mm	for depths to soffit less than 1.35 m	Brick chambers shall be used
	for depth to soffit 1.35m to 1.5m	1050 mm
	for depths greater than 1.5m	1200 mm

375 mm to 450 mm	1350 mm
500 mm to 700 mm	1500 mm
750 mm to 900 mm	1800 mm
Greater than 900 mm	Minimum of pipe diameter plus 900mm Details to be agreed in writing with the Engineer

b. The above chamber sizes are minimum sizes. Where multiple pipes enter a chamber, larger diameter chambers shall be used to accommodate the benching.

a. Developers must refer to the NYC Technical Approval Procedures for all manholes with a diameter greater than 1250mm proposed within the adopted highway. Early discussions are recommended to avoid any potential delays to approvals and thus delivery.

c. NYC permits the use of pre-made chamber bases that shall be installed to the Manufacturer's Specifications and have the appropriate BS/ EN codes of manufacture.

d. Where pre-made bases are not used, the foundation for the chamber shall be formed with 225 mm thickness of ST4 concrete.

e. Inverts shall be laid above the concrete slab and formed in clay ware for pipes up to and including 300 mm. They shall be laid to line and level. Benching of Channels shall be formed in granolithic concrete no less than 38 mm thick.

f. Brickwork shall be built using class B engineering bricks. The wall shall be a minimum of 2 bricks thick in English Bond. The mortar shall be 1:3 to Clause 17-05. Joints shall be flush or pointed. Pipes shall be flush with the brickwork.

g. Where the depth to invert is greater than 900mm from top of the cover, steps shall be installed in accordance with BS 13101 and BS 5911-3

h. Chambers shall be surrounded with 150mm of ST4 concrete unless pre-cast wide wall sections have been used.

i. All chambers shall be watertight on completion.

j. All covers must be laid on mortar to Clause 17.05 except where the road is to be surfaced within 5 days when a pre-made rapid set mortar shall be used following the prior written approval of the Engineer. The rapid set mortar shall be 60 minute first set or similar HAPAS approved.

k. Shallow chambers less than 900mm shall be constructed in brick double skin or single brick with a 150 mm concrete surround of ST4.

l. The two pipe joints nearest the manhole shall be flexible. The nearest joint shall be within 300 mm of the manhole wall.

m. Manholes covers should not be located within wheel track areas

05-11 Inspection Covers and Frames

a. All covers shall be ductile iron.

b. All inspection covers in the carriageway shall be a minimum of BS EN124 D400. In some instances, a higher standard may be required by the Engineer.

c. In verges, footpaths or cycle-tracks inspection covers shall be BS EN 124 C250 or higher.

d. On Classified Roads and Industrial Estates frames shall be 150 mm deep and in some locations the Engineer may require the use of E600 frames.

e. The final fix of frames prior to surfacing shall be undertaken using a rapid set HAPAS approved premixed mortar that shall reach first set in no more than 60 minutes and shall be faster if required by the Engineer.

f. Any Premixed mortar from bags or containers shall all be BBA – HAPAS Certificated.

g. Covers in verge areas shall have a 300mm wide 150mm thick concrete plinth to prevent vegetation encroachment.

05-12 Granolithic Concrete

Granolithic Concrete shall be pre bagged HAPAS approved, which shall have 10mm granite or whinstone aggregate.

05-13 Gullies

a. Gully pots shall be 900 mm deep by 450 mm wide internally with a 150mm outlet, trapped with a stoppered rodding eye. The use of concrete and plastic gully pots is permitted subject to their compliance with the relevant BS code or British Board of Agrément Roads and Bridges Certificates.

b. All gullies shall have a minimum of 150 mm surround of ST4 concrete with a 30 mm minimum slump which shall be included beneath the pot. For Plastic Pot installation, the concrete surround shall be compacted in place using a vibratory poker.

c. At low-points double gullies shall be installed. They shall be a minimum of 300 mm apart; a minimum of 300mm ST4 concrete shall be provide between the pots. They can be placed up to 1 m apart to allow for a service to go between.

d. Gully pots for footpaths or cycle-tracks shall be a minimum of 600 mm deep by 300 mm wide. In some locations, the Engineer may require larger gully pots e.g. tree lined location.

e. Gully leads shall not exceed 16 m in length from the last Inspection chamber unless agreed otherwise in writing by the Engineer.

f. Damaged gully pots and/or leads must be replaced and not repaired using lining.

05-14 Gully Gratings and Frames

a. All grates and frames shall be marked BS EN 124 and made of ductile iron.

b. For use in the carriageway, they shall be a minimum D400 with captive hinge. They shall have a minimum opening of 450 mm by 450 mm by 100 mm deep.

c. On roads with widths greater than 6.0m wide, grates and frames shall be 450 mm by 450 mm by 150mm deep. The Engineer may require these frames to be E600.

d. The grate shall knock down with the flow of traffic.

e. For use in footways or cycle-tracks grates and frames shall be C250 with a minimum opening of 350 mm by 310 mm by 75 mm deep with a captive hinge and bike and pedestrian friendly grate.

f. All gully grates shall be set 5 to 10 mm below the channel or watermark.

g. All gully grates in pedestrian areas shall be pedestrian friendly, this includes shared surface roads or at pedestrian crossing points.

h. Gullies in the vicinity of proposed tree canopies should have oversized lids (600x600mm) to ensure water can still drain even with leaf coverage

i. The final fix prior to surfacing shall use a premade rapid set mortar following the prior written approval of the Engineer. The rapid set mortar shall be 60-minute first set or similar HAPAS approved.

j. Covers in verge areas shall have a 300mm wide 150mm thick concrete plinth to prevent vegetation encroachment

05-15 Gully Construction

a. Gully pots shall be set on a foundation of 150 mm of ST4 concrete with a minimum of 150 mm of ST4 concrete surround. The surround shall widen at the top to a minimum of 225 mm to provide a footing for the brickwork.

b. The Gully grate and frame shall be seated on two to four courses of Class B engineering bricks two courses wide, using 1:3 mortar mix. Alternatively proprietary concrete lifting sections to BS5911 – 6 may be used with two to four sections.

c. Subject to the prior written agreement of the Engineer, concrete lifter sections may be adapted to provide a suitable base to both grate frame & kerb face. Amendments shall not compromise the structural integrity of the section.

d. When changing from one material to another the correct fitting as approved by the manufacturer must be used. The contractor must inform the Engineer of their intention to use premixed materials and obtain the Engineers approval before commencing the works.

05-16 Gully Spacing

a. The spacing of gullies should be designed to take account of the width and gradient of the carriageways and footways. As a general guide the spacing shall not exceed 35 metres on a cambered carriageway.

b. Gullies shall be provided at or near to tangent points of junctions. Double gullies shall be provided at all low points. Gullies shall be provided to prevent surface water running into private property or ponding at adjacent low points. Gullies within pedestrian crossing points should be avoided and placed upstream.

c. Gullies shall be provided for footpaths and cycle-tracks when these are not running parallel next to the road kerb. They shall be provided in locations as described in (b.) above. Gullies shall be provided to prevent surface water running out onto a road, into private property or ponding at adjacent low points.

d. No gully shall collect surface water from more than 160 m² of impermeable area comprising of road, footpath and cycle-track.

e. Houses are only permitted to discharge a maximum of 6 m² of surface water run off onto the public highway and this shall be taken into account when placing gullies.

f. Where footpaths pass between walls, private land or other features that prevent the expected surface water runoff, measures shall be put in place to manage the runoff away from private land. It is expected that this will require the provision of surface water checks or up-stands or channels to an agreed outfall.

05-17 Combined Kerb and drainage systems

See Section 11-06.

05-18 Undertakers Covers in the Carriageway

a. All covers placed in the road shall comply with BS EN124 D400 as a minimum. In some locations the Engineer may require the use of a higher standard.

b. All covers shall be set flush with the finished road surface. All covers placed in a footpath or verge shall be laid flush with the surface. Where these are near to a road, they shall be to be a minimum of BS EN124 C250.

c. All covers in heavy-duty footpath crossings shall be to road specification BS EN124 D400.

d. Covers should not be located within the wheel track areas.

05-19 Hand Rails and Ladders

a. Mild steel and solid mild steel bar for hand rails and standards shall comply with the relevant requirements of BS EN 10255 and BS EN 10025 respectively. After manufacture, they shall be hot dip galvanised in accordance with BS EN ISO 1461.

b. Ladders shall be mild steel and hot dip galvanised after manufacture to BS EN ISO 1461. They shall comply with the relevant requirements of BS 4211 when fitted.

05-20 Bricks and Mortar

a. Bricks shall be Class B Engineering and complying to BS EN 771-1. Any bricks to be laid as soldier courses shall be solid.

b. Mortar shall be at a ratio of no more than 1:3 and shall be mixed by machine or by hand to a uniform colour and consistency, with the constituent materials being accurately gauged.

c. Mortar shall not be used at temperatures of less than 3°C.

d. If Ironwork is to be lifted less than five days prior to surfacing a premade rapid set mortar shall be used following the prior written approval of the Engineer. The rapid set mortar shall be 60 minute first set or similar HAPAS approved (standard Detail C).

05-21 Existing Land Drains

a. Existing land drains and springs severed by construction shall be investigated. A scheme of mitigation to deal with the matter shall be provided to and agreed in writing by the Engineer. Works on site shall then be undertaken in accordance with the agreed mitigation.

05-22 Testing and Cleaning of Pipes

a. All pipes with watertight joints to be adopted by NYC shall be air or water tested to the satisfaction of the Engineer. The testing shall be in accordance with the requirements of SHW as indicated below

b. Air Tests shall be undertaken as follows:
- Air shall be pumped into the line until a stable pressure of 100 mm of head of water has been achieved, as indicated on a U tube gauge attached to the system.
- The air pressure shall not fall to 75 mm of head within a period of 5 minutes.

c. Water Tests shall be undertaken as follows:
- The line shall be filled to 1.2 m above the crown of the pipe at the high end, (marked on the manhole prior to filling)
- the test shall commence 2 hours after filling the section.
- The loss of water of water over a 30-minute period shall be measured by adding water at ten-minute intervals to restore the original water level.
- The amount of water added shall be measured and recorded.
- The drain shall be deemed to have passed if the water added does not exceed one litre per hour per linear metre of drain per metre of nominal internal diameter.

d. Any sections not passing any test shall have any defects made good and then be re-tested.

e. All adoptable drains and gully leads shall be checked with CCTV recording. Records of all testing including CCTV recordings and accompanying written report shall be supplied to the Engineer. Slotted pipes shall only be subject to CCTV testing.

f. CCTV of drains and gully leads must be undertaken prior to the surface course. Any defects identified as part of the report and remedials agreed in writing with the Engineer before the works commence. Further CCTV recording prior to adoption may be requested.

g. On completion of the works, or earlier if agreed by the Engineer, all chambers and drains shall be jetted from end to end. On completion all drains shall be clean and free from obstruction.

05-23 Culverts within the highway

b. Where roads cross a watercourse, ditch, or small stream these shall be piped with a culvert using either a large diameter pipe or a box section culvert. Early consultation with other Authorities is recommended. Culverts may require permissions from the Environment Agency, LLFA or IDB.

c. Weight restrictions over an existing or proposed Culvert may be required depending on the adjacent land usage.

d. The hydraulic design of culverts shall be in accordance with Chapter 12 CIRIA C786.

e. Where rivers are to be crossed, the proposals shall be discussed with all relevant authorities and parties at an early stage to determine the appropriate crossing. The design for the preferred option shall have secured in writing all necessary permissions prior to any works commencing on site.

f. Any works in, over, under or near a culvert may require Land Drainage Consent from the Environment Agency, LLFA or Independent Drainage Board (IDB).

g. All pipes or culverts shall be pre-manufactured pre-cast concrete and shall be of sufficient strength to carry the carriageway loading. They shall be BSI or BBA approved.

h. Where a pipe or culvert has a dimension greater than 900mm it shall be classed as a “Structure”. Where Structures are to be installed, they shall be subject to the Approved in Principle (AIP) processes administered by the NYC Structures Team. Early discussions are recommended to avoid any potential delays to approvals and thus delivery.

i. Culverts shall not have any dimension less than 450mm when laid under the highway. Should smaller pipes be considered necessary due to exceptional circumstances the prior written approval of the Engineer shall be sought.

j. No culvert or pipe shall be laid with less than 200mm cover to the finished road level. Should less cover be considered necessary due to exceptional circumstances the prior written approval of the Engineer shall be sought.

k. All concrete used in the surrounds etc to culverts shall be minimum strength of ST4. In some circumstances, the Engineer may require a “RC mix” to BS 8500-1 to be used.

l. No culvert shall be trafficked for a minimum of 28 days after construction (including all beds, surrounds and cover slabs) without the Engineer’s prior written approval for the use of concrete with a rapid set mix. The rapid set mix concrete shall be used in accordance with the approved details and method statements.

m. All culverts shall be constructed with headwalls unless they form part of a pipe run. Headwalls shall be constructed in accordance with Section 5.24.

n. TABLE 05-05

The contents of this table apply to both culverts and pipes used as culverts. Where manufacturer's requirements differ from the contents of this table the prior written approval of the Engineer shall be sought for the bed and surround or other protection to be used.

Cover below Finished Road Level	Greater than 1200mm	1200mm to 901mm	900mm to 501mm	500mm to 301mm	300mm to 201mm	Less than 200mm
Pipe bedding to section 2.4	Required	Not applicable				
bed and surround 150mm thick ST4 Concrete	Not applicable	Required	Not applicable			
Cover slab 300mm thick ST4 extending 300mm beyond the pipe each side	Not applicable	Required	Required	Not applicable		Prior Written approval required
Bed under pipe 200mm thick ST4 below the collar extending 200mm beyond the pipe each side (wet laid)	Not applicable			Required		Prior Written approval required
Concrete cover between pipe and underside of macadam extending 450mm beyond the pipe each side with mesh	Not applicable			Required		Prior Written approval required
A393 (10mm) mesh in middle of concrete cover to pipe	Not applicable			Required	Not applicable	Prior Written approval required
2 layers A393 (10mm) mesh set at thirds in concrete cover. Minimum cover 50mm.	Not applicable				Required	Prior Written approval required
Concrete type "RC 32/40 " to be used	Not applicable			Required		Prior Written approval required
red asphalt sand carpet 10mm thick laid between macadam layers and concrete cover	Not applicable	Required				Prior Written approval required
CCTV inspection prior to surface course and prior to adoption	Required					Prior Written approval required

o. Any amendments to the requirements of Table 5-05 shall be agreed in writing by the Engineer prior to any culvert works commencing on site.

p. Any culvert longer than 30m shall have an access point or inspection cover fitted. This shall be located clear of any carriageway.

q. Culverts with less than 900mm cover to the finished road level shall have ducting for Utility Services included within the design. The number of ducts provided shall be sufficient for the requirements of all Utility Services at the design stage plus additional ducts for future use.

The prior written approval of all Utility Service Undertakers present in the area shall be provided to the Engineer prior to any culvert works commencing on site.

r. Any duct with less than 300mm cover shall be made of ductile steel.

s. Culverts beneath the highway will attract a commuted sum for inspection and maintenance. The expected design lifespan of the Culvert will be 60 years.

05-24 Headwalls

a. All pipe or culvert inlets or outlets to or from open watercourses shall be provided with a headwall incorporating any necessary apron, scour baffle, security screens or handrails etc. All headwall designs shall be submitted to and approved in writing by the Engineer prior to any headwall works commencing on site.

b. Security Screens shall be provided to prevent unauthorised access. All security screen designs shall be submitted to and approved in writing by the Engineer prior to any headwall works commencing on site. All necessary measures to prevent any unauthorised access to culverts shall be taken in advance of permanent security screens being installed. All Security Screens shall follow the guidance in Chapter 4 of CIRIA C786 guidance.

c. In certain locations, and with the approval of the Environment Agency, flap valves may be required. Flap valves shall be made of heavy-duty plastic (low maintenance type) unless the Engineer's prior written consent is obtained for the use of alternative materials.

d. It shall be the responsibility of the developer to ensure the accurate setting out of invert levels which shall be subject to inspection and approval of the Engineer to ensure satisfactory flow through the drainage system.

e. Where headwalls are located within 2.0 m of any footway, cycleway or carriageway they shall be provided with pedestrian safety railings. In some locations, additional vehicle restraint systems may be required. All designs shall be submitted to and approved in writing by the Engineer prior to installation.

f. All headwalls shall have a top level not less than the height of the surrounding ground. Any headwall within 1.0 m of any path shall have a top level minimum 150mm above finished path level. Where a path or cycleway is within 4.0m of the headwall a suitable fence or barrier for safety shall be provided. The design of the fence or barrier shall be submitted to and agreed in writing prior to installation.
A hard margin and suitable grading of adjacent land/spoil may be required within the design.

g. Headwalls or associated fences, barriers or vehicle restraints shall not interfere with visibility splays at junctions, accesses or for forward visibility. Where necessary the culvert design shall be amended to ensure there is no encroachment in visibility splays.

05-25 Swales and Soakaways

a. The use of Swales and Soakaways are limited to locations deemed to be suitable and agreed by the Engineer. The Developer will have to prove the ground is suitable for this method, and that it can accommodate a 1 in 100-year flood event + climate change. The Developer must

invite the relevant Flood Risk Engineer to any infiltration testing on site. The Developer will have to pay a commuted sum to NYC for future maintenance of the Swale's or Soakaways.

b. Road gullies may discharge into a swale with agreement of the Engineer.

c. Water runoff from the highway to a swale will be via Concrete grips to the top of the swale. And shall have a fall of no less than 1 in 20 to be self-cleansing.

d. Soakaways will not be allowed under the Carriageway, in the location of statutory undertaker's equipment or within 5m from any building, wall, retaining structure or the edge of the carriageway. A sump on the manhole is required prior to water entering the Soakaway. The sump will be no less than 1 m deep.

e. Soakaways must be accessible by 32 Tonne tankers from the highway. A suitable access must be built to allow a tanker to be able to reverse to access the system. A minimum width of the access shall be 3 m wide and wider for any areas where the tanker has to manoeuvre. There shall be Street lighting within the access vicinity.

f. All iron work and utility cover on the access road and tanks shall be BS EN 124 D400.

g. The Developer shall work to NYC standard details in the construction of Swales and Soakaways. They must be protected from pollution, silt and debris during construction work for the development. If the Developer fails to do this the Engineer can instruct the Developer to replace the Soakaway or re-profile the swale before adoption.

h. The Developer shall build islands in the Swale where needed to allow street furniture to be installed. The sections of Swale shall be connected by a minimum 225 mm pipe, (this may be larger if requested by the Engineer) to accommodate the island. The Swale shall be built to allow for the loss of storage for the islands. (Islands can be used for Street lighting, signs and other items of street furniture)

05-26 Plot Drainage

a. Drainage from individual plots or private sites onto the public highway is limited to a maximum of 6m^2. When calculating the 6m^2 of plot drainage that is allowed onto the highway, paths, drives or access roads must be taken into account. The private drainage must be separate from the highway drainage.

b. Plot drainage can be addressed by installing ACO channel drainage systems connected to the private surface water system.

c. Drive drainage, ACO channels shall not be placed within 200mm of the highway/pin kerb. NYC recommends the use of a stretcher row of block paving between the pin kerb and any drive drainage systems.

06-00- Earthworks

06-01 General

a. The developer shall ensure, that prior to any earthworks commencing, any planning conditions relating to site levels are discharged accordingly. All site level works must be undertaken in strict accordance with the approved details.

06-02 Testing of the Formation

a. The developer shall arrange for the formation, as defined at Clause 6-04 and 7-02, to be tested every 20 m by means of a CBR test in accordance with Clause 06-05 a. The CBR testing shall be at the Developer's expense. Copies of the CBR Testing Certificates shall be provided to the Engineer.

06-03 General Excavation

a. Where sub soil has to be removed to reach the approved levels it shall be excavated in a manner that minimises the disturbance to the formation. The formation for the roadworks shall be prepared for the widths shown below:

Residential Roads	full width of the carriageway PLUS 1.0m each side
Industrial Roads	full width of the carriageway PLUS 2.5 m each side

Wherever possible the sub-grade shall be compacted at its natural moisture content by four passes of a smooth-wheeled roller, the roller having a mass per metre width of roll of 4.4 tonnes or greater.

b. Separation membranes shall be provided when required by the Engineer, before filling on sub-grades that are wet or of low bearing strength. The membrane / geotextile will be positioned as directed by the Engineer and shall be below the level of all services ducts etc. to avoid subsequent damage. Any damage to the membrane shall be repaired to the approval of the Engineer.

c. The Developer shall ensure all excavations are kept free from water during the progress of the works and provide permanent land drainage if required to do so by the Engineer.

06-04 General Fill Material

a. All fill materials shall be tested and certified as fit for purpose and approved in writing by the Engineer. This includes clay that is being recycled on the site or imported. It shall be free from contaminants and/or oversized material for example, soft brick, dust, ashes, wood, metal, plaster or other extraneous matter, and organic or inorganic impurities (e.g. sulphur or lime)

b. The use of properly certified recycled 6F5, as defined in SHW Table 6/1 is permitted for use as fill. Any 6F5 found on site to be of poor quality shall be re-tested at the Developer's expense. In these circumstances, subsequent deliveries to site shall be re-tested, at the developer's expense, when requested by the Engineer.

c. On brown field sites, the Developer may be permitted to re-use materials crushed on site subject to the materials being processed in accordance with SHW Clause 10 and complying with the requirements of the relevant fill. It shall not be used without the written approval of the Engineer. Any such material shall be fully tested to ensure it is free of contaminants and complies with the relevant specification clauses for its intended used prior to any material being included in the works. Re-testing will be required every 200m^3 when requested by the Engineer to ensure continued compliance. Additional testing may be required as a result of adverse good or bad weather conditions. Further information is provided in NYC Specification 07 and MCHW Specification for Highway Works Clause 710.

d. The rising of levels with clay or clay strengthened using lime or cement or both may be permitted subject to the written approval of the Engineer before any such work commences on site. To secure the Engineer's approval details of the testing regime and proposed laboratory, methods of construction and provisions for the supervision of works on site by the developer and the Council will be required. All material and its placement shall comply with the relevant clauses in Series 600 Earthworks of SHW. The material shall be tested at agreed regular intervals at an independent NAMAS or UKAS approved laboratory. Additional on-site CBR testing shall be undertaken in accordance with a schedule agreed in writing by the Engineer. The CBR tests shall be at a maximum spacing of 10 metres. Any lime or cement added shall be undertaken by an approved mechanical method. Manual or excavator type mixing will not be permitted. No clay shall be used or imported to site until all necessary test certificates to prove compliance as a suitable fill material free of contamination have been submitted to the Engineer and approved in writing. Additional testing may be required because of adverse good or bad weather conditions. Any clay excavated from its natural strata and placed elsewhere on site shall be classed as fill.

06-05 Use of Geotextile Membrane as Part of the Construction

a. The membrane/geotextile shall be capable of sustaining a tensile force equal to 2kN/m at 5% axial strain.

b. Where the material is required to be overlapped, the overlap shall be a minimum of 300 mm.

c. The surface of the material on which geotextile is to be placed shall not have protrusions or sharp projection that are likely to damage the geotextile during installation.

d. The method of installation shall ensure that the geotextile is in continuous contact with the surface on which it is to be placed. The geotextile shall not be stretched or bridged over hollows or humps.

e. Operation of construction plant directly on the installed geotextile will not be permitted, and its covering with fill material shall take place immediately after its laying.

06-06 California Bearing Ratio (CBR)

a. Testing the formation layer to determine the CBR shall be done in-situ at formation level. The formation level may be on virgin ground or engineered fill built up to the required level. Testing shall be done by an independent NAMAS or UKAS accredited testing service. Unless

otherwise agreed with the Engineer testing shall be undertaken using a 600mm diameter steel plate.

b. Engineered fill shall be tested in layers as the ground is made up. The frequency of testing shall be agreed in writing with the Engineer prior to works commencing. The minimum acceptable CBR value for made ground shall not be less than 5%.

c. The minimum acceptable CBR value on natural ground is 2% where a suitable ground investigation report has demonstrated no problematic ground conditions such as peat and / or clays with shrink swell properties etc.

d. Where CBR results fall below the values indicated in (b.) and (c.) above, additional testing, as directed by the Engineer, shall be undertaken to identify the extent of the poor ground.

e. Where in the opinion of the Engineer CBR testing identifies isolated pockets of poor quality sub-grade the removal of poor quality material may be accepted by the Engineer, this shall be replaced as directed by the Engineer with capping material or clean stone. The additional fill shall be brought up to level in layers no thicker than 225 mm and compacted in accordance with Table 07-07 for the compaction requirements for granular materials.

f. In circumstances where the CBR testing identifies large areas of poor subgrade, specialist interventions will be required. These will need to be supported by relevant design calculations that shall be submitted to and approved in writing by the Engineer prior to works commence. The calculations shall be undertaken by a suitably experienced professional Engineer. Specialist checking by the Engineer shall be charged to the developer. Once the remediation is complete further CBR testing, to the satisfaction of the Engineer, shall be undertaken by an independent NAMAS or UKAS accredited testing service to prove the required strengths have been achieved.

g. It is unlikely that CBRs of less than 0.5% will be acceptable to NYC without specialist interventions. These will need to be supported by relevant design documents that shall be submitted to and approved in writing by the Engineer prior to works commencing. The calculations shall be undertaken by a suitably experience professional Engineer

h. In some circumstances, the Engineer may agree to remediation being undertaken in accordance with Table 06-01 below.

Table 06-01

CBR%	Capping mm depth	75mm clean stone mm depth	Geo-textile
2%>	200	N/A	N/A
1.75%>	300	N/A	N/A
1.5%>	400	N/A	YES
1.25%>	500	N/A	YES
1%>	200	200	YES
0.75%>	200	300	YES

0.5%>	Determined by detailed design	Determined by detailed design	YES in accordance with detailed design

07-00- Road Pavement Materials

07-01 Carriageway Shape and Tolerances

a. The acceptable tolerances for the various layers are as follows.

Table 07-01

Surface Course	+6 mm	-6 mm
Binder Course	+6 mm	-6 mm
Base Course	+15 mm	-15 mm
Sub-base	+10 mm	-30 mm
Capping Layer	+20 mm	-30 mm
Formation	+20 mm	-30 mm

b. Notwithstanding the tolerances permitted in surface levels, the cumulative tolerance shall not result in a reduction in thickness of the pavement (asphalt layers) excluding sub-base by more than 15 mm form the specified thickness nor the reduction in the surface course depth by more than 5 mm form that specified.

c. Where any tolerances are exceeded, the area shall be made good as required by the Engineer.

d. The Binder course and Surface coat may be checked for irregularities at points identified by the Engineer with a 3 m straight edge. The straight edge will be used parallel to the kerb line or at right angles to the centre line of the road. The maximum allowable deviation to the surface bellow the straight edge will be 3mm for Surface Coat and 6mm for Binder Course. A suitable 3m straight edge shall be provided by the Developer.

e. Sub-base, base course and binder courses are to be inspected by the NYC Engineer prior to laying any subsequent course. If any course is found to be substandard or defective it must be replaced at the developer's expense.

07-02 Formation

a. For the avoidance of doubt, in this specification "formation" refers to the top of the natural or Engineered Subgrade, prior to laying of any pavement construction material including capping materials.

b. Preparation and surface treatment of the formation shall be carried out only after completion of all sub-grade drainage.

c. Trenches for ducts, gully connections and utilities located in roads or footpaths shall be back filled with Type 1 Sub-Base in layers not exceeding 225mm that shall be compacted thoroughly using suitable plant, as detailed in paragraph 07-06, with the specified number of passes. All such trench fill shall be to the Engineers satisfaction. Where the quality or the workmanship of the backfilling is questioned, the Engineer may require CBR tests to be undertaken.

d. To avoid damage construction traffic shall not run on the formation. Any damage that occurs shall be made good to the satisfaction of the Engineer. The formation shall be covered the day it has been exposed.

07-03 Capping Layer

a. All material used for capping layers shall comply with SHW Series 600 and be certificated from an approved testing Laboratory. Certification for all capping 6F5 shall be provided to the Engineer.

b. All materials used shall pass a 125mm BS sieve but no more than 12% shall pass a 63-micron BS sieve. The wet 10% fines value of the material shall not be less than 30 kN when tested in accordance with BS 812.

c. The capping material shall be compacted in conjunction with National Standards as set out in Table 07-02. Capping layer (200mm compacted thickness) shall be compacted in a minimum of two layers using Vibratory rollers in the 1300 to 1800 Kg/m range. For restricted areas, plate compactors in the 1400 to 1800 kg/m^2 may be used. Fill shall be laid in 110mm maximum thickness layers using the recommended number of roller passes. Any changes from the above shall be agreed in writing by the Engineer before compaction commences.

d. Materials used within 450mm of the surface of the road shall not be frost susceptible as defined by the test described in BS 812 part 124 and SHW. The material shall be deemed to be none frost susceptible if in the tests the heave is less than 15 mm.

e. Any recycled materials brought onto site for use in connection with any part of road or footway construction shall have the prior written approval of the Engineer and shall comply fully with SHW Clause 710 (See appendix H)

f. The capping layer materials, once compacted, shall achieve a minimum CBR of 15% on a plate-bearing test on a 600mm plate.

Table 07-02

Capping material	**Requirements**
minimum 200mm compacted thickness unless otherwise agreed in writing	SHW series 600, Table 6/1 Class 6F5
Grading	SHW Table 6/5
Resistance to Fragmentation	Los Angeles Coefficient (LA) of 50 or less in accordance with SHW Series 800
Water content	To BS EN 1097-5 Optimum to Optimum – 2% range
Recycled aggregates	To SHW Clause 710 and Appendix H
Compaction	As Table 07-06 and 07-07 below

07-04 Granular Sub-Base Type 1

a. Unbound Granular mixtures shall comply with the requirements BS 13285 and the SHW series 800 Clause 801.

b. Type 1 Sub-Base for use in the Highway shall comply with the requirements of BS EN 13285 and SHW paragraph 803. It shall not be frost susceptible and shall comply with the definition in SHW Series 800 and be certified from an independent NAMAS or UKAS approved testing Lab. Unbound Granular mixtures shall comply with the requirements BS 13285 and the SHW Series 800 Clause 801.

c. Type 1 Granular sub-base shall conform to the requirements of SHW Series 800 Clause 803. The key requirements are indicated below in Table 07-03

Table 07-03

Type 1 Grading requirement	**Percentage by Mass passing**		
Sieve size, mm	Overall grading range	Supplier declared value grading range	Tolerance on the supplier declared value
63	100		
31.5	75 to 99		
16	43 to 81	54 to 72	+/- 15
8	23 to 66	33 to 52	+/- 15
4	12 to 53	21 to 38	+/- 15
2	6 to 42	14 to 27	+/- 13
1	3 to 32	9 to 20	+/- 10
0.063	0 to 9		

d. The size fraction of the unbound mixture passing the 0.425 mm size test sieve shall be non-plastic as Defined by BS 1377-2 and tested in compliance therewith.

e. The material shall have a maximum Los Angeles Co-efficient of 50 in accordance with BS EN 1097-2.

f. The material shall be resistant to freezing and thawing and have a magnesium sulphate (MS) soundness value of 35 or less in accordance with BS EN 1367-2.

g. Type 1 unbound mixtures shall be produced from crushed rock, crushed slag, or crushed concrete. Recycled & Secondary aggregates may be acceptable subject to compliance with NYC's formal approval procedures detailed in Appendix H and the prior written approval of the Engineer.

Table 07-04

Type 1 Granular Sub-Base	**To meet requirement**
Grading range	As Table 07-03 above
Resistance to fragmentation	LA 50 or less
Resistance to Freezing & Thawing	MS 35 or less
Frost Heave	Material used with 450mm of the road surface shall not be frost susceptible. The material shall have a mean heave value of 15mm or less when tested in accordance with BS 812-124
Water soluble sulphates (WSS)	Any material placed with 500mm of any concrete, cementitious material or stabilised capping shall have WSS not exceeding 1500mg as (SO_4) per litre when tested in accordance with BS EN 1744 – 1 Clause 10.
Recycled Aggregate requirements	In accordance with SHW Clause 710 and Appendix H
Compaction requirements	In accordance with Table 7-06 and 07-07 and the additional guidance below

h. Additional testing of materials delivered to site may be requested by the Engineer. This shall be undertaken at an independent certified Laboratory at the developer's expense.

i. Repeat testing may be requested by the Engineer. This shall be undertaken at the Developer's expense.

j. Copies of all supplier certification for Type 1 Sub-Base shall be provided to the Engineer.

k. The approved Type1 Sub-Base shall be placed, spread to the correct thickness, and compacted in accordance with Table 07-06 and Table 07-07 and the SHW, all to the satisfaction of the Engineer.

l. Type 1 Sub-Base once laid and compacted shall have a minimum CBR value of 30% on a 600 mm plate test.

07-05 Carriageway Construction Thicknesses

Unless otherwise specified the thicknesses given in Table 07-05 shall be the minimum compacted thickness of road construction for varying widths of carriageway. The construction of classified roads shall be designed in accordance with CD series of Documents within DMRB.

Table 07-05

MINIMUM LAYER THICKNESSES FOR MACADAM CARRIAGEWAY CONSTRUCTION						
Carriageway Width	**Capping Layer (mm)**	**Type 1 Sub-Base (mm)**	**Road-Base (mm)**	**Binder-Course (mm)**	**Surface – Coat (mm)**	**Road Type**
Classified Roads	Designed to DMRB but no less than thicknesses below for the road width					
Industrial Roads	Min. 200[(a)]	450	160	90	45	Industrial Estate Road
7.3 m +	Min. 200[(a)]	300	140	80	45	Unclassified Residential Estate Road
5.5m to 7.3 m	Min. 200[(a)]	250	110	60	45	Unclassified Residential Estate Road
Less than 5.5m	Min. 200[(a)]	255	90	60	45	Unclassified Residential Estate Road

MINIMUM LAYER THICKNESSES FOR BLOCK PAVED SHARED USE CARRIAGEWAY CONSTRUCTION						
Carriageway Width	**Capping Layer (mm)**	**Type 1 Sub-Base (mm)**	**Road-Base (mm)**	**Binder-Course (mm)**	**Sand / Blocks (mm)**	**Blocks (mm) Road Type**
6.5 m	Min. 200[(a)]	350	90	50	30 / 80	Unclassified Shared Estate Roads

MINIMUM LAYER THICKNESSES FOR HRA SHARED USE CARRIAGEWAY CONSTRUCTION[(b)]						
Carriageway Width	**Capping Layer (mm)**	**Type 1 Sub-Base (mm)**	**Road-Base (mm)**	**Binder-Course (mm)**	**Surface Course (mm)**	**Road Type**
6.5m	Min. 200[(a)]	350	90	50	45[(c)]	Unclassified Shared Estate Roads

(a) Refer to CBR Values below for Capping Layer Thicknesses
(b) HRA shared use carriageway only to be used whereby cross fall cannot be achieved and is agreed at the discretion of the Engineer.
(c) Surface course for HRA shared use roads must be difference in surface or colour to warn road users they are entering a shared area. HRA for shared use only to be used at engineer discretion.

	(*) CBR Values on Formation Layer					
	<2%	2% to <3%	3% to <5%	5% to <10%	10% to <15%	15%+
Capping Layer Thickness	600mm	450mm	350mm	250mm	225mm	200mm

a. Table 07-05 is based on a minimum formation CBR of 2%. Where this CBR cannot be achieved, the developer shall be required to undertake additional CBR testing and shall provide details of additional works to mitigate the poor ground conditions. The remediation shall be provided in accordance with Table 07-05A.

b. It is unlikely that CBRs of less than 0.5% will be acceptable to NYC without specialist interventions. These will need to be supported by relevant design documents that shall be submitted to and approved in writing by the Engineer prior to works commencing. The calculations shall be undertaken by a suitably experience professional Engineer.

c. Capping layer thickness will be based on lowest CBR value from testing for full length of carriageway up until agreed juncture. Graduated capping layers will not be accepted unless otherwise approved in writing by the Engineer.

d. Table 07-05A

CBR%	Capping mm depth	75mm clean stone mm depth	Geo-textile
1.5%>	600	N/A	YES
1.25%>	600	N/A	YES
1%>	300	300	YES
0.75%>	300	300	YES
0.5%>	Determined by detailed design	Determined by detailed design	YES in accordance with detailed design

For further block paving guidance see paragraph 07-25.

e. When traffic conditions dictate the Engineer may request the requirements of Table 07-05 shall be replaced by a pavement design undertaken in accordance with DMRB Vol 7 and submitted for the Engineer's written approval. The material thicknesses shall be adjusted in accordance with the approved design.

07-06 Compaction Requirements for Granular Materials

a. When considering the choice of roller, the mass per 1.0m width of roll is the total weight on the roll divided by the total roll width. In the case of a smooth-wheeled roller having more than one axle, the assessment is based on the highest value axle.

b. The requirements for vibratory rollers are on a traveling speed of 1.5 to 2.5 kph or 0.9 to 1.5 mph, if speeds faster than this are used then more passes shall be needed. NYC recommend working at low speeds at all times to achieve satisfactory compaction.

Table 07-06

Compaction Equipment Types			
Plant- Rollers based on Mass Per 1 m width of roll	**Material**	**Maximum layer depth**	**Minimum number of passes should be halved for double drums**
Vibratory rollers 700 – 1300 Kg range (Roll width/series 80.100.120, Inc. Ramax type trench rollers etc.)	Type 1 GSB	110mm	16
As above 1300–1800 Kg Roller width/series - 130. 135, 138 Range	As above	150mm	16
Large single drum vibratory 1800 Kg – 5000 Kg	As above	225mm	6 to 10 depending on model
Large Single drum vibratory rollers over 5000 Kg	As above	225 to 300 mm	5
Plate compactors Based on Mass per unit area of base plate Kg/m^2 (Fwd. & Reverse type)			
1400 – 1800 Kg range	As above	110mm	8
1800 -2100 kg range	As above	150mm	8
Plate compactors above 2100 kg Machine attachment type	As above	150 -225 mm	6 to 10

Table 07-07

Compaction Equipment ~ number of Passes				
Type of Compaction Plant	Category	Number of passes for: -		
		Not greater than 110mm thickness	Not greater than 150mm thickness	Not greater than 225mm thickness
	(mass per metre width of roll)			
Smooth wheeled roller	2700-5400 kg	16	Unsuitable	Unsuitable
	Over 5400kg	8	16	Unsuitable
Vibrating roller	700-1300kg	16	Unsuitable	Unsuitable
	1300-1800kg	6	16	Unsuitable
	1800-2300kg	4	6	10
	2300-2900kg	3	5	9

	2900-3600kg	3	5	8
	3600-4300kg	2	4	7
	4300-5000kg	2	4	6
	Over 5000kg	2	3	5
Vibrating plate compactor	Mass per unit area of base plate (kg/m^2)			
	1400-1800	8	Unsuitable	Unsuitable
	1800-2100	5	8	Unsuitable
	Over 2100	3	6	10

c. For a machine attached vibrating plate (Hoepack or similar) an initial layer of 500mm shall be laid followed by maximum 300 mm thick layers.

d. Where the choice of appropriate plant is unclear, the matter should be referred to the Engineer.

e. Vibratory rollers shall only be operated with their vibration mechanism operating at the manufacturers recommended frequency. All such rollers shall be equipped with a means of automatically indicating the frequency at which the vibration is given. Vibratory rollers not vibrating shall be treated as smooth wheeled rollers.

f. Where Vibrating Plate Compactors are used, the static pressure under the plate is calculated by dividing the total working mass of the machine by the area of contact with the compacted stone in metres squared. Plate compactors shall normally be operated at travelling speeds of less than 1.0 kph (0.6 mph). If higher speeds are used, the minimum the number of passes shall be increased in proportion to the increase in speed of travel.

07-07 Cold Weather Working with Granular Materials

a. No Material in a frozen condition shall be incorporated into the works. It shall be set aside on site for consideration for use when thawed. Any thawed material shall be tested to prove acceptability at an approved laboratory prior to use.

b. No materials for use in roads or footpaths shall be laid on any surface that is frozen or covered with ice or snow.

HOT ROLLED ASPHALT

07-08 Site-specific Assessments

a. Site-specific assessments will be required to determine the following, which shall be agreed in writing by the Engineer in advance of the work commencing.

- Coarse Aggregate PSV
- Pre coated chipping size requirement and PSV value
- Rate of Spread of chippings
- Required Surface Texture depth. The minimum shall be 1.2 mm with an absolute minimum of 1.0 mm.
- Bond Coat and Joint sealing requirements

- Material Testing regime
- Skid resistance to be determined in accordance with DMRB – CD 236 - Table 3.3a with Investigatory levels determined as set out in DMRB - CS 228.

Site conditions may dictate that different PSV values will be required for different lengths of carriageway i.e. at roundabouts, approaches to junctions and traffic lights.

07-09 Hot Rolled Asphalt Surface

a. Hot Rolled Asphalt Surfacing shall be used in the following locations: -
- All A and B class roads,
- Ghost island right turning lanes and roundabouts on all classes of roads
- All Industrial estate roads
- Residential estate roads with a width of 7.3 m or greater.
- Residential estate roads with a width of 6.5 m that are to be used as bus routes.
- Other junctions and locations as requested by the Engineer.

b. Hot Rolled Asphalt Surface Coat shall comply with BS EN 13108 – 4, and SHW Series 900.

c. Standard recipe mix shall be HRA 35/14 F Surf 40/60 pen, unless otherwise agreed in writing by the Engineer prior to any surface course being laid on site. The Engineer may request the mix to take account of site-specific design mixes incorporating wheel tracking rate (WTR) requirements. The binder shall be 40/60 Pen bitumen complying with BS 13924-1. The coarse aggregate content shall be 35% by mass of total mix and shall have a PSV of not less than 45. The material shall be delivered, laid & compacted in accordance with BS 594987.

d. For Hot Rolled Asphalt Surfacing Binder and Base Courses over Structures refer to Clause 22-13 and 22-14 in Section 22-00 Bridges and Structures of the NYC Specification.

e. The use of High Stone Content surfacing materials is not yet approved by NYC at the time of publication of this Specification and shall therefore be subject to Engineer approval prior to its use, having a full assessment been made in consultation with an experienced surfacing contractor.

f. The use of Thin Surfacing materials is not yet approved by NYC at the time of publication of this Specification and shall therefore be subject to Engineer approval prior to its use, having a full assessment been made in consultation with an experienced surfacing contractor.

g. The environmental benefits of Warm Mix Asphalt (WMA) with its lower production temperatures and therefore reduced carbon emissions are resulting in the more widespread use of WMA. The use of WMA shall be subject to the Engineers approval based on the production of a comprehensive assessment undertaken in consultation with an experienced asphalt contractor, taking into consideration factors such as climate conditions, traffic volume, specification goals (durability and performance).

07-10 Pre-Coated Chippings

a. Pre coated chippings shall be 20 mm nominal size. The use of 14mm nominal size may be permitted in specific locations subject to the agreement of the Engineer.

b. The minimum PSV at roundabout circulatory areas and approaches to roundabouts (minimum distance 60 m) shall not be less than 65 and other locations as requested by the Engineer.

c. The minimum PSV at controlled crossings and on the approaches to controlled crossings (minimum distance of 28 m to the stop line) shall be not less than 68.

d. The binder coat to the chippings shall be 40/60 pen conforming to BS EN 13108 – 4.

e. Pre-Coated chippings shall be uniformly spread at a rate of 12 kg/m^2 and rolled into the surface coat so they are effectively held using a dead weight roller.

f. In some locations the use of Red Pre-Coated chippings may be requested by the Engineer.

g. "Thin surfacing" materials have not been approved at the time of this Specification being published and therefore shall be subject to the Engineers approval prior to use, having a full assessment having been made in consultation with an experienced surfacing contractor.

COATED MACADAM CARRIAGEWAYS

07-11 Limestone Aggregate

Limestone aggregate shall not be used for the Wearing or Binder Course, it may be used for Road-base.

07-12 Dense Base and Binder Course Asphalt Concrete (Recipe Mixtures)

Dense base & Binder asphalt concrete (formerly macadam) recipe mixtures shall be Asphalt Concrete conforming to BS EN 13108-1.

07-13 Dense Road Base

a. Dense Road Base Asphalt Concrete shall be AC 32 dense base 100/150 or AC 32 dense base 40/60 (HDM).

b. The minimum thickness shall be 90 mm. Greater depths may be required by site conditions. Designs for the details of additional thickness shall be submitted to and agreed by the Engineer prior to works commencing on site.

c. The material shall not be laid in layers thicker than 5 times the aggregate size. It should not be laid in layers of thickness less than 2.5 times the aggregate size, without the Engineers prior agreement.

d. The Engineer may request the use of a heavy duty Road-base in certain locations. i.e.180mm 40/60 AC32 Dense Base HDM to BS EN 13108-1

07-14 Binder Course Material

a. Binder Course material shall be Asphalt Concrete 20 dense binder 100/150 or Asphalt Concrete 20 dense binder 40/60 (HDM)

b. The minimum thickness shall be 50 mm and the maximum thickness shall be 100 mm.

c. The Engineer may request the use of a heavy-duty Binder-Course in certain locations. i.e. 100mm 40/60 AC20 Dense Bin HDM to BS EN 13108-1.

d. Binder Course not to be covered with a surface coat within 3 days shall be sealed with 1-3mm sealing grit spread evenly to fill all voids. See Clause 07-16.

07-15 Close Graded Asphalt Concrete Surface Course

a. Close graded Asphalt Concrete (formerly macadam) surface course recipe mixes shall be Asphalt Concrete conforming to BS EN 13108-1, using Asphalt Concrete 10mm close surface 100/150 or Asphalt Concrete 10mm close surface 70/100. Pen Bitumen

b. The minimum thickness shall be 40 mm and the maximum thickness shall be 50 mm.

07-16 General Requirements for Laying Bituminous Materials

a. All Binder courses in roads shall be sealed using a sealing grit of 3 mm down fine surface 160/220. This may only be omitted by prior written agreement of the Engineer.

b. Road-base shall not be left uncovered for more than 24 hours without the written approval of the Engineer.

c. All bituminous materials for carriageways shall be delivered, laid and compacted in accordance with BS 594987.

d. All bituminous materials shall be produced in batching plants operating to BS EN 13108 -21 (Factory Production Control). Material shall be supplied by batching plants operating at Operational Compliance Level (OCL) **A**. Where this is not met additional testing may be requested.

e. All works under Section 278 of the Highways Act 1980 shall be carried out to a quality assurance scheme based on National Highway Sector Scheme 16 (NHSS -16). The surfacing contractor shall be registered to this Quality Assurance scheme and approved in writing by the Engineer prior to works commencing on site.

07-17 Defective Materials

a. Where any surfacing is found to be defective by the Engineer the minimum patch shall be machine laid and shall not be less than 15 m in length and not less than the width of the formed surfacing joint.

b. In some instances, the Engineer may instruct the area to be surfaced to the full carriageway width

c. If multiple areas have failed or are considered defective the Engineer may instruct the multiple areas to be combined and are to be repaired as a single patch. If widespread defects are identified the Engineer may instruct the whole road to be resurfaced.

d. Any rework required is to be completed at the Developers expense.

07-18 Regulating Course

Any regulating course to be provided under the Surface Coat or under Block Paving shall have the prior written approval of the Engineer.

07-19 Hot Applied Bond Coat

a. Hot Applied Bond Coat shall be used before the laying of surface coat on a cleaned surface.

b. Hot Applied Bond Coat shall be applied using a tanker applicator unless agreed in writing by the Engineer before work commence.

c. The Hot Applied Bond Coat shall be Polymer Modified Binder classified in accordance with BS EN 13808 or BS EN 15322 or BS EN 14023 (generally cationic modified emulsions such as C50 BP3 or C65 BP3).

d. Hot Applied Bond Coats shall cover a minimum of 95% of the area to be surfaced.

e. Hot Applied Bond Coats shall be used in all cases between every layer of tarmac laid on a carriageway.

f. Spread rates and accuracy for the spread of Hot Applied Bond Coat shall comply with BS EN 12272-1

g. Once the Hot Applied Bond Coat has been applied, no trafficking of the surface shall be permitted until the Hot Applied Bond Coat has been allowed to “break completely” (turn from brown to black).

h. The surface to which the Hot Applied Bond Coat is applied shall be free of standing water but may be damp. The Engineer’s definition of “standing water” shall apply.

i. Table 07-08 identifies minimum target rates of spread for Hot Applied Bond Coats in litres per m^2.

Table 07-08

Manufacturers Bond coat rates of spread		
Class of polymer modified bituminous emulsion	Newly laid and existing asphalt substrates Residual binder 0.2Kg/m^2	Planed (milled) substrates Residual binder 0.35Kg/m^2
C50 BP (2 to5)	0.40 L/m^2	0.70 L/m^2
C60 BP (2 to 5)	0.33 L/m^2	0.58 L/m^2
C65 BP (2 to 5)	0.31 L/m^2	0.54 L/m^2

K1-70	0.60 L/m^2	0.90 L/m^2

07-20 Tack Coat

Tack Coat shall only be used on cleaned cycle tracks, footpaths and footways (cycle track as defined in paragraph 1.45 of LTN 1/20). It shall be spray applied with a minimum coverage of 85% applied at a rate of no less than 0.5 Litre per m^2. The Tack Coat shall be K1-40 to BS 434-1. It shall be used only on cycle tracks, footways and footpaths, and shall be applied undiluted.

07-21 Laying of Bituminous Materials for Carriageway

a. Laying of Road-base material shall only be undertaken when: -
- Any edge restraint where specified is in place and laid to line and level.
- Where in exceptional cases the specified edge restraint is not in place, the laid width of the carriageway shall be increased to create a sacrificial strip that shall be cut back immediately prior to the edge restraint being laid. The increase in width and the detail for cutting back the sacrificial strip and laying the edge restraint shall all be agreed in writing prior to any material being laid.
- The underlying Type 1 Sub-Base has been confirmed to comply with the approved tolerances and has been formally approved in writing by the Engineer.

b. Unless otherwise approved in writing by the Engineer, all bituminous material shall be laid with an approved Mechanical Paving Machine that shall be capable of laying to the required width and applying the required initial compaction.

c. Hand laying will only be permitted in areas where it is impractical for a mechanical paver to operate.

d. With the exception of adjustment of levels around ironwork or at the channel line, hand raking of Surface-Coat material that has been laid by a mechanical paver shall not be undertaken.

e. All work, whether hand or machine laid shall comply, in all respects, with the recommendations for laying contained in BS 594987.

f. Tolerances on the finished surface shall be +6 or -6mm in accordance with Clause 07-01.

g. Final compaction on Hot Rolled Asphalt surface-coat or High Stone Content Surface-coat shall be undertaken using an 8 to 12 tonne dead weight smooth-wheeled roller.

h. Final compaction of 10mm Surface-Coat may be undertaken using a twin smooth-wheeled roller. The roller shall not be less than a 100AD and should preferably be 135AD.

Table 07-09

Minimum rolling temperatures for Asphalt to BS EN 13108-4		
	Type	Temperature (Centigrade)
Maximum at any stage	40-60 pen bitumen Surface Course and Binder/Base	90°C
Minimum Delivery *	40-60 pen bitumen Surface Course	140
	40-60 pen bitumen Binder/Base	130
Minimum Rolling	40-60 pen bitumen Surface Course	110
	40-60 pen bitumen Binder/Base	105
	The above temperatures are those by which all compaction shall be substantially completed	
The use of Warm Mix Asphalt will require a comprehensive assessment as detailed in section 07-09(g)		

i. When Tarmac is at or near the temperatures in Table 07-09, the supplier shall be required to increase the delivery temperature in accordance with BS 594987.

Table 07-10

Dense / Close Graded Asphaltic Concretes BS EN 13108-1		
	Type	Temperature (Centigrade)
Maximum at any stage	40-60 pen Bitumen Macadam	190
	100-150 pen Bitumen	170
Minimum Delivery *	40-60 pen Bitumen Macadam	120
	100-150 pen Bitumen	115
Minimum Rolling	40-60 pen bitumen Macadam ** 1	105
	100-150 pen Bitumen	75
	All temperatures given are immediately prior to rolling	
The use of Warm Mix Asphalt will require a comprehensive assessment as detailed in section 07-09(g)		

Table 07-11

Longitudinal Rolling Straight Edge Measure			
Irregularity	4mm	7mm	>10mm

Permitted max number of irregularities per 40m length	10	1	Nil
Permitted max number of irregularities per 75m length	18	2	Nil

j. Cross trenches that are cut through any carriageway surface shall be restored to coincide with the mean level of the immediately adjacent surface.

k. Texture depths as set out in Table 07-12 below shall be achieved using the sand patch method in accordance with BS EN 13036 - 1. The chippings shall be adequately embedded and evenly spread.

Table 07-12

Housing Estate Roads	1.0mm minimum
Junctions with principal, non-principal and classified roads (Class A, B & C)	1.2mm minimum
within 60 m of junctions with principal, non-principal and classified roads (Class A, B & C)	1.2mm minimum
Roundabout circulatory carriageway	1.2mm minimum
within 60m of roundabouts	1.2mm minimum
within 60m of Pedestrian crossings	1.2mm minimum

07-22 Substitution of Materials

Where the overall design pavement thickness exceeds the 600mm the depth of sub-base material may, with the prior written approval of the Engineer, be reduced by increasing the Bituminous Base thickness in the proportion of 1 part Bituminous Material to 3 parts Granular material, subject to:

- Overall construction thickness shall not be less than 600mm
- Sub-base thickness shall not to be less than 200mm
- Geotextiles approved by the Engineer shall be used at formation level

07-23 Jointing into Existing Construction

Where any new carriageway joins an existing carriageway, the existing carriageway shall be cut or planed back to sound vertical faces providing staggered joints with a minimum length of 300mm for each layer. A Hot Applied Bond Coat shall be applied between all layers.

07-24 Working in Adverse Weather Conditions with Bituminous Materials

a. The laying of bituminous macadam and other bituminous materials shall cease if the temperature of the surface to be covered is at or falls below 2^{o}C. However, where the surface is dry, unfrozen and free of ice or snow, laying may proceed at temperatures at or above -1 ^{o}C on a rising thermometer.

b. Laying of bituminous macadam and other bituminous materials shall be avoided as far as practicable during wet weather and shall stop when free standing water is present on the

surface, or when the rain becomes more than light rain (1 mm/hr). No bituminous material shall be laid during periods of rain, that are predicted to last more than two hours or when more than 1 mm/hr falls.

Table 07-13

Adverse Weather Requirements for Bituminous Materials			
Material	**Commence Working Air Temp**	**Additional Requirements**	**Cease Working Air Temp**
Asphaltic Concrete to BS EN 13108-1	-1ºC & rising	Ground unfrozen and free from ice	0ºC & falling
HRA base and Binder course to BS EN 13108-4	-1ºC & rising	Ground unfrozen and free from ice	0ºC & falling
High stone content HRA surface course to BS EN 13108-4	-1ºC & rising	Ground unfrozen and free from ice	0ºC & falling

PRE-CAST CONCRETE BLOCK PAVING

07-25 Pre-Cast Concrete Block Paving

a. Pre-Cast Concrete Block Paving shall be chamfered and conform to BS EN 1338. They shall be hydraulically pressed. Blocks shall be pigmented throughout the material; they shall and not be surface dyed or painted without the prior written approval of the Engineer.

b. The mixing of Blocks from different manufacturers shall not be permitted within any road without the prior written approval from the Engineer.

c. The use of Pre-Cast Concrete Block Paving is permitted as a carriageway surface in cul-de-sac's and for speed tables and other lightly trafficked areas with the prior written approval of the Engineer. Pre-Cast Concrete Block paved road shall not be used on through routes.

d. The use of Pre-Cast Concrete Block Paving as a footway surface may, on limited occasions, be permitted subject to the prior written approval of the Engineer.

e. All Pre-Cast Concrete Blocks shall be 100 mm x 200 mm and 80 mm thick. The colour shall be brindle, red or charcoal. Other colours may be accepted subject to the prior written approval of the Engineer; other colours shall subject to a commuted sum.

f. Pre-Cast Concrete Block Paving shall be laid and constructed in accordance with BS 7533-3 and NYC Standard Details A3. The Pre-Cast Concrete Block Paving replaces the Surface-coat.

g. Pre-Cast Concrete Blocks shall be laid in herringbone pattern at a 45-degree angle to the kerb; preformed edge blocks shall be used. The Blocks shall be laid on 30 mm compacted thickness of sand which shall comply with BS 7533-3; the sand shall be naturally formed. Crushed rock and Recycled material shall not be used.

h. All block paving shall be laid with a minimum cross fall of 1 in 40. There shall be no camber or changes of fall direction within any block-paved area.

i. The acceptable tolerance for the laid surface of blocks shall be + or – 6 mm, with a maximum reflective difference between adjacent blocks of 2 mm.

j. Block cutting shall be done using a purpose made block splitter or saw. The minimum size of a laid block shall be 33% of a full block. The bond shall be broken as needed to accommodate the minimum block size.

k. Full edge restraint shall be provided prior to the laying of blocks.

l. Where Pre-Cast Concrete Block Paving abuts a bituminous surface a 150mm x 150mm channel shall be laid to provide a restraining edge; this shall be laid flush. Where the block paving adjoins “iron work” a “picture frame” shall be formed with the blocks. Any gaps should be filled with colour matched granolithic concrete. The use of in-situ concrete infill is not acceptable.

m. Pre-Cast Concrete Block paving shall be compacted on the day of laying. A rubber soled vibrating plate shall be used which shall be in the range of not less than 0.25 m^2 transmitting a force of 75 to 100 kN/m^2.

n. Any blocks damaged during compaction shall be replaced immediately.

o. The joints between blocks shall be filled with kiln-dried sand that shall comply with BS EN 16236& BS EN 933-1.

p. Any Pre-Cast Concrete Block Paving approved by the Engineer for use in footpaths or footways or as a Lamp Column surround shall be laid in accordance with Clause 07-24. They shall be laid on 50 mm of Binder Course compacted thickness, of AC20 mm nominal size dense Binder course, using 100 /150 Pen bitumen binder. The blocks shall be laid on 30mm compacted thickness of sand which shall comply with BS 7533-3 the sand shall be naturally formed. Crushed rock and Recycled material shall not be used. The use of blocks less than 80mm thick is not permitted.

q. The use of a Vacuum Sweeper is not permitted on Block Paved areas for a minimum period of twelve (12) weeks after completion, to allow the jointing sand to become fixed in the joints.

r. The use of clay pavers is not permitted.

07-26 Joint Sealants

a. Before new surfacing is laid adjacent to existing or newly cured surfacing joints shall be made by: -
Cutting or planing back the edge to a sound vertical face that exposes the full thickness of the layers providing staggered joints with a minimum length of 300mm for each layer.

- Discarding all loosened material
- Painting or spraying the vertical face completely with a thin uniform coating of hot applied 40/60 or 70/100 paving grade bitumen, or cold Applied thixotropic emulsion of a similar grade or modified bitumen emulsion bond coat as previously agreed in writing by the Engineer.

b. The above treatment shall also be applied for kerb/channel faces and chamber covers, gratings etc.

c. The over-banding of joints is generally permitted when an anti-skid, HAPAS approved, product is used. Approval should be sought from the Engineer prior to use.

07-27 Existing Carriageways and Footways

a. Where an existing carriageway or footway is not up to the current NYC Adoptable Standards and is included within the Developers Scope of Works. Core samples or trial holes shall be done to prove the existing construction at the developer's expense.

b. It is at the NYC Engineers discretion to advise on any remedial works required to bring the road up to an Adoptable Standard. This may consist of resurfacing or replacement of macadam courses. In extreme cases the sub-base and capping layer may need to be replaced and the road reconstructed.

11-00- Kerbs, Footways and Paved Areas

11-01 Kerbs and Channels

All kerbs and channels irrespective of type shall be laid, bedded and backed in accordance with this specification. They shall be laid true to line and level, shall provide a flowing alignment and be to the satisfaction of the Engineer. No longitudinal fall shall be less than 1 in 150. For block paved roads no longitudinal fall shall be less than 1 in 100.

11-02 Precast Concrete Kerbs and Channels

a. Precast concrete kerbs shall generally be 125 mm x 255 mm half battered, and shall comply with BS EN 1340, and shall be hydraulically pressed. Precast radius kerbs shall be used on all radii up to 10 m.

- Precast concrete dropped vehicular crossing kerbs (Centre Kerbs) shall be 125 mm x 178 mm and shall comply with BS EN 1340, except dimensionally and shall be hydraulically pressed. They shall be used in conjunction with the correct transition Kerbs to BS EN 1340 and shall be hydraulically pressed.
- Precast concrete pedestrian crossing kerbs (Bullnosed) shall be 125 mm x 150 mm and shall comply with BS EN 1340, except dimensionally and shall be hydraulically pressed. They shall be used in conjunction with the correct transition Kerbs to BS EN 1340 and shall be hydraulically pressed

b. Precast concrete channels shall be 150 mm x 150 mm and shall comply with BS EN 1340, except dimensionally and shall be hydraulically pressed.

c. Precast concrete channels laid on radii up to 10m shall be cut to a maximum length of 33% or 50% of a full kerb as appropriate. On some occasions, the Engineer may require 225 mm x 125 mm radius channels to be used. (Standard Detail B3)

d. Precast dished channels shall be 150 mm x 125 mm or 255 mm x 125 mm and shall comply with BS EN 1340, except dimensionally and shall be hydraulically pressed.

e. NYC expect Developers to use Pre-made Internal and External corner units and Cut Quadrants shall be used for all corners with an angle of 45^{o} or greater. In some locations the use of tight radius kerbs may be permitted subject to prior written approval by the Engineer.

f. Precast concrete transition kerbs for vehicular crossings shall be laid 500mm offset from driveway to prevent vehicular overrun.

11-03 Natural Stone Kerbs for Conservation Areas

Natural stone kerbs shall comply with BS EN 1341 and be made of igneous rock of a size 200 mm x 150 mm x 75 mm. Samples shall be submitted to and approved in

writing by the Engineer prior to their use. The kerbs used shall be equivalent to or superior to the approved sample.

11-04 Setts

Setts for use in the highway shall be natural stone granite, whinstone or York stone. Samples shall be submitted to and approved in writing by the Engineer prior to their use. The setts used shall be equivalent to or superior to the approved sample.

11-05 Blue Brick Channels

Where approved by the Engineer, a Staffordshire blue brick channel (often referred to as scoriae blocks) complying with the requirements of BS EN 771 -1 or Class A engineering bricks may be used. It shall be laid as shown on Standard Detail B4 on a concrete foundation bedding of ST2 concrete. The Engineer may permit the use of charcoal 200mm x 100mm x 80mm concrete blocks laid upside down to be used as a substitute.

11-06 Combined Kerb and Drainage systems

a. Where systems using gullies and standard kerbs are not practical, the Engineer may consider the use of combined kerb and drainage units. The use of combined kerb / drainage units shall not be permitted without the prior written approval of the Engineer.

b. The kerbs shall be suitable for use in any kerb location as defined in BS EN 1433, and SHW with a Loading Classification E600. A sample of the unit to be used shall be provided to the Engineer before works start.

c. A built-in trapped gulley shall be provided, the design of which shall be approved in writing by the Engineer prior to works commencing.

d. They shall be wet laid on a bed of ST2 concrete 200 mm deep. The joints of the lower units shall be sealed with the manufacture's approved sealant.

e. The upper units shall bed on to the manufacture's approved bedding and laid to line and level. The line and level shall be approved by the Engineer before backing.

f. Once the line and level has been approved, the completed units shall be backed with a minimum 150 mm of ST2 to within 100 mm of the top of the upper unit. The lower unit shall be held in place at the front with ST2 concrete.

g. Combined drainage systems will attract a commuted sum for the additional maintenance required.

11-07 Raised Bus Kerbs

a. When asked for by the Engineer, raised bus kerbs shall be “Kassel” type units to provide 160mm high kerb face. Generally, they will be laid with four full units and proprietary transition units at each end.

b. They shall be laid on a widened raft to provide 150 mm in front of the kerb and 150 mm behind the kerb.

c. Proprietary transition units shall be provided at each end of the raised kerbs. The kerbs they shall have a fall to the road. Where the proprietary transition units meet the standard kerb units the first kerb at either end shall be adjusted as necessary to provide a smooth transition.

d. They shall be backed with ST2 concrete to within 100 mm of the top.

e. If they are in a channel line, a channel will need to be cast to the front of the kerbs, this shall be ST5 concrete or stronger.

11-08 Kerb and Channel Foundation or Raft

a. Typical sections giving full details of the rafts and kerb backing are shown in the Standard Details B Series.

b. The concrete raft shall be formed on well compacted Type 1 Sub base to a minimum thickness of 150 mm. Soundly fixed formwork or shuttering shall be used, the concrete shall be ST2 and shall be compacted to produce a dense foundation free from honeycombing. The formwork or shuttering shall remain in place for 24 hours before removal. 10 mm diameter Dowel Bars shall be fitted every 600 mm. 10mm diameter hoops are permitted as an alternative, as shown in standard Details B1 & B2. Hoops or dowels shall extend a minimum of 75 mm above the concrete raft and shall be set a minimum of 75mm into the concrete raft. There shall be a minimum of 50mm of cover above the bottom of the raft.

c. Compressive Strength Testing of Standard and Prescribed mixes will not normally be required unless directed otherwise by the Engineer or his Representative. Where testing is required, the strength target shall be as signified by the grade of concrete being assessed. In such circumstances all testing shall be in accordance with the relevant sections of BS 1881 by an appropriately accredited laboratory.

11-09 Kerb and Channel Laying

a. Kerbs shall be laid on a concrete raft as specified in Clause 11-08. They shall be laid with a trowel thickness gap on a 25mm thick bed of moist 1:3 cement mortar which shall be able to set in 24 hours (see clause 17-05). Any surplus bedding material shall be thoroughly removed and the raft wetted, if necessary, prior to the placing of the backing concrete. The backing shall be ST2 concrete placed in a soundly fixed road form/shutter, and thoroughly compacted to produce a concrete dense and free from honeycombing, to the section shown in standard Details Series B.

b. Kerbs shall be laid true to line and level and have a slight fall to the road with a minimum gradient of 1 in 150 to achieve satisfactory drainage.

c. Channels are only required where the gradient of the carriageway is less than 1:80 (1.25%) unless agreed otherwise in writing by the Engineer prior to kerbing works commencing. Channels shall be laid to line and level with a slight fall toward the kerb. They shall be laid on a 25 mm 1:3 mortar bed that should be moist. They shall be broken joint bond with the kerb, with a trowel edge gap.

d. All kerbs and channels shall be laid to the satisfaction of the Engineer. They shall be of good line and level. Any kerbs or channels found to be more than 3 mm out of line and level over a 3 m length shall be re-laid.

e. Any gaps between kerbs and channels must be infilled with Epoxy / Mortar.

f. The use of extruder kerbs must be agreed with the Engineer.

11-10 Preparation of Formation to Footpaths, Cycleways and Other non- Vehicular Areas

a. During the course of the works the formations of all footpaths, cycleways and other non- vehicular areas shall be kept free of water.

b. These formations shall be properly shaped and compacted with an approved smooth-wheeled roller of 2 to 3 tonnes mass or an equivalent approved vibratory roller. Any depressions in these formations shall be filled with Type 1 Sub Base and compacted to the Engineers satisfaction. In certain areas the Engineer may require a weed suppressant membrane to be laid beneath the sub base. All trenches for utilities shall be back filled with Type 1 Sub Base that shall be compacted to a minimum CBR of 20%.

11-11 Base to Footways Footpaths & Cycle-Ways

a. All formations shall be inspected and approved by the Engineer prior to any fill being placed. Type 1 Sub Base material, in accordance with the approved drawing, shall be spread evenly and thoroughly compacted with a vibratory roller complying with Tables 07-06 and 07-07. The compacted footway sub base shall be checked for compliance with line and level tolerances using a timber template places between the kerb and pin kerb edging. The template shall be notched to the overall depth of the Binder & Surface Course; any discrepancies shall be made good and re-compacted until the top surface of the Type 1 Sub-base complies with line and level tolerances.

11-12 Coated Macadam to Footways Footpaths & Cycle-Ways

a. All flexible footway surfacing shall comply with BS EN 13108 & be laid & compacted in accordance with BS 594987 to Clause 5.10a

b. Footways and cycleway construction has been categorised into five tables as depicted below:

Table 11-12 - C – 'Segregated' Footway and Cycleway

Layer	Material	MCHW Specification
Surface Course	20mm Compacted Thickness of AC6 dense surf 70/100 or 100/150 pen bitumen binder laid in accordance with BS594987	Series 900 : Clause 909
Binder Course	50mm Compacted Thickness of AC20 dense bin 40/60 or 100/150 pen bitumen binder laid in accordance with BS594987	Series 900 : Clause 906
Basecourse	-	
Sub-Base	100mm of Type 1 Unbound Sub-base or Cement Bound Granular Material (CBGM)	Series 800
Sub-Grade	>=2.0% CBR	
Comments	Typically used within Residential Estates, and shall only be used where the footway is physically segregated from the carriageway with a physical barrier or other permanent obstruction (eg bollards / walls) where vehicles cannot mount the footway/cycleway. Specification can also be utilised where separation from carriageway is by a verge of width 3m or greater.	

Table 11-12-D - 'Standard Duty' Footway and Cycleway

Layer	Material	MCHW Specification
Surface Course	20mm Compacted Thickness of AC6 dense surf 70/100 or 100/150 pen bitumen binder laid in accordance with BS594987	Series 900: Clause 909
Binder Course	50mm Compacted Thickness of AC20 dense bin 40/60 or 100/150 pen bitumen binder laid in accordance with BS594987	Series 900: Clause 906
Basecourse	-	
Sub-Base	150mm of Type 1 Unbound Sub-base or Cement Bound Granular Material (CBGM)	Series 800
Sub-Grade	>=2.0% CBR	
Comments	Typically used within Residential Estates, where occasional overrun is likely i.e. overrun might occur two or three times a year by delivery vehicles or the occasional 'bumping up' and parking on the pavement.	

Table 11-12-E - 'Medium Duty' Footway and Cycleway

Layer	Material	MCHW Specification
Surface Course	20mm Compacted Thickness of AC6 dense surf 70/100 or 100/150 pen bitumen binder laid in accordance with BS594987	Series 900: Clause 909
Binder Course	60mm Compacted Thickness of AC20 dense bin 40/60 or 100/150 pen bitumen binder laid in accordance with BS594987	Series 900: Clause 906
Basecourse	-	
Sub-Base	225mm of Type 1 Unbound Sub-base or Cement Bound Granular Material (CBGM)	Series 800
Sub-Grade	>=2.0% CBR	
Comments	Typically used within Residential Estates, where occasional HGV overrun is likely (i.e overrun might occur two or three times a year by delivery vehicles), where the footway/cycleway gives access to a vehicular private drive crossing. D400 utility lids must be used within vehicular drive crossings and medium duty footways unless otherwise agreed in writing.	

Table 11-12-F - 'Heavy Duty' Footway and Cycleway

Layer	Material	MCHW Specification
Surface Course	40mm Compacted Thickness of AC10 close graded 70/100 or 100/150 pen bitumen binder laid in accordance with BS594987	Series 900: Clause 912
Binder Course	60mm Compacted Thickness of AC20 dense bin 40/60 or 100/150 pen bitumen binder laid in accordance with BS594987	Series 900: Clause 906
Basecourse	-	
Sub-Base	320mm of Type 1 Unbound Sub-base or Cement Bound Granular Material (CBGM)	Series 800
Sub-Grade	>=2.0% CBR	
Comments	Typically, construction shall be used where there is regular vehicular overrun and pavement parking, for example commercial High Streets and streets where regular footway parking is known to occur. D400 utility lids must be used within vehicular drive crossings and heavy duty footways unless otherwise agreed in writing.	

Table 11-12-G - 'Industrial Estates' Footway and Cycleway

Layer	Material	MCHW Specification
Surface Course	40mm Compacted Thickness of AC10 close graded 70/100 or 100/150 pen bitumen binder laid in accordance with BS594987	Series 900 : Clause 912
Binder Course	60mm Compacted Thickness of AC20 dense bin 40/60 or 100/150 pen bitumen binder laid in accordance with BS594987	Series 900 : Clause 906
Basecourse	120mm Compacted thickness of AC32 dense base 40/60 laid in accordance with BS594987	Series 900 : Clause 948
Sub-Base	280mm of Type 1 Unbound Sub-base or Cement Bound Granular Material (CBGM)	Series 800
Sub-Grade	>=2.0% CBR	
Comments	Specification for use in Industrial Estates where commercial vehicles operate and where overrun and pavement parking are likely to occur. Footway Crossings on Industrial Estates and other areas subject to regular HGV traffic shall be built with full road construction to match adjacent carriageway (See Standard Detail A2) D400 utility lids must be used within vehicular drive crossings and industrial estate footways unless otherwise agreed in writing.	

h. Binder course that is not to receive surface course within three days of laying shall be sealed with sealing grit 1-3mm. The sealing grit shall be spread evenly and brushed into all areas.

i. Footway crossings on Industrial Estate and other areas subject to regular HGV traffic shall be built with the full road construction of the adjacent carriageway. (See Standard Detail A2)

j. All footway Sub base shall be inspected by and approved by the Engineer prior to the Binder-Course being laid. The surface of the sub-base shall be laid to +/- 6 mm tolerance of line and level.

k. Prior to the laying of Surface-Course the Binder-Course shall have been thoroughly cleaned using a pressure washer. Where the Binder-course has been laid for less than three days including the day it was laid the surface course may be laid without the use of a Tack-coat. Where the Binder-course has been laid for more than three days including the day it was laid a Tack-coat K1340 or equivalent in accordance with Clause 07-19 shall be applied using a sprayer, which shall give a minimum of 85% coverage at 0.5Lt per m² coverage.

l. The Surface-Course shall be laid to provide a smooth flowing alignment and shall be within +/- 6 mm of the agreed line and level.

m. The Surface-Course shall be compacted using a roller of minimum category 700-1300 Kg/per m roll. Vibrating-plate compactors shall only be used as a finishing aid.

n. Where 6 mm Dense Surface Course is to be laid particular care will need to be taken with weather conditions due to the materials being sensitive to adverse weather conditions when being laid. Compaction shall be completed before the minimum rolling temperature of 85°C is reached. The material on site shall have a minimum temperature of not less than 110°C prior to being laid.

o. The Engineer may require surface testing for irregularities at locations identified by the Engineer. This shall be undertaken using a 1.5 m straight edge, placed parallel with or at right angles to the footway edges. The maximum deviation of the surfaces below the straight edge shall be :-

a. For Surface-Course 3 mm
b. For Binder-course 6 mm
c. Where these allowable deviations are exceeded, the area shall be made good as required by the Engineer.

p. Where any surfacing is found to be defective the minimum patch shall be 4 m in length, for the full width of the path. If multiple areas have failed or are defective the Engineer may require multiple patches to be joined into a single area to be repaired. In extreme cases the Engineer may require the whole of the path to be resurfaced.

11-13 Tactile Paving

a. All tactile paving shall be laid in accordance with the latest national guidance and any superseding advice. The current guidance is:

b.

- DDA - *'Inclusive* Mobility', 2005, Department for Transport (UK Gov).
- Tactile paving - 'Traffic *Signs Manual Chapter 6 - Traffic Control*', 2019,
- *'Guidance on the use of Tactile Paving Surfaces',* 2007, DETR - Dept of the Environment, Transport & Regions, PPU 1622RB.

c. Tactile paving shall be used at pedestrian crossing points to identify the appropriate place to cross and at other locations required by the advice.

d. Where there is conflict between the DfT Guidance and this specification the DfT guidance shall take precedence. Any such matters shall be identified to the Engineer before works are undertaken on site.

e. Red blister paving shall only be used at controlled crossings, i.e. pelican, puffin, toucan signal controlled crossings and zebra crossings plus crossings points for pedestrian phases on signal controlled junctions.

f. Buff blister paving shall be used at all other crossings.

g. The Blisters shall be laid to ensure that the blisters are in line with the pedestrian's direction of travel in a straight line to the other side of the crossing. Blister crossings shall always be laid as a pair, see detail B3 for guidance.

h. The size of blister paving to be laid varies in relation to location but shall never be less than 1200 mm wide by 400 mm deep.

i. Tactile paving flags shall be 75 mm thick unless agreed otherwise by the Engineer. They shall be laid on a 15 mm mortar bed on 150mm of ST2 concrete. They shall be enclosed with a 150 mm x 50 mm pin kerb. The 3 mm joints between flags shall be filled with kiln dried sand comply with BS EN 16236 & BS EN 933-1.

j. The minimum size of flag to be laid shall be 33% of a full flag. Where part flags are laid the flags may be staggered but the line of blisters shall be unaltered.

k. Tactile Corduroy / Hazard Warning Flags shall be laid two flags wide from one side of the path to the other as required by the Guidance.

l. Cycleway Paving / Tramline Paving shall be laid in accordance with the guidance and with the ribs in the direction of travel for cyclists.

m. Segregated Cycleways and Footpaths shall have an approved demarcation between pedestrian and cycle lanes. This shall be in accordance with the Guidance.

n. All tactile paving units shall be hydraulically pressed and comply with the requirements of BS EN 1340

11-14 Pin Kerb Edgings

a. Pin kerb edgings shall generally be 50 mm x 150 mm x 900 mm flat topped pre-cast concrete, complying in all respects with BS EN 1340. The pin kerbs shall be wet laid to line and level in ST2 concrete of no less than 30 mm slump. They shall have a minimum of 100 mm of ST2 concrete bed, but in locations subject to heavier than normal domestic use the Engineer may request a thickness of 150 mm. The backing shall extend to 66% of the height of the pin kerb. The pin kerbs shall be inspected by the Engineer before further works are undertaken. The depth of the concrete haunch shall be such that it is possible to lay the full depth of binder layer and surface course over the concrete haunch.

b. Timber edgings may be permitted is certain locations subject to the prior written approval of the Engineer. They shall be 3000 mm x 150 mm x 40 mm, of treated / tantalised timber. The use of plastic or recycled units may be substituted with the prior written approval of the Engineer. They shall be supported every 1m with a wooden peg attached with 75 mm galvanised nails or suitable screws. The edgings shall be laid to line and level and inspected by the Engineer before moving to the next stage.

c. In some locations, to retain ground behind a footpath the Engineer may request the use of oversized pin kerbs. Generally, these will be 50 mm x 300 mm x 900 mm flat topped pre-cast concrete complying in all respects with BS EN 1340, they shall be wet laid in ST2 concrete of no less than 30 mm slump to the agreed line and level. They shall have a minimum of 150 mm of concrete bed. The backing shall extend to 75% of the height of the oversized pin kerb. They shall be inspected by the Engineer and any subsequent work will be undertaken ‘at risk’ if undertaken in advance of the formal approval of the Engineer.

d. Where pin kerbs are to be cut, no unit shall be less than 30% in size of a full unit when cut. When going around radiuses of less than 10 m radius, the pin kerbs shall be cut in half, and on tighter radii, they shall be cut in thirds.

e. On Industrial estates and in heavy trafficked locations, the pin kerb shall be replaced by a 150 mm x 150 mm concrete channel.

11-15 Hard Margin

A hard margin shall be provided where the carriageway boundary is adjacent wall or fence. The hard margin shall consist of Blockwork with pin kerb edging in accordance with detail A3.

11-16 Concreting in Cold Weather

a. Concreting shall stop if the ambient temperature drops below 2°C.

b. Before placing concrete, the Type 1 Sub base and shuttering shall be clear of snow and ice. The Type 1 and the shuttering shall be at a temperature above 0°C before any concrete is poured.

c. The initial temperature of the concrete shall be at least 5°C. And the poured concrete shall be covered to maintain a temp of 5°C until the concrete has reached 5N/mm^2 this

12-00- Road Markings and Traffic Signs

12-01 General

a. All traffic signs used in the works (including reflectors and road markings), whether permanent or temporary, shall be of the size, shape, colour and type prescribed for use in the most recent version of the Traffic Signs Regulations and General Directions (TSRGD).

b. The supply and installation of traffic signs and road markings shall follow the advice provided in The Traffic Signs Manual. The sections are:

- Chapter 1 introduction
- Chapter 2 primary route destinations in England by region
- Chapter 3 regulatory signs
- Chapter 4 warning signs
- Chapter 5 road markings
- Chapter 6 traffic control
- Chapter 7 the design of traffic signs
- Chapter 8 (part 1) road works and temporary situations – design
- Chapter 8 (part 2) road works and temporary signs – operations
- Chapter 8 (part 3) road works and temporary situations

12-02 Permanent Traffic Signs

a. Sign plates shall be constructed from sheet aluminium, extruded aluminium or extruded plank sections. They shall conform to BS EN 12899-1:2007. The use of composite materials e.g. Di-bond is permitted.

b. Sign plates shall all be reflectorised and comply with the UK National Annex to BS EN 12899-3:2007. They shall come with a ten-year manufacturer's guarantee. The supplier shall be a member of the Association for Road Traffic Safety and Management (ARTSM).

c. Signs on roads with a 40 mph or lower speed limit shall be erected on tubular steel posts, which shall be hot dipped galvanised in accordance with BS EN ISO 1461. Where appropriate posts shall have square base plate and plastic caps fitted.

d. Posts on roads with a speed limit greater than 40 mph shall be "passively safe" in accordance with the Council's 'Passive Safety Protocol' and with reference to "BS EN 12767– Passive safety of support structures for road equipment". Information on the classification and test methods shall be provided if requested by the Engineer.

e. All post foundations shall be appropriate for the wind loading of the sign plate to be mounted on the post. They shall comply with support foundations to BS EN 12899-1: 2007 and the UK National Annex.

f. On roads with a 40mph or lower speed limit illuminated signs shall have a wide based post with an access door in accordance with Section 13 - Road Lighting. Further

information can be obtained from the Road Lighting Unit whose contact details are listed in Section 1. For higher speed limits, passively safe posts should be considered in accordance with the Council's 'Passive Safety Protocol'.

g. Unless in a formally signed 20mph zone, sites where traffic-calming features are installed shall have the required traffic calming traffic signs to TSRGD Diagram 557.1, with an associated distance sub-plate if required, when road humps are introduced; these shall be provided and installed at the Developer's expense. The location of any such signs must be agreed by the Engineer in writing before installation. Signs may be attached to street lighting columns if agreed in writing by the Engineer prior to installation. The minimum height to the bottom of a sign shall be 2.1 metres above a footway, and 2.4 metres above a cycleway.

12-03 Electrical Supply Provision to Illuminated Signs

Details of electrical supply provisions to illuminated signs are provided in Section 13 – Road Lighting.

12-04 Temporary Traffic Signs

a. Any design required for temporary traffic signs shall be carried out by the Developer or his Contractor and submitted to the Engineer for approval in writing and a Licence obtained prior to any signs being installed on site. Temporary signs must comply with Schedule 13 of the TSRGD 2016.

b. See Section 26-03 for Developer Signs

c. Temporary Signage shall be relocated or removed upon request by the Engineer or within 6 months of the final property on the development being completed (ready for occupation).

12-05 Permanent Road Markings and Temporary Markings

a. Unless otherwise requested by the Engineer, permanent white road markings shall comply with the requirements of the following clauses.

b. The material type shall be thermoplastic material, complying with BS EN 1463-1 and shall be either extruded or screen applied.

c. All markings shall be retro-reflective; they shall have glass beads mixed into the thermoplastic before application and shall contain a minimum of 250g per m^2 of line to provide anti-skid and reflectivity.

d. All road markings shall be laid in accordance with BS 3262-3.

e. The exact colour of "yellow" lines will be dependent on location. They shall generally be "lemon" to BS 1436 and BS 4800. In conservation and environmentally sensitive areas "Primrose" to BS 1436 and BS 4800 may be requested.

f. Road markings shall be laid on dry clean roads to BS 3262-3.

g. Road markings applied to block paving shall have a proprietary bonding agent applied before thermoplastic lines are applied. (e.g. bondit-45th)

In locations where only a short length of lining is required, the use of thermoplastic tape may be permitted at the Engineer's discretion. This shall comply with BS EN 1463-1. The surface shall be clean, pre warmed and dry. The tape shall be fully melted onto the surface. The prior written approval of the Engineer shall be sought for any use of thermoplastic tape.

h. The use of blackout / masking thermoplastic tape shall not be utilised unless prior approval in writing by the Engineer is agreed

12-06 Permanent Reflective Road Studs and Crossing Studs

a. Reflective road studs to BS EN 1436 that shall have received statutory type approval shall be used. A sample of the studs to be used shall be submitted to and approved in writing by the Engineer prior to work commencing on site.

b. Road studs shall be fixed in strict accordance with the manufacturer's instructions.

c. Only one type of stud shall be used in a particular location in any one carriageway.

d. At controlled crossings stainless steel or aluminium pyramid studs with a grooved top surface shall be used, they shall be 100mm x 100mm square and have a shank no shorter than 70mm. They shall comply with Schedule 6 of the Traffic Signs Manual, Road Markings. The studs shall be spaced at 600mm centres.

e. Bitumen grout to BS 8442 shall be used for the installation of road studs. The bitumen used for stud fixing shall be Bitumen 60% to 80% Pen of 25-30 with Limestone filler 80 – 90% 75-micron sieve and a softening point 85°C.

f. Stick-on type road studs are not suitable for permanent installation unless agreed in writing by the Engineer.

12-07 Street Nameplate Signs

a. Street nameplate signs shall be square sectioned steel post and tray (recess) type, black in colour with 'Helvetica medium' text, with the principal street name being 89mm upper case lettering and subsequent wording such as "Leading to…" a maximum of 40mm in height.

b. All letters shall be black on a non-reflective white background with only well-known abbreviations such as Ave., Cres., St. , Tce being used. A cul-de-sac symbol may be added and no other symbols are permitted.

c. The length or the nameplate should not exceed 1250mm and should be no more than 225mm high for single line text and 375mm high for double line text

d. Posts should be 1450mm in length and set in 450mm cube of concrete with a deformed end or other mechanical fixing method to prevent the posts from being pulled out of the ground. The sign should be mounted approx. 1 metre above ground level with at least 600mm to the bottom of the plate.

e. NYC will not accept liability for bespoke street nameplates typically attached to stoneplinths or entrance pillars unless agreement is reached on commuted sums. These nameplates and the supporting structures remain the liability of the housing developer or their management company. The Council reserves the right to erect a standard street nameplate as necessary within the highway where problems are arising.

f. The Developer shall ensure street name signs are agreed with the Council's Street Naming and Numbering Team prior to the occupation of any dwellings.

g. The Street Name shall be provided in accordance with designated name given by the Street Naming Authority and shall be installed by the Developer or his Contractor.

h. The signs shall be placed in a location to be approved in writing by the Engineer prior to installation. They shall not obstruct visibility at road junctions or be an obstruction to pedestrians.

i. The Street name Plates shall be installed prior to the occupation of the first house in each street. The use of any temporary street nameplate sign shall be agreed in writing by the Engineer prior to installation.

13-00- Road Light and Electrical Equipment including Illuminated Signs and Bollards

13-01. Street Lighting Design

a. The Street Lighting Asset Management Plan for North Yorkshire provides detailed information regarding the Design and Detail of Street Lighting systems. A list of approved materials is also available. Both documents can be obtained via request by emailing roadlighting@northyorks.gov.uk.

b. Street Lighting Designs must be undertaken by suitably competent lighting design consultants that are registered with the Institute of Lighting Professionals (ILP), and must be approved by the NYC Street Lighting Department. Detailed plans coming forward via this route are required to be submitted to Roadlighting@northyorks.gov.uk for approval. A fee will be charged for the Assessment.

c. The Council's Electrical Team can undertake any street lighting design and any electrical design associated with the installation of illuminated traffic signs, bollards, beacon poles or feeder pillars. A quotation for Design, or Design and Build, can be obtained from the Team on request by contacting them by email. Roadlighting@northyorks.gov.uk. The fees applicable for design will vary depending on the size and complexity of the development and estimates can be obtained from the NYC Electrical Engineering department.

d. Where the Council's Electrical Team have been commissioned and subsequent payment has been made to provide that service, the design will automatically be accepted as being to adoptable standard and will not require a design review and subsequent approval which can save the developer time and costs.

13-02. External Document Reference

a. Each category of road, street, footpath and cycle track etc. will have its own specific requirements for road lighting which will affect the level of lighting to be provided.

b. Street Lighting Designs must comply with the current edition of the following standards at time of design approval:

- BS5489-1: Design of Road Lighting - Part 1: Lighting of Roads and Public Amenity Areas – Code of Practice
- BS EN 13201-2: Road Lighting – Part 2: Performance Requirements
- BS EN 13201-3: Road Lighting – Part 3: Calculation of Performance
- BS EN 13201-4: Road Lighting – Part 4: Methods of Measuring Lighting Performance

- BS EN 13201-5: Road Lighting – Part 5: Energy Performance Indicators

c. Street Lighting Designs must comply with the current edition of the following standards at time of design approval:

- ILP Professional Lighting Guide PLG02: The Application of Conflict Areas on the Highway
- ILP Professional Lighting Guide PLG03: Lighting for Subsidiary Roads
- ILP Professional Lighting Guide PLG23: Lighting for Cycling Infrastructure
- ILP Technical Report TR25: Lighting for Traffic Calming Features
- ILP Technical Report TR30: Passive Safety – Guidance on the Implementation of Passively Safe Lighting Columns and Signposts
- ILP General Publication GP10: Safety During the Installation and Removal of Lighting Columns and Similar Street Furniture in Proximity to High Voltage Overhead Lines
- The Electricity at Work Regulations
- Current Edition of the IET Wiring Regulations

13-03. Passive Safety

a. Where the traffic speed is 40 mph, or above, a passive risk assessment should be undertaken in line with ILP Technical Report TR30: Passive Safety – Guidance on the Implementation of Passively Safe Lighting Columns and Signposts to determine any requirements for the use of passively safe equipment and determine the appropriate class of passively safe equipment.

b. Further to the above the following documents shall be taken into consideration for any passive safety installations.

- BS EN 12767:2019 Passive safety of support structures for road equipment, requirements classification and test methods.

- Passive Safe UK Guidelines for Specification and use of Passively Safe Street Furniture on the UK Road Network.

c. To provide electrical disconnection and ensure safety in the event of a vehicular collision with passively safe lighting equipment, all passively safe equipment shall utilise a suitable disconnection system for the specified column type.

13-04. Electrical Supply Provision to Street Lighting and Illuminated Signs

a. Each street lighting column and illuminated sign shall have a 230v 50 hertz mains electricity supply provided by the local DNO or IDNO. Any negotiation with the DNO or IDNO shall be the responsibility of the main contractor. Consultations with electricity suppliers should be done well in advance.

b. On some sites, it may be necessary to connect to a streetlight, or to get a supply to a single point/feeder pillar, from which a fused looped electrical distribution system could then be derived. Such a system must meet all current legislation and be approved by the NYC Electrical Engineering Team in writing before work commences.

c. Black service ducts for DNO/IDNO services cables may be required. Such ducts shall be installed to the relevant DNO/IDNO specification.

d. Where an IDNO has been used, the cut out must be clearly and indelibly marked with the IDNO name and contact number clearly visible for emergencies.

e. The street lighting contractor shall be responsible for testing all electrical equipment, and all certificates shall be issued by the street lighting contractor or main contractor to the NYC Electrical Engineering Team for their written approval. This must be completed prior to any site inspection by the NYC Electrical Engineering Team.

f. The Developer or the Contractor shall provide an as-built drawing to the NYC Electrical Engineering Team that includes details of all cable routes, ducts and depths.

g. All points of supply (post or feeder pillar) fed from the mains shall have the suppliers name clearly visible for emergencies. They shall also have the NYC Column Number and the date of installation displayed; these shall be done on an indelible label attached to the wooden back board.

13-05. Design Submission

a. Where detailed design is submitted by an External Lighting Design Consultant then the Developer's lighting design proposals must be submitted for approval to the NYC Electrical Engineering department and shall include the following:

- Lighting design statement setting out the nature of the site including a copy of the lighting risk assessment used to determine the lighting classification.
- It should be noted the preferred design software for submission of lighting design calculations is 'Lighting Reality'.
- Reality Illuminance results where area calculation methods have been used in both RTMA and PDF format.
- Luminance calculations, where appropriate in both RTMR and PDF format
- Written equipment specification including all information needed to identify exact luminaire used, and to ensure installation will meet the requirements of this document.
- Lighting calculations – the cover of each lighting calculation shall identify which Street Light Asset numbers the lighting calculation is applicable to and the process which has resulted in the lighting class selection.

- Any drawings submitted should be in an AutoCAD format and PDF format and must be to an appropriate scale when printed.
- All public lighting cable networks fed from a feeder pillar, or a DNO/IDNO supply point within a column, should be fully detailed on a schematic diagram outlining connection type, cable size/type, and circuit protection to be provided. This information shall be accompanied by cable calculations in accordance with the current edition of the IET Wiring Regulations (BS7671) produced using a suitable proprietary electrical design software package (Trimble pro design preferred) with results and schedules made available for review.
- Site clearance drawings detailing Assets and equipment to remain and to be removed, including any work to affected sign plates, private underground and over ground cabling, DNO underground and over ground cabling, illuminated bollards, pruning/limbing required to facilitate works.
- Proposed ducting layouts detailing proposed duct routes and chamber locations.
- Proposed lighting and electrical layout detailing proposed works and any work to affected sign plates, private underground and over ground cabling, DNO underground and over ground cabling, installation of non-illuminated and/or illuminated bollards.
- Electrical detail drawings showing cabling and wiring schematics (which include identification of asset refs, fusing, cabling type and size, earth rods, joints, passive equipment connections), internal feeder pillar layouts (both new and refurbished) plus any other aspect of electrical, ducting or lighting equipment.
- Sign and post schedules shall be provided for all new illuminated and non-illuminated traffic signs that form part of the detailed scheme design.
- Assets under overhead lines shall be checked for clearance with the DNO and National grid. The guidance within the Institution of Lighting Professionals General Publication GP10; Safety During the Installation and Removal of Lighting Columns and Similar Street Furniture in Proximity to High Voltage Overhead Lines should be considered.
- The designer may elect to combine site clearance, ducting layouts and proposed lighting and electrical layouts into fewer drawings where there is reduced detail needed for the Design.
- A designer risk assessment shall also be submitted.

13-06. Design Appraisal and Review

a. Failure to seek approval for the electrical and/or street lighting design will prevent any part of the proposed highway works obtaining technical approval and could result in significant delays or the development not being adopted by NYC.

b. The fee structure (available upon request depending on complexity and number of proposed assets) covers the costs of the NYC Electrical Engineering department to assess two submissions for technical approval: the initial submission and one subsequent re-submission.

c. Where the Developer submits an amended electrical and/or street lighting design for a third time, an additional fee, to that of the original fee, will be charged for that submission (and each subsequent submission).

d. Additional submission fees are to be advised. An hourly charge out rate will be applied (with a minimum of four hours charged). A quotation will be provided, which will need to be agreed in writing and paid by the Developer, prior to additional approval work being carried out.

e. Due to the fast technical advances of LED technology, approved drawings shall expire 2 years from date of approval.

f. Where a Developer requests the use of heritage, contemporary or decorative style equipment or any street lighting equipment that is not of a standard nature then NYC are likely to require a Commuted Sum to assist with future replacement and maintenance costs.

g. North Yorkshire Council has published Commuted Sum advice and process guidance on its website Additionally, advice on commuted sums is available from the 'Association of Directors for Environment, Economy, Planning and Transport' (ADEPT). ADEPT who have published a guidance document on the subject, entitled 'Commuted Sums for Maintaining Infrastructure Assets' (this is available through the website www.adeptnet.org.uk).

13-07. Construction of Street Lighting Works

a. Competence of operatives or contractors will be verified through the National Highways Sector Scheme 8 (HERS) as applicable.
b. At any point during the installation phase NYC inspectors can verify NHSS8 compliance via site inspections.
c. The installation of new street lighting equipment must take into account the need to light phases within a development that are occupied or require access by residents.

d. The Developer shall be responsible for the implementation of all work required in the removal, replacement or re-siting of all existing electrical equipment made necessary by the development.
e. No existing street lighting shall be switched off, relocated, dismantled or removed without prior written approval by NYC through the HDM. This approval shall normally only be granted if the Developer can provide evidence that arrangements have been made for either immediate installation and energising of new equipment or the immediate provision and energising of temporary lighting.
f. Any relocation of equipment shall be at the Developer's expense, prior to adoption and shall be within design parameters. If a revised column location differs to that indicated in the approved lighting layout the Developer will be required to provide a revised lighting calculation and obtain technical approval prior to installation.
g. Where temporary lighting is installed, it must be approved by the NYC Electrical Engineering department and provide illumination to the standard that will be achieved by the permanent street lighting layout.
h. Temporary lighting shall not include the use of catenary cables crossing the carriageway and shall be positioned, such that it does not cause glare, distraction or discomfort to any highway users.
i. Under no circumstances are joints to private cable to be allowed. Any cable should be installed in full continuous lengths.
j. Emergency Repair – NYC or our agents holds the right to make safe, or cause to be made safe, any equipment that is dangerous (i.e., though vehicular impact damage etc.) and all reasonable costs shall be chargeable to the Developer. Standard repairs however will be the responsibility of the Developer until final adoption has been certified.
k. The Developer shall be responsible for the mitigation of light intrusion, such as putting up shields if required by the residents or North Yorkshire Council. This shall be at the developers cost.

13-08. Inspection of Street Lighting Installation

a. NYC Electrical Engineering department, they shall inspect the site to check:

- that the Assets have been installed in accordance with the design
- that the Assets have been installed in accordance with the manufacturer's instructions
- that the installation complies with NYC street lighting guidance
- that installation complies with the material specification and NYC S.L.A.M.P
- that the installation is compliant to the current version of BS7671

a. Following an initial site inspection any remedial actions shall be issued to the Developer/contractor via the HDM requesting adoption. When these remedials have been notified as fully complete back to the HDM, the NYC Electrical Engineering department shall re-inspect the site. The initial inspection and the second inspection shall not be charged. The Council reserves the right to charge the developer for any additional visits required as result of non-completion of reported defects.

13-09. Equipment Warranty and BS7671 Test Certificates

a. Any electrical equipment that has a warranty period remaining, at the time of adoption is the Developers responsibility to have that remaining warranty transferred to NYC.

b. The following certificates will be required prior to the issue of a Final Certificate:

- A 30-year column/sign pole Design Life Expectancy Certificate, which will show that the column has more than 50% of its residual life remaining. If the column has less than 50%, then it will have to be replaced at the Developers expense.
- An Electrical Test Certificate that is valid for at least 2 years after adoption (as part of 6-year test cycle)
- Lanterns to have a minimum of 15 years residual life remaining after adoption. If the residual life is less, then the unit will have to be replaced at the Developers expense.
- Sign Lanterns to have a minimum of 10 years residual life remaining after adoption. If the residual life is less, then the unit will have to be replaced at the Developers expense.
- The Developer shall provide NYC with written confirmation, including a manufacturer's certificate, for any equipment that is subject to an extended warranty, which details the original warranty period and the amount of warranty remaining, at the time of requesting the 'Final' inspection.

17-00- Concrete and Mortar

17-01 Concrete Specifications

a. The requirements for the concrete grades shown in the Specification are for Class DS-1 conditions in accord with Table 2 of the BRE Special Digest 363 (2005). Where other than Class DS-1 conditions are encountered then the mix shall reflect the requirements of Table 2 of the above Digest. All concrete references relate to BS 8500 & BS EN 206.

b. Aggregates shall comply with BS EN 206 including the option to utilise all-in aggregates. The stated size shall be 20 mm unless otherwise stated.

c. The ratio of the combined or all-in aggregate to the cement for the most basic mixes shall be not more than 1:8 by volume or 1:10 by mass. No account needs to be taken of bulking of materials.

d. The concrete shall be batched mixed to meet the requirements of the crushing strengths as detailed within this specification. The use of hand mixes shall not be permitted in any works offered to the Local Highway Authority for adoption.

e. The surface finish of the installed material shall comply with Clause 2602 Ss9 of the SHW.

f. The Engineer may require the developer to undertake compressive strength testing of Standard and Prescribed mixes. When testing is required, the strength target shall be as signified by the grade of concrete being assessed. In such circumstances all testing shall be in accordance with the relevant sections of BS EN 12390-1 & BS EN 12390-2.

g. Air entrained concrete – Where requested by the Engineer air entrained concrete shall be a designated mix reference PAV1 or PAV 2 to BS EN 206 -1. It shall have a 20 mm nominal size coarse aggregate and a 75 mm slump. It shall be delivered to site ready mixed.

h. The as placed concrete shall be compacted by hand or mechanical vibration means.

i. All formwork and reinforcement shall be free from dirt, standing water, snow or ice.

j. Concrete shall not be placed until approval of formwork or the foundation has been given by the Engineer. Concreting shall then be started within 24 hours or further approval must be sought. Fresh concrete shall not be placed against in-situ concrete which has been in position for more than 30 minutes. Concrete shall be laid and compacted as specified within 30 minutes of its discharge from the mixer and unless otherwise agreed by the Engineer shall not be dropped into place from a height exceeding 2 metres.

k. Concrete curing - Concrete shall be protected for seven days against the harmful effects of weather including rain, wind, sun and frost and from drying out. The method of protection used shall be subject to the written approval of the Engineer.

l. Construction Joints - the joint shall be formed by introducing a lath 25 mm square against the face of the formwork. The joints shall be raised as before and sealed. The remaining depth of concrete shall be roughened in order that the two faces adhere.

m. Surface finish - the surface finish of the installed material shall comply with Clause 2602 Ss9 of the SHW.

n. Round bar reinforcement Carbon steel for reinforcement shall comply with BS 4449.

o. Mesh reinforcement Steel wire mesh shall comply with BS 4483. Where required as a bottom reinforcement in surface water drain trenches it shall be 5.55kg/m^2 ref C636.

p. Tying wire shall be 1.2 mm diameter (no 18 gauge) stainless steel wire.

q. Waterproof underlay shall be approved 125µm impermeable plastic sheeting. Where an overlap of plastic sheeting is required, it shall be at least 300mm.

r. Formwork shall include all temporary or permanent forms required for forming concrete, together with all temporary supports. It shall be so constructed that there shall be no loss of material from the concrete. After hardening, the concrete shall be in position and of the shape, dimensions and surface finish required by the Engineer

s. Testing Compressive strength testing of Standard and Prescribed mixes shall not normally be required unless directed by the Engineer or his Representative. Where testing is required, the strength target shall be as signified by the grade of concrete being assessed. In such circumstances all testing shall be in accordance with the relevant sections of BS 1881-108.

t. Concrete mix comparison To BS 8500-1:2015 & BS EN 206

TABLE 17-01

Mix Type	Description
ST	Standardised Prescribed Concrete
C	Strength mix description
Gen	General Purpose Concrete
PAV	Paving Concrete
RC	Reinforced Concrete
Foam Concrete	Trench fill or Haunch fill concrete

TABLE 17-02

Mix type (as Table 17-01)						Strength at 28 days N/mm²
ST	C	Gen	PAV	RC	Foam	
					Foam rapid setting	2 to 4 at 24 Hours
1	6/8	0				8
2	8/10	1				10
3	12/15	2				15
4	16/20	3				20
5	20/25			20/25		25
				25/30		30
			1	28/35		35
			2	32/40		40
				35/45		45
				40/50		50

u. Standardised prescribed concrete mixes are a defined list of concretes within BS 8500 which are made to a prescribed quantity of materials as required by British standard. These concretes are fairly basic mixes.

v. General purpose concrete for use on houses and/or similar non-structural applications. The requirements specify a minimum quantity of cement and have low levels of durability. Any GEN mixes shall be Quality assured Plant supplied.

w. Reinforced concrete is a series of designated concretes that are used in concrete that will be reinforced, pre-stressed or contain embedded steel. These are designated concretes and include requirements for maximum water ratios and minimum cement content, these are useful in exposed or highly demanding conditions.

x. Paving concrete, give the concrete the necessary levels of freeze-thaw resistance for conditions experienced in the UK. And are suitable for almost all external domestic and structural roads, pavements and hard standings. These have specified cement and water content. But also require the mix to have a minimum air content. Which varies dependant on the maximum aggregate size used/specified.

y. Foam concrete, most suppliers use own brand names. Generally, 2/4 N/mm² has good compressive strength but has limited structural strength and is easy to dig through. It is recommended in HAUC specification for works by Utilities. It is very good at filling voids and needs no compacting.

z. On occasions the use of concrete with a colour pigment may be requested by the Engineer. The mix shall be agreed in writing prior to the work commencing.

17-02 Concreting in Cold Weather

a. Concreting shall stop if the ambient temperature drops below 2°C.

b. Before placing concrete, the Type 1 Sub base and shuttering shall be clear of snow and ice. The Type 1 and the shuttering shall be at a temperature above 0°C before any concrete is poured.

c. The initial temperature of the concrete shall be at least 5°C. And the poured concrete shall be covered to maintain a temp of 5°C until the concrete has reached 5N/mm^2 this usually takes 48 hours. This shall be done by covering the concrete using plastic or hessian, and the use of thermal insulation blankets if the overnight temperature is expected to drop below -2°C. The shuttering shall be left in place for 48 hours if the temperature remains low.

d. The Developer should also consider the use of heated water to ensure the mix is at 5°C and remains at that temperature until first set.

e. Any concrete found to have suffered frost damage shall be removed and replaced by the Developer.

17-03 Water for Concrete or Mortar

a. All water for use in mixing concrete and mortar shall be from the water mains only.

b. Anyone found using water from another unapproved source shall have that work condemned and removed from site.

17-04 Expansion Joints

a. For slabs of concrete in laybys roundabout overruns and other locations. The Developer shall agree with the Engineer the design details in writing prior to works on the slab commencing on site.

b. The design details shall consider the type of construction, the type of joint to be used, continuous mesh or full depth joints, or the use of tie bars together with any other relevant considerations.

c. Slabs shall be no longer than 6.5 metres without an expansion joint. Joints shall be installed at a rate of 30 x the slab thickness, such that a 200 mm thick slab should have joints at 6 metre centres.

17-05 Mortar Specifications

a. All mortar used below ground shall be composed of Sulphate Resisting Portland Cement to BS EN 197-1 and naturally occurring sand complying with the requirements of BS EN codes

b. The ratio of cement to sand shall be 1:3 by volume. No mix shall be dry, it shall have enough water to set at 24 hours. The incorporation of lime to form a cement**:** sand**:**

lime mix ratio of 1**:** 3**:** 0.25 may be used. Allowance shall be made for bulking of the sand in mortars.

c. The mortar shall be mixed by machine to a uniform colour and consistency, with the constituent materials being accurately gauged.

d. Mortar shall be made in small quantities only as and when required. Mortar that has begun to set or which has been mixed for more than two hours shall be discarded. No addition of water shall be permitted for any material after discharge from the mixer.

e. For Section 278 works and roads that are to be surfaced within 7 days, the Developer shall use a pre mixed rapid setting mortar which is HAPAS approved and shall reach first set in no more than 60 minutes. The mortar shall be capable of being trafficked in 2 hours. In some locations a faster set may be requested by the Engineer.

f. For Section 278 works all iron work shall have all voids filled with a rapid setting pre mixed concrete or resin which is HAPAS approved and shall reach first set in 60 minutes or less. The material shall be capable of being trafficked in 2 hours. In some locations a faster set may be requested by the Engineer.

g. Beds for bricks or Ironwork shall be no thicker than 25 mm of standard mortar.

h. Tub mortar shall comply with BS EN 998-2 and shall not have a retardant of more than 24 hours.

17-06 Grout for Cobbles

a. Grout for cobbles shall be 1 part Portland cement to 1 part building sand to 1 part grit sand. The mix shall be free flowing. Any proposed amendments to the prescribed mix shall be agreed in writing with the Engineer prior to grouting works commencing on site.

22-00 Bridges and Structures

22-01 Introduction

This section covers specific specification requirements for work on highway structures in North Yorkshire in addition to the Manual of Contract Documents for Highway Works (MCHW) and other related documents. In cases of ambiguity, this document shall take precedence.

22-02 Technical Approval Authority

The Technical Approval Authority (TAA) shall be the Bridges Team of North Yorkshire Council (NYC). In matters relating to bridges and structures all decisions shall be taken by the TAA in consultation with the Engineer.

22-03 Technical Approval (TA)

TA shall be in place prior to any bridge or structural works or preparatory works relating to bridges and structures commencing on site.

22-04 Standards

All works shall comply with the Design Manual for Roads and Bridges (DMRB) and MCHW respectively unless stated otherwise. Other relevant standards shall be referred to where applicable. The HAUC specification alone shall not be accepted for reinstatement works over structures throughout the North Yorkshire Council area.

22-05 Retaining Structures

a. Gabion baskets, hollow block and stone slab / PCC flag structures shall not be accepted as highway structures.

b. Cavity reinforced masonry structures intended to support the highway or land will not be accepted for adoption by NYC.

22-06 As-built Drawings and Health and Safety File

All relevant Health and Safety (H&S) information including As-built drawings (pdf and CAD drawings), quality assurance and relevant material information shall be issued to the TAA upon completion along with relevant design reports and calculations. The H&S file shall be compliant with the Construction Design and Management Regulations 2015.

22-07 Fixings

Unless agreed otherwise in writing by the TAA prior to structural works commencing on site all fixings shall be either galvanised or stainless steel with appropriate nylon isolating washers to prevent bi-metal corrosion where required. Screws must not be used for timber fencing.

22-08 Inspections

a. All works shall be inspected by a suitable qualified and experienced supervisor approved by the TAA; upon completion a "Certificate of Construction Compliance" shall be submitted to the TAA by the developer.

b. For structures to be adopted by NYC, the ongoing works shall be inspection by NYC staff. Two working days' notice shall be given for a specific time for each inspection required. If the element is not ready at the agreed time a further two working days' notice shall be required to allow the inspection. Example inspection items are listed below for each element of the works. Other inspections as identified by the TAA shall also be undertaken depending on the type and form of structure;

- Formation or sub-formation prior to blinding or placing fill beneath a structure
- Reinforcement checks prior to erecting formwork
- Pre pour check
- Post pour check
- Witness waterproofing pull of test and holiday testing

Fees for this shall be charged at the rates as shown on the NYC website for structures approvals, in the "Highways fees and charges" page https://www.northyorks.gov.uk/licensing-and-registration/road-licences/skip-permits/highways-fees-and-charges

22-09 Parapets and Fencing (MCHW Series 0300 and 0400)

a. Unless agreed otherwise in writing by the TAA prior to structural works commencing on site, all parapets shall have mesh infill panels. Solid panels shall be required by standards, or when considered appropriate due to equestrian use or to prevent climbing or damage to the parapets where mesh is not suitable.

b. All timber used as part of a structure shall be in accordance with MCHW Series 0300 and specifically shall be treated or naturally durable to ensure a 30-year service life for the relevant use class. Certificates and delivery notes shall be required as proof of the timber's origin and treatment process. Timber shall be cut and notched prior to treatment, cutting on site shall not be permitted.

c. For new structures, vehicle parapet systems installed onto concrete stringcourses shall have cradles cast into the stringcourse.

22-10 Service Ducts / Apparatus (MCHW Series 0500)

a. Arrangements for service ducts and other apparatus over structures shall be approved in writing by the TAA prior to the start of any works and included on AIP submissions. NYC reserves the right to require spare ducts to be installed at the developer's expense.

b. Under no circumstances shall apparatus be attached to the outside of a structure.

c. All proposed pipe/duct arrangements shall be compatible with the movement joints.

d. The ducts shall have marker tape laid on-top and that it must say what the service is and if possible, the undertaker who is using the duct. As-built drawings shall be issued indicating which duct is used or owned by statutory undertakers.

22-11 Drainage (MCHW Series 0500)

a. Plastic or reinforced plastic pipes over 900 in diameter are prohibited from use in any highway adoptable area within North Yorkshire.

b. All bridge decks shall have sub-surface drainage provided, details shall be issued to and approved in writing by the TAA prior to construction works commencing on site.

22-12 Backfill to Structures (MCHW Series 0600)

a. The use of recycled back fill material against structures is prohibited for structures to be adopted by NYC. The TAA shall not accept nor approve such material.

b. Granular fill material 6N/6P granular stone is the back fill material that shall be used.

c. Back of wall drainage shall be provided as follows:

- A dished concrete plinth shall be formed to support a semi perforated rigid pipe
- All sections of the pipe shall incorporate measures to enable rodding
- The semi perforated rigid pipe shall have a no fines concrete surround placed above.
- Above the no fines concrete, hollow concrete blocks filled with 10mm single sized gravel shall be used.
- Suitable rodding points and access shall be provided and agreed with the TAA.
- An outfall must be provided, discharge to a soakaway will not normally be permitted.
- On retaining walls and deep abutments, weep holes with a backfall shall be provided a minimum of 200mm above the back of wall drainage.

22-13 Surfacing (MCHW Series 0700)

a. Clause 943 Hot rolled asphalt (35/14 or 30/14) WTR2 with pre coated chippings. The PSV of the chippings shall be no less than 60 and greater if required by the Engineer. The HRA mix above shall be the only permitted material for surface course on all highway structures unless agreed otherwise with the TAA

b. On all concrete bridges decks / slabs and arch structures, hot rolled asphalt shall be used for base, binder and regulating course layers as appropriate. This includes verge, footway and cycleway areas unless agreed otherwise with the TAA.

c. It is permissible to use HDM binder and base coarse material over existing structures in the following circumstances when the total bituminous thickness will be 180mm or more;

- Masonry arches with more than 150mm of granular fill
- Precast culverts or pipes with more than 150mm of granular fill

d. Between all cement and bituminous bound layers, a tanker applied bond coat shall be applied without exception.

22-14 Kerb, footways and paved areas (MCHW Series 1100)

a. HRA 15/10 or 0/2 with pre coated chippings shall be used for all verges on highway structures subject to foot or cycle traffic. For verges not subject to foot or cycle traffic the verge fill may be used as the finished surface provided a brush finish is achieved.

b. Kerbs laid on bridge decks shall have the following bedding provision;

Bedding depth	
Greater than 75mm	ST4 concrete with 20mm aggregate
50-75mm	ST4 concrete with 10mm aggregate
10-50mm	1:3 mix of sulphate resisting cement and granolithic dust

c. Bridge deck kerb drains shall not be permitted except in exceptional circumstances subject to the prior written approval of the TAA through the TA process.

22-15 Hollow Piles (MCHW Series 1600)

All hollow piles used for construction of adoptable highway structures shall be driven with a pile shoe as per clause 1605 of the MCHW. Piles shall as a minimum then be filled with designed mass concrete mix.

22-16 Reinforced Concrete (MCHW Series 1700)

The following requirements for reinforced concrete shall be met;

- All external corners shall have 25x25 fillets formed, both above and below ground unless agreed otherwise in writing by the TAA.
- All blow/ bug holes on finished surfaces with a dimension greater than 3mm shall be filled

22-17 Waterproofing (MCHW Series 2000)

a. Bridge deck waterproofing shall be in accordance with Series 2000 of the MCHW.

b. The following testing of bridge deck waterproofing shall be undertaken to verify that the thickness and adhesion of the installed membrane conform to the criteria stated in the BBA Roads and Bridges Agrément Certificate.

- Cut out tests. 1 No. per every 50m^2 of membrane applied or proportion thereof.
- Pull-off tests. 1 No. per every 50m^2 of membrane applied or proportion thereof.

c. The requirements in b above represents the standard rate of testing. Additional testing may be required by the TAA if either of the properties being tested is non-conforming. The Contractor shall reinstate the test areas including primer if necessary. Areas that do not conform to the stated criteria shall be removed and re-sprayed.

d. The finished waterproofing membrane shall be "Holiday tested" for pinholes. Any imperfections detected shall be rectified.

e. For existing stone or brick arches receiving a concrete saddle, waterproofing may be omitted if;

- Stainless steel reinforcement is used
- A suitable designed concrete mix is used
- Concrete receives a bituminous bond coat prior to surfacing

f. Protection to bridge deck waterproofing shall be provided when granular fill is to be used above. The detail of which shall be agreed with the TAA

22-18 Bridge Expansion Joints and Sealing of Gaps

Any proposal shall be discussed and agreed in writing with the TAA

22-19 Brickwork, Blockwork and Stonework (MCHW Series 2400)

a. All brickwork used for structures shall be Solid Class A Engineering bricks unless agreed otherwise with the TAA. Any concrete brick or blockwork used either above or below ground level shall have a minimum compressive strength of 22.5N/mm^2.

b. All ties and associated fixings shall be stainless steel. Unless agreed in writing by the TAA at AIP stage brick, block and stone facework should be built after concrete has cast. A propriety channel fixing system for brick ties shall be specified and cast into the concrete element. See NG2416 for further details.

c. The following mortar mix ratios shall be used, sand should be suitable selected and agreed in writing with the TAA prior to been used. A trial panel prepared at the developer's expense may be required by the TAA.

	Cement	Hydrated Lime	Sand
New engineering brickwork	1	0.25	3

Walls - Stone work and old brickwork	1	1	6
Arches – stonework and old brickwork	1	2	9

For work on listed bridges, a designed hot lime mix shall be used. The exact mix is to be agreed through the TA process, further details can be provided of example mixes for different structural elements. The use of NHL mortars is not permitted on North Yorkshire Council owned or to be adopted structures.

22-20 Specification and Design

a. Prior to any structural works including preparatory works commencing on site a full Specification shall be submitted to the TAA with the Design Certificate. The specification shall be based around the MCHW and include relevant appendices as required to supplement the MCHW.

b. All design information, calculations and reports including that for any precast elements shall be submitted to the TAA with the Design Certificate Prior to any structural works including preparatory works commencing on site.

22-21 British Board of Agreement Roads, Bridges Certificates and Kite Mark Certificates

a. Where any work, goods or materials are required to have a British Board of Agreement Roads and Bridges Certificate, only works, goods or materials so certified shall be used. The Developer shall in each case submit to the TAA a copy of the certificate prior to any use on site. Types of work, goods and materials subject to such requirements are listed Appendix -C of the MCHW.

b. The requirement for types of goods or materials listed in Appendix C of the MCHW to have a British Board of Agreement Roads and Bridges Certificate shall be satisfied by goods or materials having an equivalent Agreement certificate issued in any member state of the European Union, provided that the goods or materials covered by such a certificate offer in use levels of safety, suitability and fitness of purpose equivalent to those incorporated in the British Board of Agreement Roads and Bridges Certificate. This sub-clause applies also to works only insofar as means of carrying out such works are indivisibly associated with the goods or materials for which an alternative Agreement Certificate is proposed.

c. All products shall be CE/UKCA and kite marked with the certificate provided within the AIP submission.

26-00 – Miscellaneous Items

26-01 Bollards for use in the Highway

a. All bollard types and locations shall be agreed in writing by the Engineer before any work related to their installation commences. They shall be reflective. Unless agreed otherwise in writing by the Engineer the reflective material shall be red to the left of traffic and white to the right of traffic.

b. Bollards shall be Passively Safe Bollards, NAL retention sockets may be required. The type and manufacturer shall be agreed in writing by the Engineer prior to any bollard installation works commencing on site. NYC use the socketed Glasdon type in a Manchester Neapolitan Victory or Admiral depending on the location.

c. Removable bollards shall be used at Emergency Accesses. The type and location shall be agreed in writing by the Engineer prior to any bollard installation works commencing on site. Preferred is a Manchester type with a cover plate over the hole when the bollard is removed. The reflective band should be Red but Yellow may be permitted. A sample shall be provided for the Engineer if requested. Emergency Access Bollards shall be a padlock type with two sets of keys or a combination padlock and a cover plate. The keys / combination code shall be kept available on site once the bollards are installed and shall be handed to the Engineer on completion of the works on site.

d. NYC may require Bollards for Islands to be illuminated. The Engineer's decision in writing on this matter is final. Where appropriate non- illuminated bollards shall be a Retroreflective Rebound-able / Self-Righting Bollards on a black body and shall have a blue circle with white arrow or Opal Face. NYC preferred type is the SPS 3Sixty bollard and shall have reflective front and back. NAL sockets are acceptable for islands.

e. Where over-running of footways may occur the Engineer may request the use of Heavy Duty Bollards; they shall have reflective bands. The type and location shall be agreed in writing by the Engineer prior to any bollard installation works commencing on site. The reflective bands shall comply with paragraph 26-01a.

26-02 Obstructions and Loose Materials

a. No obstruction shall be permitted within 450 mm of the carriageway, measured from the face of the kerb. Obstructions include walls, fences of any type, hedges or any other planting, bollards, cabinets and other street furniture.

b. If there is no footpath, a Hard Margin shall be provided where there is an adjacent fence or wall.

c. A Hard Margin may be required where Water stop tap or Meter Boxes are located at the back of a kerb.

d. No obstruction shall be placed within a visibility splay except for those permitted by Section 3 or 7 of DMRB CD 123.

e. No obstruction higher than 900 mm in height shall be permitted in a visibility splay. This includes the 2 m x 2 m visibility splays from all driveways.

f. The siting of Street Nameplate Signs shall be agreed in writing by the Engineer prior to being installed on site. Where located within visibility splays, they shall not exceed 900 mm in height above the adjacent surface level.

g. No gravel or other loose material shall be laid within 2.0 metres of any part of the adopted highway.

h. There shall be no coping stones or other masonry or metalwork overhanging any part of the adopted highway. Any other obstructions overhanging any part of the adopted highway network shall be a minimum of 450 mm from the front face of the kerb. Canopies shall be a minimum of 450mm from the public highway. The clearance under any obstruction shall be a minimum of 2.1 metres above a footpath or footway and 2.4 m above a cycle path or cycleway.

26-03 Developer's Signs

a. Temporary Development Signs in accordance with Chapter 8 of the Traffic Signs Regulations and General Directions (TSRGD) may be used. The sign layout, the number of signs and their location shall be approved in writing by the Engineer prior to any signs being installed on site. A Formal application for these signs should be made to the relevant Area Office prior to any works on site starting. The payment of all fees and charges in accordance with NYC's published charges will be the responsibility of the Developer.

b. Temporary Development Signage to Diagram 2701 shall be kept to a minimum i.e. a maximum of 3 for each site or as directed by the Engineer. It is the responsibility of the Developer to erect, maintain and remove the signage.

c. The directional signs shall preferably be installed on an existing post or lamp column (following approval from the Street lighting department). They must not be placed on a post which has an existing regulatory sign (i.e. speed limit, give way, one way, parking restriction etc.) The mounting height must be 1.8m over a verge, 2.1m above a footpath or 2.4m above a cycleway and fixed using stainless steel banding.

d. The use of cable tied plastic or cardboard signs shall not be permitted under any circumstances within any part of the adopted highway.

e. Any signs placed within the adopted highway without the formal written permission of NYC shall be considered illegal signs. Any such signs may be removed by NYC. In such circumstances, NYC may charge a fee for each sign removed in accordance with NYC's published fees.

f. Housing Development Advertising / Marketing Signs and flags on or adjacent to the Adopted Highway will require Planning Permission from the Local Planning Authority.

26-04 Construction of Retaining Walls near the Highway

a. The siting of any retaining walls shall be such that they avoid the angle of repose of fill supporting the highway or supporting materials adjacent to the highway.

b. Any retaining wall located near any part of the adopted highway and retaining material 600 mm or more in height shall be classed as a "Structure". The design and detailing of Structures are subject to a formal approval process by NYC for which a fee is charged in accordance with NYC's published fees.

c. The siting of foundations for adjacent structure or properties beneath the adopted highway may be permitted by NYC. The prior written approval of the Engineer shall be sought for any such foundations. Permission may be granted where it can be shown the foundation will not interfere with Statutory Undertakers' OR Street Lighting Apparatus. A commuted sum may be charged for such foundations.

26-05 Traffic Lights for Junctions and Pedestrian Crossings Including Pedestrian Railings

a. Developers should note that NYC will only accept traffic signal installations by the following companies:
- Swarco
- Yunex Traffic
- Telent

b. Should a Developer need to switch off a permanent traffic signal installation that is maintained by NYC please inform the NYC Traffic Engineering Team in advance – Tel. 01609 780780 / Email: traffic.signals@northyorks.gov.uk . The Developer may arrange for the switch off with the signal's maintenance contractor, which is currently Dynniq – Tel, 0345 6031433 / Email: switchouts@dynniq.co.uk .

c. Ducts for traffic signal cables shall be high density polyethylene, 100mm in diameter, orange in colour with a smooth bore. Ducts must have the text 'Traffic Signals' printed every 1 metre in length. The maximum bend in ducting should not exceed 45 degrees. Draw ropes shall be provided in the duct runs for pulling cables. The duct system is to be used exclusively for the traffic signals equipment and must not contain any other services. Ducting for electricity supplies and telecommunications shall be of the size and colour appropriate for the service. The ducts under the road shall have a concrete surround and shall have marker tape laid on top of the concrete.

d. NYC may require a PSTN connection to the signals controller. The developer must ensure that the telecommunication cables are provided into a feeder pillar or access chamber that is positioned close to the controller cabinet.

e. Tactile paving of the 'blister' type at signal-controlled pedestrian crossings must be red in colour and be set out in accordance with the national Guidance on the use of Tactile Paving Surfaces.

f. Any pedestrian barrier railings required near a junction or crossing point shall be set back 450mm from the kerb face and be 1100 mm high. It shall have staggered palings to allow visibility through the fence e.g. Visirail. Railings must be hot dipped galvanised and be in its natural colour or be in a colour specified by NYC. If a colour is required

railings will be coated and not painted. The type, colour and position must be agreed by the Engineer before installation.

26-06 Road Restraint Systems (Safety Barriers)

a. A road restraint system is a general name for vehicle restraint system or pedestrian restraint system used on the road.

b. The requirements for these items are given in National Highways document CD 377.

c. Safety barriers and vehicle parapets are designated vehicle restraint systems.

d. The containment level and length of a vehicle restraint system required are given by the 'Road Restraints Risk Assessment Process' (RRRAP) software tool specified in CD 377.

e. On application, the Council will determine the appropriate level of assessment i.e. The RRRAP or North Yorkshire Council's own vehicle restraint system assessment tool.

f. Terminals shall be provided at each end of the safety barrier. For roads with a speed limit of 50mph or higher a class P4 energy impact absorbing terminal is required, otherwise a class P1 terminal may be provided.

g. Only vehicle restraint systems listed in the latest publication of the National Highways EN 1317 'Compliant Road Restraint Systems' document will be permitted.

h. All works must be carried out by fully qualified staff in accordance with Sector Schemes 2B and 5B and competent to do the works.

i. Any design alterations to an existing system must be undertaken by an appropriately experienced designer. Any relaxations or departures from standard shall be submitted to and approved in writing by NYC prior to any works on existing Road Restraint Systems commencing on site. Failure to comply with this requirement shall result in NYC undertaking emergency remedial works which shall be recharged to the developer.

26-07 Bus Stops

a. Bus stops should be considered in pairs on both sides of the road. The Engineer will confirm the circumstances where this is not the case. Drop crossing points should be provided adjacent to bus stops. These should be located in a safe location and be constructed in accordance with Standard Detail B3 or B4.

b. Bus stops may require a Bus Shelter and the developer should consult the Engineer at an early stage to confirm any bus stop improvements.

c. When a Bus Shelter is required, the developer will need to provide sufficient extra land to accommodate the Bus Shelter and provide a minimum 2.0 m wide footway past the shelter. The area of additional land will depend on the type of shelter to be installed

and shall form part of the land offered to North Yorkshire Council for adoption. Commuted Sum's will typically apply for Bus Shelters.

d. Bus Shelters shall not carry any advertisements unless the requirement advertisement consent has first been obtained.

e. Lighting for shelters in most cases can be provided from the nearest Street light, by means of laying a duct from the light to the electrical entry point on the shelter. The Developer must consult with NYC Road Lighting before starting the work.

f. Each bus stop will require a 79 mm diameter post to be hot dip galvanised with a metal base plate and plastic cap to be installed for the Flag and Time Table to be fitted to, the location shall be towards the back of the footpath. The flag mounting height shall be 2.1m on a footway or 2.4m on a cycleway/shared cycle/footway or otherwise agreed with the Engineer.

g. The Edging or Pin kerb will need to be raised to keep a 1 in 40 cross fall toward the carriageway.

h. If the Bus stop is to have a layby for the bus to pull into, it shall comply with DMRB CD 169 Section 5 - Bus Lay-bys unless otherwise agreed with the Engineer prior to the works starting.

i. The raised Bus stop kerbs shall be Kassel type only 160mm high type with transition unit at each end. (See clause 11-08 e).

j. 'Real-time bus stop infrastructure shall be approved by the Engineer.

30-00- Landscaping

30-01 General

a. The adoption of landscaped areas or grass verges other than grass service strips is not accepted by NYC. They shall be taken on by a maintenance company or other third party that has been approved in writing by the Engineer.
See Chapter 19 of the NYC Design Guide for further information.

b. Areas of land outside the adopted highway but within the ownership of North Yorkshire Council shall be landscaped in accordance with a design approved in writing by the Council.

30-02 Topsoil

a. Topsoil shall comply in all respects with BS 3882 and samples shall be approved by the Engineer. Unless agreed otherwise in writing by the Engineer soil shall not be imported onto the site from another source. All soil shall be of good quality medium loam, free from stones over 50mm in size.

b. Areas to be grass seeded or turfed shall have no less than 150mm depth of topsoil.

c. Areas to be planted shall have a minimum of 300mm of topsoil.

30-03 Grass Seed

a. Grass seed shall only be sown at the appropriate time of year, and when weather and soil conditions are suitable. The seed shall be sown at a spread at a rate of 25-30g per m^2.

b. In rural locations, the grass seed shall be an appropriate approved mix with wild flowers included in the seed.

c. In urban areas the grass seed shall not contain Ryegrass but be a hard-wearing mixture.

30-04 Turfing

a. Turf shall comply with BS 3969. It shall not be laid on extremely dry or water-logged ground, frost and snow shall be avoided. If the turf is laid during dry weather, it shall be watered no less than every other day.

b. Turf shall be laid stretcher bond, and without gaps on well-worked topsoil that has been raked even.

c. The turf laid shall comply with the seed requirements of 30-03.

30-05 Planting

a. Any planting shall be agreed in writing with the Engineer prior to any landscaping works commencing on site start. (See appendix E)

b. Lateral clearance of any planting adjacent to the highway shall be in accordance with NYC Standard Hedge / Rail Offset detail that can be made available upon request.

c. All plants used shall comply with Appendix E and the NYC publication “Trees within New Developments in the Highway” (Appendix F).

d. Areas of general planting outside the highway shall not include species that may be predicted to grow over any part of the adopted highway network within one growing season.

e. Any trees or vegetation that are found to interfere with the normal use of any new or widened path, cycle track or road shall be removed unless agreed otherwise in writing by the Council. The work shall be undertaken at the Developer’s expense and to the Engineers satisfaction prior to the area being opened to public use. Attention is drawn to Section 154 of the Highways Act 1980 and to NYC Guidance for cutting back overhanging foliage. See Appendix 19-2 of the NYC Guidance for further information.

30-06 Street Trees

a. Planting of trees adjacent to or within the adopted highway shall be in accordance with the table below:

CARRIAGEWAY DESIGN SPEED (mph)	MINIMUM OFFSET REQUIRED FROM THE EDGE OF CARRIAGWAY TO THE CENTRE OF PROPOSED TREE (m)
20	1.0
30	1.5
40	2.0
50+	EARLY DISCUSSIONS REQUIRED WITH ENGINEER
MINIMUM OFFSET REQUIRED FROM THE EDGE OF A FOOTWAY/CYCLEWAY MUST BE NO LESS THAN 500mm TO THE CENTRE OF THE TREE	

b. When trees are permitted within the adopted highway, they shall be provided with root protection approved in writing by the Engineer prior to any landscaping works commencing on site. The root protection shall be either a tree root pit or a root barrier a standard detail can be made available upon request.

c. The type of street tree(s) to be planted within or adjacent to the highway shall be subject to agreement with an experienced landscape architect / Abhoriculturalist, together with a suitable maintenance protocol until the tree is established. Commuted Sums may be applied by the Local Highway Authority.

30-07 Deleterious Materials Adjacent to the Adopted Highway

No forest bark or other deleterious materials shall be placed adjacent to the highway (including service verges and footways) such that it could spread onto the highway. Care shall be taken when planting near the highway to ensure the level of soil and other deleterious materials is below the level of the adjacent pin kerb.