

WIRRAL COUNCIL

ADOPTABLE RESIDENTIAL ROADS SPECIFICATION

INTRODUCTION

This document is intended for Developers and their advisers to achieve acceptable standards of adoptable highway design and to ensure that highway safety is not compromised when access to residential developments is required within Wirral.

The Adoptable Residential Roads Specification applies to the construction of highway works for new residential developments in the Wirral Council area. Its scope includes new roads for adoption under Section 38 Agreements and improvements to the existing publicly maintainable highway under Section 278 Agreements and some S106 Agreements.

For further guidance on highway design, reference should be made to the 'Manual for Streets' published by Thomas Telford Publishing in March 2007, especially for lightly trafficked roads.

The Design Manual for Roads and Bridges (DMRB) is the nationally recognised design document for all new highway improvements on the Motorway and Trunk Road network within England. Volume 0 Section 1 of the DMRB further states how the DMRB can be used for access and junction improvements in other situations, including classified roads from residential developments and to the entire road network from commercial developments. Although it is not obligatory for Local Authorities to comply with the standards in DMRB, it is a longstanding practice within Wirral Council, along with most other Local Authorities, to adopt the DMRB as the basis of design standards.

It is recognised that, due to site conditions, it may be difficult to comply with this Adoptable Residential Roads Specification, particularly on urban or brownfield sites. Consequently, if the Developer presents an acceptable case with supporting evidence that explains why a layout that is not explicitly covered by these guidelines is being proposed, it will be considered if it meets other policies and objectives of Wirral Council as the Local Highway Authority (LHA) and the Local Planning Authority (LPA). The Developer must approach the LHA and LPA for early discussions to ensure that all matters are considered before any layout proposals are prepared. In these instances, the Developer must supply a concept proposal and full supporting details.

The Developer must start to consider the required details as soon as possible, and certainly before submitting a planning application. Otherwise, even if the development is granted planning permission, there is no guarantee that Wirral Council will agree to adopt any of the roads on the new development.

GENERAL SPECIFICATION

All highway works are to be in accordance with the 'Specification for Highway Works' (SHW), published by the HMSO as Volume 1 of the Manual of Contract Documents for Highway Works.

STANDARD DRAWINGS

All highway works shall be in accordance with Wirral Council's Standard Drawings and Development Special Details as listed at the end of this document. Safety Fences and Barriers shall be in accordance with Section 2 of 'Highway Construction Details' published by the Stationery Office as Volume 3 of the Highways Agency's Manual of Contract Documents for

Highway Works. Any works not covered by Wirral Council's Standard Drawings will require the submission and approval of scheme specific drawings.

1.0 LAYOUT DESIGN

1.1 DESIGN CONSIDERATIONS

1.1.1 General

The planning of new development roads, and the design and layout of buildings associated with them, should create a sense of space that provides a balance between acceptable levels of daylight, sunlight and visual privacy, whilst allowing for the natural surveillance of roads from the buildings they serve.

Roads serve two purposes:

- Firstly, as a means of getting from place to place: - "Travelling" roads.
- Secondly, as the origin or destination of a journey: - "Destination" roads.

On "Travelling" roads, vehicle traffic is dominant.

On "Destination" roads, consideration of the human environment takes priority and the needs of pedestrians, cyclists and residents are dominant.

The role of roads requires that designs for development areas make suitable provision to ensure that roads and road safety are an integral part of the design.

The design should produce an adoptable movement network at a reasonable cost that has an extensive design life and low maintenance implications for Wirral Council.

1.1.2 Basic Layout Principles for Residential Roads and Footpaths

Careful consideration of the development site in the context of the local road network is essential to ensure the identification of possible problems due to through traffic, high vehicle flows and speeds. Arrangements to control these should be designed into the development.

To avoid attractive routes for non-access traffic, the number and location of access points to the site, the characteristics of the site and the locations of major traffic generators or attractors within the site must be carefully considered.

The object of the design of any adoptable road layout should be to create the basis for safe, secure and attractive places for people to live and work.

1.1.3 Movement in Residential Areas

Measures to discourage non-access traffic and ensure speed restraint need to be balanced with the need to provide a layout that allows practical vehicular access for residents, visitors, deliveries, services and emergency vehicles. They should not be so complex that they cannot be navigated by visitors reasonably easily.

Access for pedestrians, cyclists and public transport should be conveniently located wherever possible

1.1.4 Access and Residential Roads

The design of residential roads should progressively indicate to drivers that they need to reduce speed and be aware that their priority as a road user is being reduced and that pedestrians and cyclists are being prioritised. This is achieved by road types that have different functions, characteristics and standards.

It is vital that certain standards are provided in the interests of road safety and future maintenance, but innovative and imaginative designs will be actively encouraged.

1.1.5 Emergency Vehicle Access

There are potentially conflicting design objectives in restricting access and vehicle speeds, whilst providing unhindered access for emergency vehicles. It is essential that the Merseyside Fire and Rescue Service is consulted at the earliest possible stage of the layout design.

Matching carriageway standards to the number of dwellings served and providing sufficient off-road parking will ensure emergency access to all properties is always possible.

1.2 ESSENTIAL FEATURES

1.2.1 General

The specification and characteristics of adoptable roads are based upon expected vehicle flows, which for ease are based upon the number of dwellings or units to be served.

1.2.2 Definitions and Characteristics

See Table 2 for a summary of the requirements for Adoptable Residential Roads.

1.2.2.1 Local Distributor Roads (Type 3)

On this type of road the vehicle is dominant.

- | | |
|---|--|
| • Take access from | Classified Distributors |
| • Give access to | Major Residential Access Roads
Minor Residential Access Roads
Shared Surface |
| • Serve | Up to 300 dwellings or
400 with transitional road |
| • Desirable Design Speed | 30mph (48kph) in restricted areas |
| • Minimum Carriageway Width | 6.75 metres |
| • Footway required on both sides | 2.0 metres min width |
| • If no pedestrian traffic,
then verges/service strip both sides | 2.0 metres min width |

1.2.2.2 Major Residential Access Roads (Type 4)

On this type of road, pedestrians are dominant.

- | | |
|-------------------------------|---|
| • Take access from | Classified Distributors
Local Distributors |
| • Give access to | Minor Residential Access Roads
Shared Surface
Private Driveways to individual dwellings |
| • Serve | Up to 200 dwellings with 2 connections to a Type 3 road or up to 120 with 1 connection |
| • Desirable Design Speed | 20mph (32kph) |
| • Minimum Carriageway Width | 6.0 metres |
| • Footway required both sides | 2.0 metres min width |

1.2.2.3 Minor Residential Access Road (Type 5)

On this type of road, pedestrians are dominant.

- | | |
|--|---|
| • Take access from | Classified Roads
Local Distributor Roads
Major Residential Access Roads |
| • Give access to | Shared Surface
Private Driveways to individual dwellings |
| • Serve | Min of 6, up to 100 dwellings,
but up to 20 may be Shared Surface |
| • Desirable Design Speed | 20mph (32kph) |
| • Carriageway Width | 5.5 metres |
| • Footway required both sides
where dwellings have access | 2.0 metres min width |

1.2.2.4 Residential Shared Surface

Designed to allow vehicles and pedestrians to use the same surface without segregation.

- | | |
|--------------------------|---|
| • Take access from | Classified Roads
Local Distributor Roads
Major Residential Access Roads
Minor Residential Access Roads |
| • Give access to | Private Driveways to individual dwellings |
| • Serve | Min of 6, up to 20 dwellings |
| • Desirable Design Speed | 15 mph (24kph) |
| • Minimum Width | 5.0 metres |
- It is essential that pedestrians are given priority of movement.
 - There must be intervisibility between pedestrians and vehicles throughout.
 - Each dwelling to have a private garage or dedicated parking space plus a visitor's parking space.
 - Car parking spaces to be clearly defined.

Types of Residential Shared Surface

Access Way

An informal cul-de-sac particularly suitable for open plan low to medium density housing. A strong physical definition must be provided between the shared surface and the carriageway from which it is served. This can be achieved by the provision of ramps.

The Developer should note that Wirral Council does not approve the use of block paving in ramps.

A turning head is usually required, preferably amorphous in design, i.e. having no determinate form, being irregular or shapeless.

Minimum kerb face of 100mm to delineate the hard and soft areas.

Services accommodated in an adoptable 2.0m wide grassed service strip. Where the service strip crosses hard paved areas, e.g. at private drives, it must be delineated by a stringcourse of flat-topped concrete edging. The Developer will be required to ensure, by means of a covenant or similar, that any form of open-plan layout will be protected, and that a grassed service strip will be maintained by the frontagers and kept free of any form of obstruction.

Mews Court

A formal cul-de-sac with minimal soft landscaping, suitable for higher density developments, characterised by dwellings around a central space, with each dwelling provided with private parking spaces as detailed above.

Standard house types are unlikely to be suitable, in view of the need to maintain privacy, parking and curtilages.

As with an Access Way, it is essential that a strong physical definition be provided between the shared surface and the carriageway from which it is served.

The shared surface should be at one level and services should be located in a defined strip 2.0m wide along one side of the shared surface. The service strip must be at least 500mm from adjacent buildings.

1.2.3 Horizontal Alignment Changes

Junctions

There is a general presumption against the construction of new junctions and accesses onto Class A and B roads. Use should be made of existing side road junctions where these are available, with improvements where necessary. In special circumstances, where favourable consideration is given to the construction of a new access onto such roads, it shall be designed in accordance with the Highways Agency TD 42/95 for priority junctions.

Junctions onto C class roads and busy urban unclassified roads should normally be designed in accordance with the above standards, but these requirements may be relaxed in special circumstances.

It is important that drivers emerging from minor roads have adequate visibility in each direction to enable a safe manoeuvre to be made. Visibility splay envelopes are made up of two elements, the X distance and the Y distance. The X distance is the distance back down the minor road from the junction with the major road. An X distance of 2.4m allows for one vehicle to safely negotiate the junction. Any subsequent vehicles must also pull up to the junction and look along the major road before undertaking the turning manoeuvre. A greater X distance of 4.5m or 9m allows subsequent vehicles to see traffic along the major road before reaching the give way, which allows for greater capacity.

An X distance of 2.4m is considered sufficient for most residential access roads to ensure safe manoeuvres. However, on heavily trafficked roads, this distance may need to be increased to 4.5m, to allow for following vehicles to see along the priority road.

The Y distance is the level of forward visibility that that can be achieved and should be at least equal to the minimum Stopping Site Distance adjusted for bonnet length (SSD).

The Developer must demonstrate that visibility splays are achieved on either land over which highway status exists or land under the control of the Developer.

If the appropriate DMRB requirements cannot be achieved but existing visibility can be improved to the benefit of both existing and development traffic, a Safety Audit will be required to determine if the development provides a net safety benefit.

Pedestrian visibility is beneficial where a footway is likely to run along the frontage of a development that proposes a new driveway or access, particularly where there is expected to be high levels of pedestrian movement. Ideally therefore, pedestrian visibility splays shall be incorporated by ensuring adjacent site boundaries remain free of obstructions in excess of 0.6 metres in height.

Table 1 provides a summary of typical visibility requirements for a highway priority junction.

Dropped kerb pedestrian crossings with tactile paving must be provided at all junctions across the mouth of the non-priority road, where footways have been provided.

Priority junctions on Residential Access Roads should have kerb radii no less than 6.0m, assuming that junctions are at 90 degrees. Smaller radii may be considered if a swept path analysis shows that they are suitable, that vehicles will not over-ride footways and that there are no adverse effects on junctions.

Residential Road / Shared Surface junctions should have kerb radii no less than 4.5m, assuming that junctions are at 90 degrees. Smaller radii may be considered if a swept path analysis shows that they are suitable, that vehicles will not over-ride footways and that there are no adverse effects on junctions.

Mountable shoulders may be used at Shared Surface junctions where large vehicle manoeuvring space is required.

Where swept path analysis of large vehicles results in the use of the whole width of the carriageway to manoeuvre, it is important to ensure that forward visibility is provided to enable this to be achieved safely. At no time should it be necessary for cars and smaller vehicles to have to make use of the whole width of the carriageway to make similar manoeuvres.

The transition to the surfacing of a shared surface should be at the tangent point of the junction radius kerbs, with a shallow ramp between 900mm and 2000mm long. This ramp lifts the carriageway to the level of the shared surface.

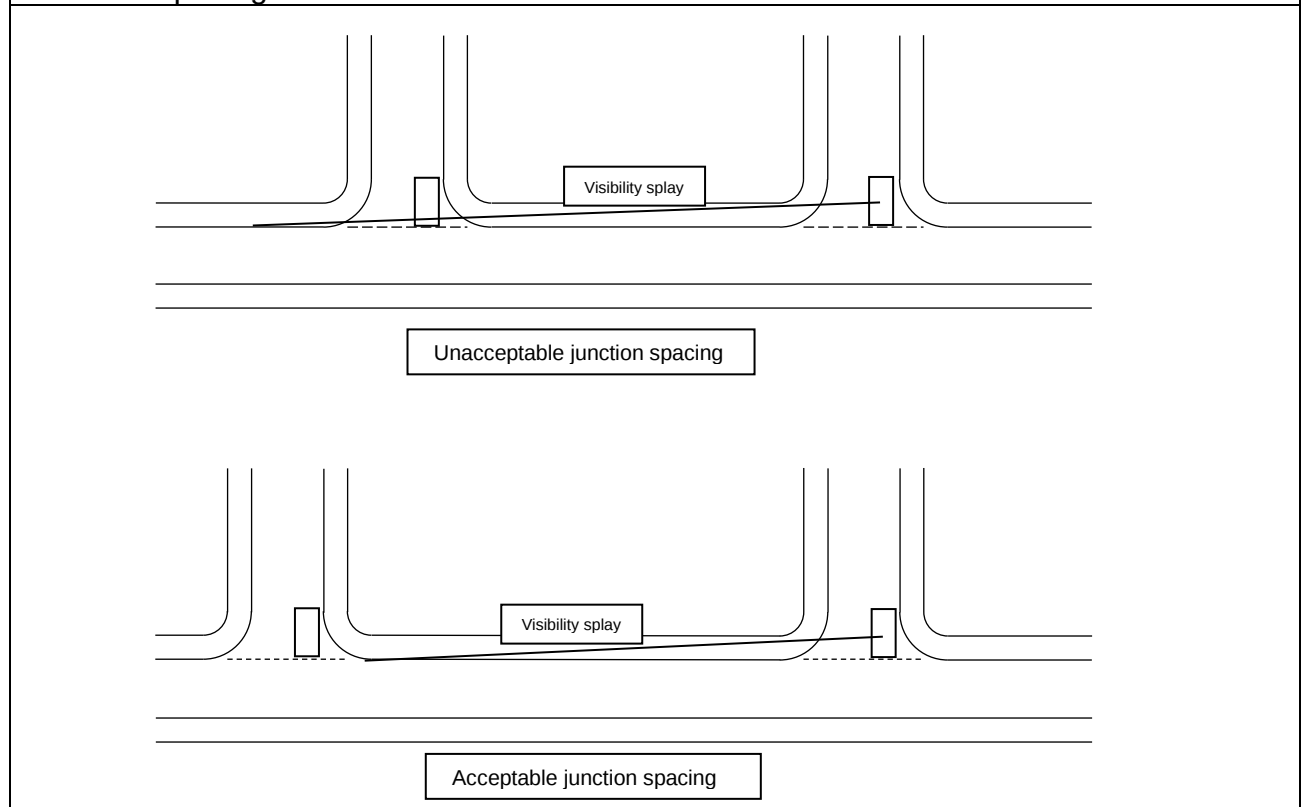
Junction spacing

Road junctions on the same side of a road must be spaced so that a vehicle waiting to enter the main road at one does not interfere with visibility for a vehicle waiting at another, as shown on Figure 1. Reference should be made to Table 1 for spacing.

Table 1
Junction Details

Major Road	Minor Road	Min Kerb Radius (m)	Min Junct Spacing (m)		Visibility X,Y (m)
			Adjacent	Opposite	
Classified or Local Distributor Road	Any Other Road	10.5	80	40	4.5 x 43 (at 30 mph/48kph)
Major or Minor Residential Access Road	Major or Minor Residential Access Road	6	25	12	2.4 x 23
	Shared Surface Road	4.5	25	10	2.4 x 23
	Private Drive	N/A	N/A	N/A	2.4 x 23
Shared Surface	Shared Surface	4.5	Intervisible		2.0 x 17
	Private Drive	N/A	N/A	N/A	2.0 x 17

Figure 1
Junction Spacing



Crossroads

Priority-controlled (Give Way) crossroads should be avoided but may be used with very low vehicle flows and/or speeds, or where a raised junction is used for restraining vehicle speeds.

When a crossroads cannot be avoided, Developers should normally provide an appropriate form of control such as a roundabout. Mini-roundabouts will not normally be acceptable to provide access to a development unless they form part of a more comprehensive traffic-calming scheme that is either required to reduce the development's impacts or that has previously been identified in initial discussions.

Staggered Crossroads

May be used in low vehicle flow and/or speed situations and should have a right / left stagger of at least one carriageway width.

Roundabouts

Should be designed in accordance with the DMRB TD16/93 Geometric Design of Roundabouts and are preferable to priority junctions in residential areas, especially on Local Distributor Roads.

Roundabouts should have a kerbed central island of not less than 4.0 metres diameter.

Forward Visibility

Forward visibility is the stopping distance needed by vehicles travelling along a road at the defined design speed.

Forward visibility on bends is to be provided, with the envelope calculated as below and as shown in Figure 2 below.

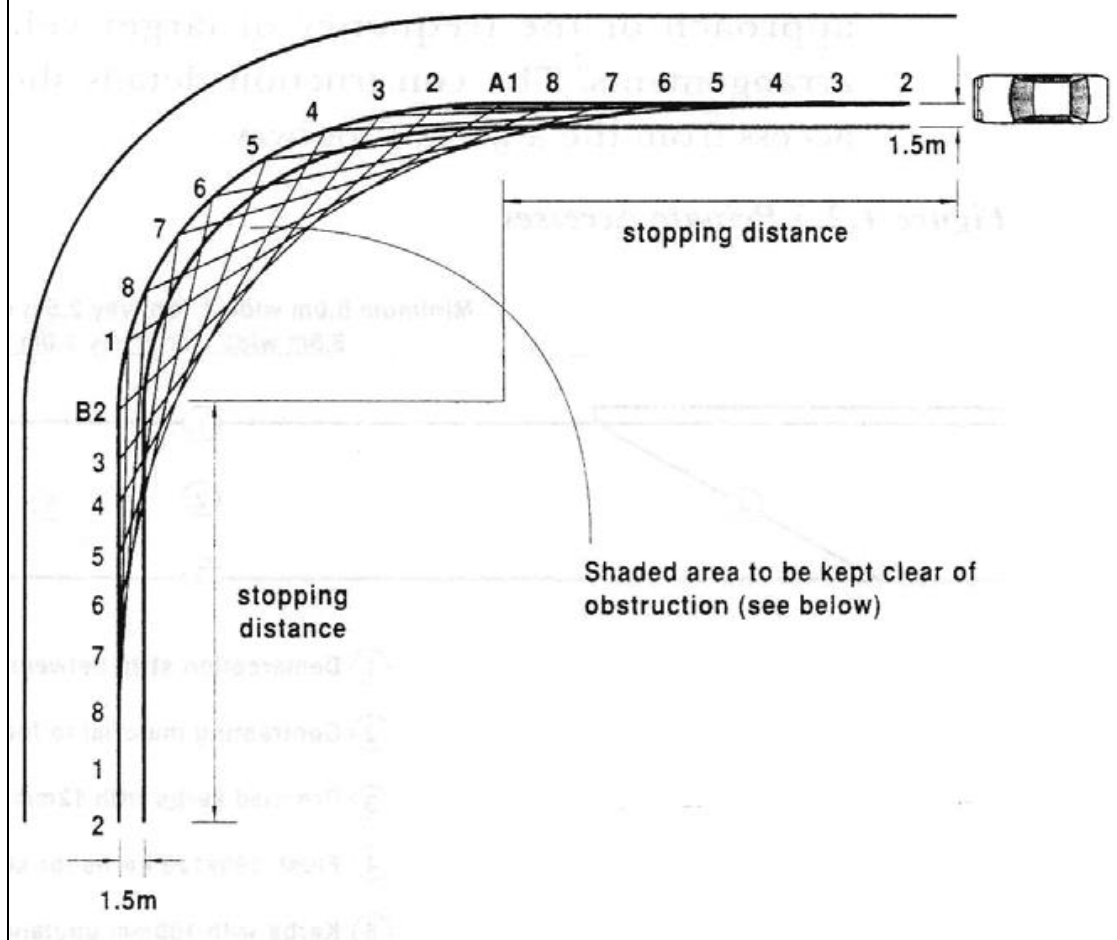
The minimum visibility defined in Table 2 below should always be available to the driver at the design speed of the road. The envelope of the area to be kept free of obstruction can be determined in the following manner:

1. Draw a line parallel to the inside kerb, 1.5m into the carriageway, to represent the path of an approaching vehicle.
2. Obtain the design speed for the type of road and the required stopping distance for this design speed from Table 2.
3. Measure the full stopping distance back from tangent point "A" in the diagram above and divide the vehicle path into equal increments (usually 3m) and numbered as shown.
4. Continue these increments sequentially around the curve until a full stopping distance beyond tangent point "B" in the diagram is achieved.
5. Draw lines to connect increment points that are the stopping distance apart. The resultant envelope must be kept clear of obstructions so that an object 0.25m high in the carriageway can be seen from the driver's height of 1.05m.

Developers should be aware that there might be situations where it is desirable to reduce forward visibility to control traffic speed.

Figure 2

Forward Visibility



1.2.5 Turning Facilities

Purpose-designed turning areas are required at the heads of residential cul-de-sacs longer than 20m.

Extra turning space is required to avoid the need for larger service vehicles, such as refuse vehicles or furniture vans, having to reverse more than 20 metres or negotiate any form of speed reduction measure in reverse. Longer reversing distances may be considered, but any reversing route must be straight and free from obstacles or visual obstructions.

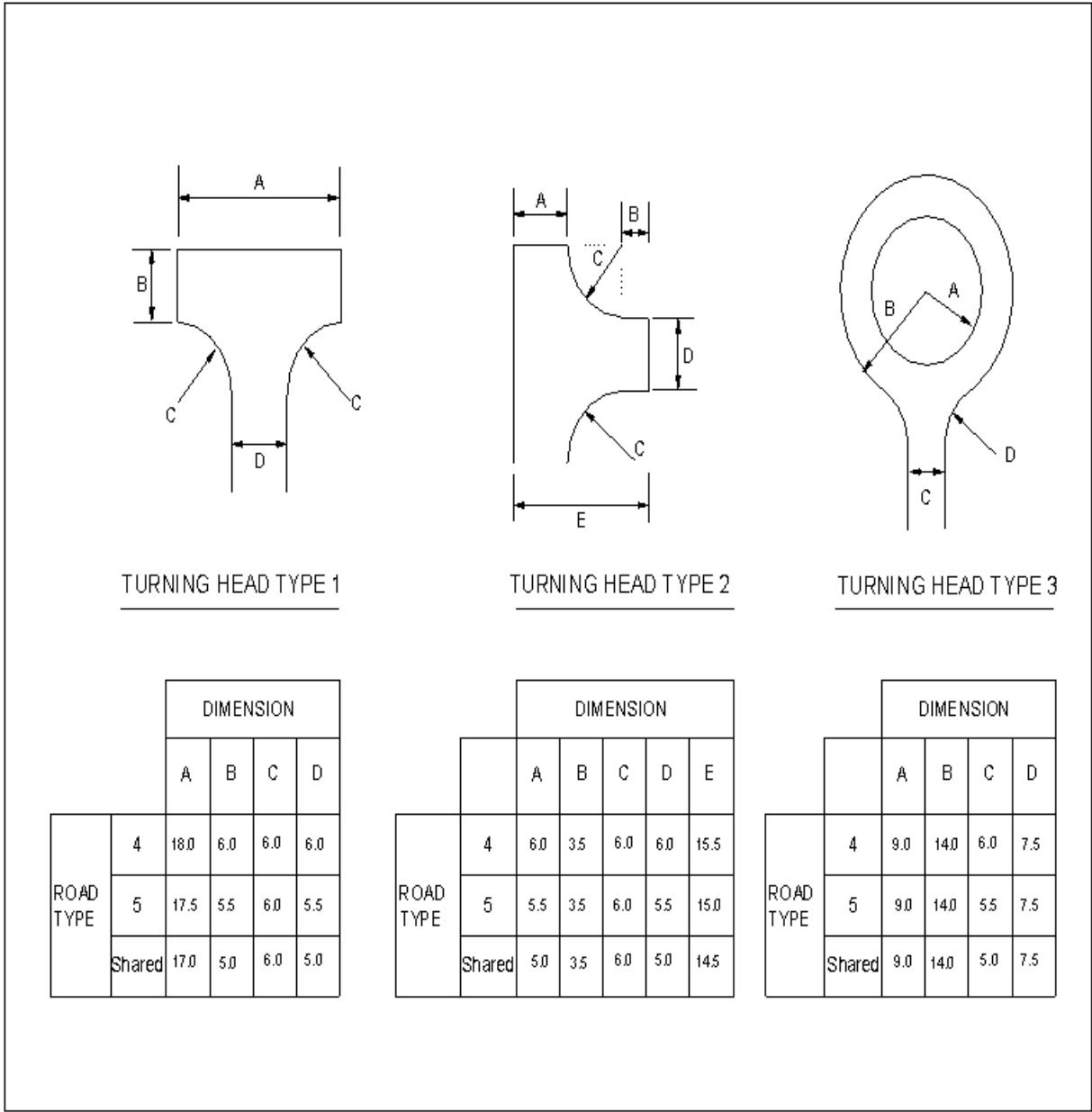
Turning Heads

Turning head layouts do not need to conform to standard patterns but must meet the criteria of providing sufficient space to manoeuvre and being safe to see. The typical layouts shown in Figure 3 give an indication of the minimum radii and dimensions required.

Amorphous turning areas can allow cars to be parked on the adopted highway without obstructing driveways, but there can be a tendency for any space that could be in private ownership to be wasted.

Turning heads for access ways may be reduced to a size that would allow only cars and small service vehicles to turn.

Figure 3
 Turning Heads



Road type 4 - Major Residential Access Road

Road type 5 - Minor Residential Access Road

Shared - Residential Shared Surface

1.3 PROVISIONS FOR PEDESTRIANS, CYCLISTS AND PEOPLE WITH REDUCED MOBILITY

1.3.1 General

A large number of journeys in local areas are short and could be made on foot or bicycle.

Designers can help make developments more pleasing places by making specific provision for this group of people. Particular attention should be paid to providing safer routes to schools for pedestrians and cyclists.

1.3.2 Access

Routes for pedestrians and cyclists must take into account the need for reasonable freedom of movement, safety and security.

There is a balance to be struck between freedom of movement via short cuts, footpath links and security. For this reason, footpath links between cul-de-sacs are not encouraged.

In the majority of smaller developments serving less than 100 dwellings specific provision for pedestrians and cyclists is unlikely to be necessary.

1.3.3 Footways and Footpaths

Footways are required on both sides of Local Distributor and Major Residential Access Roads. Carefully routed and designed footpaths may be provided where they will improve access for pedestrians.

Widths

Footways associated with carriageways should always be 2.0 metres wide, to allow a wheelchair to pass a person pushing a pram, although greater width should be provided outside school entrances, shops and bus stops.

Maintenance

All adopted footpaths must provide access for maintenance vehicles at reasonable intervals.

1.3.4 Road Junctions and Crossings

All road junctions including entrances to Shared Surfaces should make provision for pedestrians to continue along the Major Road with the minimum of inconvenience. Dropped kerb pedestrian crossings with tactile paving must be located where they are most likely to be of benefit.

Tactile surfacing should be provided at pedestrian crossings and laid in accordance with Wirral Council Standard Details.

1.4 VEHICLE SPEEDS

1.4.1 General

The most important factor contributing to road safety is vehicle speed. Keeping vehicle speeds below 20mph (32kph) is particularly beneficial. Wirral Council's current policy is that all new residential roads are subject to a 20mph speed limit. It is vital that speed restraint features are designed onto road layouts rather than to add them as an afterthought. The design of the road, including its alignment, surface and surroundings, should ideally restrain the build-up of speed without the need for remedial action.

1.4.2 Emergency Vehicles

There is a need to balance the need for improved road safety and the requirement for emergency vehicles to proceed as quickly as possible.

It is therefore imperative that emergency services, in particular the Merseyside Fire and Rescue Service, are consulted at the earliest stage of the design of the road layout.

1.4.3 Target Speeds

Most drivers on non-through route residential roads will be local residents who will accept slightly longer journey times as a result of slower speeds but with improved safety and a better living environment.

Major Residential Access Road (Type 4)

- Desirable Design Speed 20mph (32kph)
- Unrestrained Road Length between 80m - 120m

Minor Residential Access Road

- Desirable Design Speed 20mph (32kph)
- Unrestrained Road Length No more than 60m

Shared Surface

- Desirable Design Speed 15mph (24kph)
- Unrestrained Road Length No more than 40m

Definition of Unrestrained Road Length

Straight sections of carriageway not subject to some physical means of limiting vehicle speed, examples of which are as follows:

Horizontal measures

Mini roundabouts
Gateway features
Horizontal displacement
Chicanes

Vertical measures

Raised junctions
Road humps/speed cushions
Speed tables

Priority Give Ways
Speed control bends
Traffic islands

Curved alignments have little effect on speed reduction if effective radii are greater than 30m.

Speed Restraint and Traffic Calming

Speed restraint and traffic calming should be based around the concept of safety by design and the layout should be such that high speeds are impossible to achieve.

All speed restraint shall be incorporated in the initial stages of road construction to ensure potential residents are fully aware of the nature and scope of the measures. Furthermore the features should be shown on any of the plans, illustrations or models used in the marketing of the development to reinforce the approach. Traffic calming, as a blanket approach, should be unnecessary if the roads have been designed correctly.

Speed Control Bends

Small radius bends turning through between 80 and 100 degrees.

Mountable shoulders may be required for large service vehicles.

Road Humps/Speed Cushions

Road humps/speed cushions are usually constructed in improvement schemes in residential areas where there is little space for alterations to horizontal alignment.

Road humps/speed cushions are not favoured by bus companies and have adverse effects on access for emergency service vehicles.

Consideration for cyclists

Traffic calming can benefit cyclists by reducing the speed of traffic, however it must be of a cycle friendly design. Wherever possible, the introduction of pinch points that 'squeeze' cyclists, e.g. by the installation of central refuges, should be avoided. At 30mph the minimum width beside a refuge that allows safe overtaking without intimidation is 4.5m (CTC Report). Only below 20mph should narrower widths be considered. The Transport Research Laboratory has identified optimum widths for pinch points and the Developer should consult this research prior to undertaking any detailed design.

Table 2				
Adoptable Residential Roads Summary				
	Local Distributor Road (Type 3)	Major Residential Access Road (Type 4)	Minor Residential Access Road (Type 5)	Shared Surface
Access from	Classified Distributor	Classified & Local Distributor Roads	Classified & Local Distributor; Major Res. Access Road	Classified & Local Distributor; Major & Minor Res. Access Rd
Access to	Major & Minor Res. Access Rds; Shared Surface	Minor Res. Access Rds; Shared Surface; Individual Dwellings.	Shared Surface; Individual Dwellings	Individual Dwellings
Serves (Number of Dwellings)	Up to 300 or up to 400 with transitional road	Up to 200 with 2 connections to Type 3 road or Up to 120 with 1 connection to Type 3 road	Minimum of 6, up to 100, but up to 20 may be Shared Surface	Minimum of 6, up to 20
Cul-de-Sac	No	May be	May be	Yes
Frontage Access	No, except on transitional road with 6.75m carriageway	Yes	Yes	Yes
Design Speed	30mph (in restricted areas)	20mph (32kph)	20mph (32kph)	15mph (24kph)
Carriageway Width (min)	6.75m	6.0m	5.5m	5.0m
Physical Speed Restraint	Subject to Emergency Services Approval	Subject to Emergency Services Approval	Yes	Yes
Footway	Min 2.0m wide both sides	Min 2.0m wide both sides	Min 2.0m wide both sides where dwellings have access	N/A
Verge/Service Strip	If no ped traffic, then min 2.0m wide both sides Note - verges against fences or walls must be hard paved	2.0m wide Optional with footway but mandatory without. Note - verges against fences or walls must be hard paved	2.0m wide Optional with footway but mandatory without. Note - verges against fences or walls must be hard paved	2.0m Service Strip min 0.5m from buildings Note - verges against fences or walls must be hard paved
Min Centre Line Radius	60m	20m	15m	12m - with overrun widening on bends if required
Min Forward Visibility Distance (SSD)	43m	23m	23m	17m
Max Unrestrained Length	N/A	80-120m	60m	40m
Min Kerb Radius at adjoining Access Road	10.5m	6m	4.5m	4.5m
Max Gradient	1 in 15 (6.7%)	1 in 15 (6.7%)	1 in 15 (6.7%)	1 in 15 (6.7%)
Max Gradient at junctions	1 in 30 (3.3%) for 1st 10 metres of minor road (can be relaxed by LHA on steeply sloping sites)			
Min Channel Gradient	1 in 125 (0.8%)	1 in 125 (0.8%)	1 in 125 (0.8%)	1 in 125 (0.8%)
Min Crossfall/Camber	1 in 40 (2.5%)	1 in 40 (2.5%)	1 in 40 (2.5%)	1 in 40 (2.5%)
Kerb face	125mm	125mm	125mm	40mm (to define highway limit) 100mm between soft areas & road

1.5 PARKING PROVISION

1.5.1 General

There is usually a need for some short-term on-street parking in residential areas and this must be catered for in the design.

1.5.2 Parking Space Location

The location and number of parking spaces and the suitability of parking arrangements should take into account the characteristics of the development and should be considered in the context of safety, convenience and security. Parking arrangements may need to be different for residents, visitors and service vehicles.

Secure and convenient parking for groups of properties can be achieved by siting:

- Garages, carports and hardstandings within dwelling curtilages
- Grouped garages, carports and hardstandings immediately outside the entrances of the properties they serve, or at least within site of them.
- Spaces for visitors and service vehicles in close proximity of the properties they serve.

Ideally, it should be possible to park safely and securely within approximately 20m of an entrance to an individual property. The layout design should prevent the necessity for indiscriminate parking on carriageways and verges **at all times**.

1.6 LIGHTING

1.6.1 General

The design of street lighting schemes on adoptable Residential Roads must comply with BS 5489 and is the responsibility of the Developer.

All proposed lighting schemes must be submitted to Wirral Council for approval.

Details of existing lighting and illuminated street furniture must be included on the application, together with any proposed changes/alterations.

Approved removal/resiting of existing illuminated street furniture or street lighting will be carried out by Wirral Council. A minimum of 6 weeks notice will be required to arrange this work.

The Developer must ensure that the approved street lighting scheme is operational along the road between any single dwelling and the existing adopted highway before that dwelling is occupied.

The Developer must maintain the installed lighting and illuminated street furniture until it has been adopted by Wirral Council.

The Developer must pay the energy costs for the installed lighting and illuminated street furniture until it has been adopted by Wirral Council

2.0 CONSTRUCTION DESIGN

2.1 DESIGN OF CARRIAGEWAYS

2.1.1 Design Criteria

- Maximum Gradient 6.7% 1 in 15

However depending upon the topography of the site, steeper gradients may be required.

- Minimum Channel Gradient:

Hot Rolled Asphalt	0.8%	1 in 125
Block Paving	1.25%	1 in 80

(Note – block paving is not currently acceptable for adoption by Wirral Council).

- Camber/Crossfall 2.5% 1 in 40

2.1.2 Construction Design Principles

Carriageway construction shall be designed in accordance with the Specification for Highway Works (SHW), the relevant parts of which are indicated in this Adoptable Roads Specification.

2.1.3 Determining California Bearing Ratio (CBR)

The Developer shall either:

- Have a NAMAS accredited laboratory carry out tests to establish the CBR value of each sub soil type for approval by the Engineer

Or

- Subject to the Engineer's approval, dig trial holes 0.5m deep below formation level to ascertain the sub soil types. The CBR value may then be obtained from Table 3

Frost susceptible sub-grades must have at least 450mm of non-frost susceptible cover.

No sub-grade shall have a CBR below 2%. Under these conditions either:

- All the unsuitable material shall be removed, if the depth is small

Or

- If the unsuitable material is between 0.5 & 1.0m in depth, it should be replaced with suitable fill material. The CBR of the new sub grade should be assumed to be just less than 2% and capping/increase in sub base should be designed accordingly.

2.1.4 Design Process Summary

The process for establishing CBR value is as follows:-

- Establish value either by test or from Table 3

- Apply CBR value using the values in Table 4 to determine minimum sub-base thickness. Reference can also be made to the Department for Transport's Interim Advice Note IAN 73-06 HD 26/06 for capping and sub-base thicknesses, which has superseded HD25/94
- Obtain Base, Binder Course and Surface Course type and thickness from Table 5
- Check for sub-grade frost susceptibility and increase sub-base thickness if necessary.

Table 3			
Estimated CBR Values			
Soil Types	Plasticity Index	Equilibrium CBR Value %	
		Low Water Table	High Water Table
Silty Clay	40	2.5	2.0
Silty/Sandy Clay	30	3.0	2.5
Sandy Clay	20	3.0	2.5
Very Sandy Clay	10	2.5	1.5
Silt		1.5	1.0
Poor Graded Sand		20.0	20.0
Well Graded Sand		40.0	40.0
Well Graded Sandy Gravel		60.0	60.0

Table 4			
Minimum Sub-base Thickness (mm)			
CBR of Sub-Grade	Capping Layer	Sub-Base	Overall Thickness
Under 2%	450	150	600
2% - 3%	300	150	450
3% - 4%	200	150	350
4% - 5%	150	150	300
5% - 15%	0	225	225
Above 15%	0	150	150
Above 30%	If sub-grade is hard rock or granular, no sub-base is required if water table is not at a high level	0	0

Table 5			
Carriageway Construction Materials and Thicknesses			
Layer	Material	SHW Clause	Layer Thickness
Capping Layer	Class 6F2	613	Dependent upon CBR value - see Table 4 see also 3.4.4 below
Sub Base	Granular Sub base Type 1	803	Dependent upon CBR value but not less than 150mm - see Table 4
Base	Asphalt Concrete AC32 dense base 100/150 to BS EN 13108-1	906	150mm
	Hot Rolled Asphalt HRA 60/32 base 40/60 to BS EN 13108-4	904	150mm
Binder Course	Asphalt Concrete AC 20 dense bin 100/150 to BS EN 13108-1	906	60mm
	Hot Rolled Asphalt HRA 60/20 bin 40/60 to BS EN 13108-4	905	60mm
Surface Course	Hot Rolled Asphalt HRA 35/14 surf 40/60 to BS EN 13108-4	910	50mm

2.2 DESIGN OF FOOTWAYS

2.2.1 Crossfall and Gradient

Footways must have a crossfall of at least 1 in 40, i.e. 50mm across a 2.0m wide footway.

Footway crossfall is to be towards the carriageway. If in very rare circumstances this is not possible, then drainage channels and gullies to the satisfaction of the Engineer must be provided along the rear edge of the footway.

Footway crossings to accommodate the passage of vehicles to domestic premises should have a crossfall not exceeding 1 in 12.

The alignment of the rear of the footway must be smooth and not undulate to accommodate private drives.

2.2.2 Footway Crossings

Where a footway crossing is located in a service strip, a demarcation of flat-topped concrete edgings must be introduced between the back of the crossing and the commencement of the private drive.

Table 6					
Footway Construction Materials and Thicknesses					
Layer	Material	SHW Clause	Layer Thickness		
			Normal	Industrial	Crossing
Sub Base	Granular Sub Base Type 1	803	100mm	150mm	200mm
Binder Course	Asphalt Concrete AC 20 dense bin 40/60 to BS EN 13108-1	906	50mm	75mm	75mm
Surface Course	Asphalt Concrete AC 6 dense surf 160/220 to BS EN 13108-1 note - non-limestone aggregate	909	25mm	25mm	25mm

2.3 DESIGN OF HIGHWAY SURFACE WATER DRAINAGE

2.3.1 General

Surface water drains to be adopted must be under adoptable carriageways, footways and verges, or public open space

Surface water drains under privately owned land will not be adopted unless an acceptable easement is provided

2.3.2 Sub-soil Drainage

In high water table areas, french drains or sub-soil drains shall be provided to permanently reduce the water table level to 1.0m below carriageway formation level.

2.3.3 Pipeline Design

A minimum diameter of 225mm shall be provided for surface water drains, except for gully connections, which shall be 150mm diameter. Pipelines shall be at such a gradient to provide a self-cleansing velocity of not less than 1.0m per second.

The size and gradient of surface water pipelines shall be determined using a recognised method.

The tables used for the design shall be Tables for Hydraulic Design of Pipes and Sewers published by the Hydraulics Research Centre Wallingford.

The "K" value used shall be 0.6mm

2.3.4 Storm Frequency

The system must be capable of accepting the relevant design storm from the following without surcharge: -

- Sites with average ground slope greater than 1% 1 year
- Sites with average ground slope 1% or less 2 years
- Sites where consequences of flooding are severe 5 years

2.3.5 Impermeability

Levels of Impermeability shall be:

- Highways including verges and other paved areas 100%
- Other areas Nil

2.3.6 Trench and Bedding Details

Drains laid within the highway should have a minimum cover of 1.2m from the top of the pipe barrel to the finished road surface.

Bedding and surround shall be Type "S".

Drains laid with less than 1.2m and more than 4.5m cover and all gully connections shall have bedding and surround Type "Z".

All trenches to be backfilled with Granular Sub-base Material Type 1 to formation level.

2.3.7 Manhole Spacing

Manholes shall be provided at: -

- Every change in alignment or gradient
- The head of every pipeline
- Every junction of pipelines, excluding gully connections
- Every change of pipe size
- At a maximum spacing of 100m

2.3.8 Gully Spacing

Gullies to be spaced at intervals to ensure that the maximum carriageway drainage areas indicated in Table 7 are not exceeded.

Table 7	
Gully Drainage Areas	
Crossfall / Camber 1 in 40	
Channel Gradient 1 in	Max. C/way Drainage Area Sq.metres
150	58
125	66
100	71
80	79
60	90
50	98
40	109
30	124
20	149

3.0 CONSTRUCTION SPECIFICATION

3.1 HIGHWAY WORKS

3.1.1 Introduction

On the Landowner's request to the Head of Environment and Regulation, Wirral Council is prepared to consider entering into an agreement under Section 38 of the Highways Act 1980 to secure the making up of the new streets and to include amenity areas.

If relevant, the Developer must enter into an agreement with the Regional Water Company under Section 104 of the Water Industry Act 1991 if any sewers on the site are to be adopted.

The erection of a building having a frontage onto a new street is prohibited until the carriageway of the new street has been constructed and sewered in accordance with plans approved in the S38 agreement.

All highway surface water drains to be offered for adoption must lie in areas of highway to be adopted by Wirral Council.

Where the development site abuts or access is gained to it from an existing adopted highway, a joint pre-inspection must be arranged with the Engineer to ascertain the condition of the adopted highway before work commences on the development site. If such an inspection is not carried out, Wirral Council will assume that the adopted highway was in good condition before the Developer commenced his works and the Developer will be charged accordingly for any necessary remedial works on completion of the development.

3.1.2 General

This Specification is based on the 'Specification for Highway Works' (SHW), published by the HMSO as Volume 1 of the Manual of Contract Documents for Highway Works.

The references to clause numbers in the materials specifications are references to the SHW Clauses.

This Specification has been compiled to be sufficient for normal development purposes, but reference may have to be made to British and European Standards and the SHW for complete descriptions of the work and materials.

This Specification shall apply to any carriageway, footway, margin, verge paved area, drainage system, highway equipment and street lighting system being constructed or installed as part of a residential or industrial development, and which is intended to be adopted by Wirral Council as a publicly maintained highway.

3.1.3 British and European Standard Specifications

Unless otherwise specified, all materials shall comply with the appropriate British and European Standard up to the specification reference date and shall be transported, stored and laid in accordance with the British and European Standard Specifications.

Tests on materials and workmanship will be conducted in accordance with British and European Standard Specifications.

3.1.4 Materials Suppliers

The Developer shall, before the commencement of work, submit to the Engineer for his approval a list of suppliers from whom materials are to be purchased and the source of supply shall not be changed without prior approval by the Engineer.

3.1.5 Nomenclature

The nomenclature in this Specification is that in the "Glossary of Building and Civil Engineering Terms", BS 6100.

The term "the Engineer" means the Head of Highways and Associated Services of Wirral Council, and / or his representative.

The term "the Developer" means the Developer and / or his agent and / or his contractor.

3.1.6 Work on Existing Public Highways

Traffic Management

The Developer shall be responsible for designing traffic safety and management proposals and submitting these to the Engineer for approval. The Engineer will then write to the Developer to approve, reject or amend the proposals and organise any requested legal Traffic Regulation Orders.

If a Traffic Regulation Order is required, the Developer shall allow a minimum of twelve weeks to elapse before receiving approval and for the commencement of work on site.

The Developer shall not commence any work that affects the public highway until the approved traffic safety and management measures are fully in place.

The Developer's traffic safety and management proposals shall comply with the "Traffic Signs Manual" or other conditions stated in the Specification

The Developer's traffic safety and management proposals shall comply with "Safety at Street Works and Road Works: a Code of Practice".

All traffic signs used shall comply with "Traffic Signs Regulations and General Directions"

The Developer shall phase his work so as to cause the minimum disruption to highway users and shall maintain two-way traffic on all highways wherever possible. If required, the Developer must apply to the Engineer for approval to use two-way temporary signals, giving a minimum of two days notice.

The Engineer's permission must be obtained before three-way or more traffic signals are used. The Engineer requires a minimum of seven days notice.

Single line traffic operation will be required when the undivided clear width of carriageway available is less than 5.5 metres (6.75 metres on a bus route). When single lane traffic operation is required, the Developer shall provide a width of at least 3.5 metres or wider if necessary at curves and junctions to a maximum of 3.7 metres and the length of a single line operation at one time shall not be greater than 200 metres unless agreed by the Engineer.

Traffic control for single line operations shall be carried out using manually operated Stop/Go signs or vehicle actuated temporary traffic signals supplied by the Developer. During the hours of darkness traffic control for single line traffic operations shall be carried out with vehicle-

actuated traffic signals only. Signals and signing shall be in accordance with "Chapter 8 of the Traffic Signs Manual".

The Developer shall liaise with the Emergency Services and Merseytravel to inform them of phasing of the works and any diversions, a minimum of 5 working days prior to commencement.

The Developer is to provide a Traffic Officer responsible for maintaining the traffic management system, 24 hours a day, 7 days a week and will attend the site within 1 hour of any call out.

3.1.7 Highway Safety

Mud, Debris and Dust on the Highway

It is an offence under the Highways Act 1980 to allow mud, debris or anything to be deposited on the highway so as to cause damage or obstruction or to create a nuisance or danger.

Highways in the vicinity of the works must be kept free of mud, debris and dust falling from the wheels of vehicles connected with the works or spreading from the works. Where the deposit of such materials is unavoidable, warning signs must be erected whilst the work is in progress and carriageways and footways regularly cleaned.

Control of Noise

The best practical means to prevent or reduce noise should be taken, including the use of effective silencers on power-operated plant and equipment and the use of purpose-made mufflers on pneumatic breakers or drills.

Prohibition of use of the Highway

Existing public highways must not be used as sites for stockpiling of plant, vehicles, materials and equipment. The Developer shall be liable for the cost of reinstatement if damage is caused to the highway.

3.1.8 Order of Work

All work within the area of carriageway construction such as drainage and sewerage works, installation of statutory undertakers' mains and any service cross-connections, ducts and manholes for future cabling and street lighting cross-connections shall be completed before highway construction is commenced. Highway construction will then be carried out in two stages:

Stage 1

- Formation preparation, sub-base, base and binder course, together with gullies.
- Install street lighting.
- Erect street nameplates
- Then follows house building and making service connections

Stage 2

- Where necessary, settlement and all faults are made good and regulating course applied.
- Footway and carriageway surface courses.
- White lines and carriageway markings.

3.1.9 Street Nameplates

Following approval of a street name for the new development, the Developer must arrange for the installation of street nameplates before any properties become occupied. Nameplates can either be supplied and erected by the Developer or Wirral Council's Term Contractor, in both cases using a nameplate to Wirral Council's specification.

The Developer should be aware that there is a charge for this service.

If the Developer requests Wirral Council to supply and erect the nameplates, the position of the nameplates will be as shown on the naming and numbering plan issued to the Developer by Wirral Council.

3.2 EARTHWORKS

3.2.1 Ground Conditions

The ground conditions affecting the proposed route of the road shall be investigated by means of trial pits and boreholes.

Data shall be obtained and reported in accordance with BS EN 1997-2:2007.

Testing of soil samples shall be in accordance with BS EN 1997-2:2007, with particular attention being taken in establishing the equilibrium CBR value at the proposed formation level.

Bulk excavations and filling shall be carried out in accordance with the approved drawings.

3.2.2 Unsuitable Material

The following materials are unsuitable for construction purposes and shall be disposed of clear of the highway works: -

- Materials from swamps, marshes or bogs.
- Peat, logs, stumps, and perishable material.
- Materials in a frozen condition.
- Material susceptible to spontaneous combustion.
- Clay having a liquid limit exceeding 90 or plasticity index exceeding 65, determined in accordance with BS EN 1997-2:2007.

3.2.3 Filling Material

With the exception of acceptable cohesive material, for which the Engineer's approval is required, fills for construction purposes shall be granular in nature and shall be either acceptable material obtained from excavation on site, or acceptable imported material.

Granular Fill Material

Granular Fill material shall consist of natural sand, natural sand and gravel, non-argillaceous crushed rock, crushed concrete or well burnt colliery shale.

The maximum size shall not exceed 125mm and not more than 10% shall pass a 63-micron sieve prior to compaction.

Rock Fill Material

Rock Fill material shall consist of crushed cobbles and gravel, crushed non-argillaceous rock or crushed concrete.

The maximum size shall not exceed 500mm and not more than 10% shall pass a 125mm sieve.

Storage

Material intended for filling shall be kept separate from other materials and shall be protected from damage by contamination. Stockpiling should be avoided, but if fill material is stockpiled it should be compacted and shaped to facilitate the shedding of water from its surface.

Embankment Fill

Fill shall be acceptable excavated material or Granular fill material as described above.

- Fill shall be spread and compacted either in layers not exceeding 150mm thick after compaction by at least 8 passes by a smooth-wheel roller having a mass per metre width of at least 5000kg; or in layers not exceeding 200mm thick after compaction by at least 4 passes of a vibratory roller having a mass per metre width of 3000kg.
- Embankments shall be built up evenly over the full width and the surface shall be given a camber or crossfall so that water does not collect.
- Any fill that deteriorates during construction shall be replaced.

Unsound Ground Fill

Fill shall be Rock Fill material as described above and with the agreement of the Engineer shall be placed: -

- Where the CBR value of the ground below highway works is less than 2%
- Where it is necessary to stabilise saturated silts and fine sands.
- So that a total thickness of at least 1.0m is provided as a foundation for highway or embankment construction in areas of unsound ground.
- So that the upper surface of the rock fill is above winter ground water table level.
- So that any local depression is filled.
- In layers not exceeding 500mm thick by crawler dozer and compacted by at least 5 complete passes of a towed vibratory roller having a mass per metre width of at least 3000kg.
- With the upper surface blinded with a suitably graded but equally hard material prior to the placing of embankment fill or sub-base.

3.2.4 Sub-soil Drainage

A proper system of sub-soil drainage connected to a suitable outfall shall be constructed to the satisfaction of the Engineer where: -

- The winter height of the water table is within 600mm of formation level.
- The sub-soil is saturated.
- There is a likelihood of water running off or out of adjacent ground.
- Springs, drains or watercourses are encountered.

3.2.5 Formation Preparation

Immediately prior to the laying of the sub-base, the formation shall be prepared as follows: -

- All surfaces shall be cleaned and any wet material, mud, slurry, unsound or unstable material removed.
- The surface shall be brought up to the formation level given on the approved drawings by the addition of fill or the grading-off of high spots.
- The surface shall be regulated by grading to within a tolerance of +20mm to -30mm of true level.
- The formation shall be finished by rolling 4 complete passes of a smooth wheeled roller having a mass per metre width of not less than 5000kg, or a vibratory roller having a mass per metre width of 3000kg.

3.2 HIGHWAY SURFACE WATER DRAINAGE

3.3.1 Order of Work

All surface water drainage works shall be completed and all trenches and pits backfilled before carriageway construction commences.

3.3.2 Sub-soil Drainage

Sub-soil drains shall comply with Table 5/1 of the SHW, laid accurately to straight gradients and alignments in trenches.

Gradients should be such that a minimum self-cleansing velocity of 1.0m/sec is attained.

The pipelines shall be properly linked with junction pipes and shall discharge into catchpits or manholes and outfall into the surface water drainage system.

Existing land drains and springs severed by the work shall be connected into the surface water drainage system.

Sub-soil drains shall be surrounded by Type A filter material as SHW Clause 505, filter drains shall be filled to ground level with this material.

3.3.3 Surface Water Sewer Pipes

Surface water drains shall comply with types specified in Table 5/1 of the SHW and as follows:-

- Vitrified clay pipes shall be either British Standard Pipes or British Standard surface-water pipes in accordance with BS 65, with flexible joints or plain ended with sleeve couplings.
- Concrete pipes shall comply with BS.5911 and shall have spigot and socket joints that may be flexible but must be self-aligning.

3.3.4 Excavation for Pipes and Manholes

Excavation in trenches and pits within the boundaries of highways to be adopted shall be made with vertical sides unless the specific approval of the Engineer is obtained to use battered sides.

Trenches shall be true to line and level as shown on the drawings approved by the Engineer and the width and depth shall not exceed that required to contain the permanent work except where special provision is made for working space or the Engineer orders extra width or depth for proper construction of the work or for inspections or tests.

Minimum trench widths shall be: -

- For drains not exceeding 1.5m cover below finished level: the internal diameter of the barrel plus 300mm.
- For drains exceeding 1.5m cover below finished level: the internal diameter of the barrel plus 450mm.

Maximum trench widths shall be: -

- For drains not exceeding 1.5m cover below finished level: the internal diameter of the barrel plus 600mm.

3.3.5 Support of Excavations

Sides of trenches and pits shall be supported at all times and such support shall comply with BS.6031

3.3.6 Treatment of Overbreak and Slips

If overbreaks or slips occur or if the bottom of the pit/trench becomes unstable, all unacceptable material to be removed, the excavation trimmed back to vertical faces and excess excavation treated as follows: -

- Where the trench/pit is to contain a pipe/manhole with concrete protection any excess excavation shall be filled with additional concrete of the same quality as the protection.
- Where the pipe/manhole is not to have concrete protection, excess excavation is to be filled with ST1 concrete.

3.3.7 Excavations in Existing Highways

All excavation and reinstatement within existing highways is to be carried out in accordance with the New Roads and Street Works Act 1991.

3.3.8 Bedding and Laying of Pipes

Pipes shall be laid to true lines and levels as indicated on the approved drawings with the spigot end towards the outfall and laying shall commence at the outfall unless otherwise agreed with the Engineer

In trench, pipes shall be laid on the pipe bed immediately following excavation.

Where concrete protection is not required pipes shall have Type "S" bed and surround of granular material to SHW Clause 503.3(i)

Each pipe shall be in contact with the bed throughout the length of the barrel.

Bricks or other hard material shall not be placed under the pipes for temporary support and sockets shall not bear on the bed.

Where concrete protection is required pipes shall be laid on setting blocks placed across the trench and pipes wedged in position to true line and level with wooden wedges.

3.3.9 Jointing of Pipes

Rigid joints, i.e. joint made by caulking the sockets or by bolting together flanges integral with the pipe are NOT acceptable.

Flexible joints means joints made with deformable rings or gaskets held between pipe spigots and sockets, sleeves or collars.

Joints in surface water drains shall be "Watertight Joints" or "Partly Watertight Joints" complying with SHW Clauses 504.3 and 504.4 respectively.

Ducts need not have watertight joints

Where a concrete surround is used with rigid pipes having flexible joints, a joint filler board complying with SHW Clause 1015 shall be placed in contact with the end of the socket at a pipe joint and shall extend through the full thickness of the concrete in contact with the pipe. Such joints shall be at intervals not exceeding 5 metres, except where the spacing of the joints is greater than 5 metres when they shall be at each pipe joint.

Joints in filter drains and pipes for service ducts shall comply with the relevant British Standards.

3.3.10 Concrete Protection for Pipelines

Concrete bedding and surround Type Z shall be provided for: -

- All pipes with less than 1.2m cover under carriageways or footways
- All gully connections.
- All pipes with less than 1.0m cover under margins and verges where vehicles cannot pass.
- All pipes with over 4.5m of cover no matter where.
- All pipes in highways where the Engineer requires a surround to be provided for engineering purposes
- All pipes in made-up or filled ground.
- Concrete for concrete protection shall be Class ST2 to BS 5328 with 20mm nominal size aggregate and where required with sulphate resistant cement.

The minimum thickness of concrete bedding and surround shall be: -

- 150mm for pipes up to and including 825mm diameter.
- 225mm for pipes exceeding 825mm diameter.
- The overall width of the concrete protection shall be the width of the trench

3.3.11 Connections to Existing Public Sewers

The Developer shall carry out any searches, tests and trial holes necessary to locate existing sewers, drains and culverts

Developers must contact either United Utilities or Welsh Water, the relevant sewerage undertakers in the Wirral Council area, should they wish to connect to an existing public sewer.

3.3.12 Manholes and Inspection Chambers – General

All manholes to comply with the relevant clauses of the latest edition of "Sewers for Adoption" - Water Services Association publication.

Typical details of manholes with depth from cover level to sewer soffit not exceeding 6.0m are shown in the Standard Details at the rear of this document. No departure to be made from these details to be made without prior approval of the Engineer.

Details of manholes with depths greater than 6.0m to be agreed in advance by the Engineer.

The chamber height for a Type "A" manhole (benching slab to soffit) should normally be 2.0m. Where this is not possible, Type "B" manholes are preferred, subject to an absolute minimum chamber height of 900mm.

3.3.13 Precast Concrete Manholes

Precast concrete sections shall comply with BS5911

Joints between sections shall be made with proprietary bitumen, resin mastic sealant or mortar to SHW Table 24/1 (i), without lime but with sulphate resistant cement if required.

After erection of the sections, the excavation and any sections erected above ground shall be surrounded with mix ST4 concrete, SHW Clause 2602 with 20mm nominal size aggregate, to a minimum thickness of 150mm.

3.3.14 Brick Manholes

Where manhole walls are to be brickwork, the bricks are to be Class B Engineering Bricks to BS3921. The brickwork to be in English bond set in mortar to SHW Table 24/1 (i), without lime but with sulphate resistant cement if required.

Where a pipe through a brick manhole has a diameter of 225mm or greater a relieving arch shall be built.

3.3.15 Channels and Inverts

Channels and inverts shall be formed in prefabricated half round channels bedded in mix ST4 or formed in situ in mix ST4 concrete with sulphate resistant cement.

Inverts shall be carefully formed where pipes of different radii enter or leave the manhole, the inverts shall be semi-circular and evenly tapered to suite the dimensions of the pipes. All pipes entering or leaving the manholes shall have level soffits.

3.3.16 Step Irons Safety Chains and Ladders

Step irons for manholes and other chambers shall comply with BS1247: Parts 1, 2 and 3 or Wis 4-33-01

Hot dipped galvanised safety chains to be provided when outfall pipe is of 600mm diameter or greater.

Toeholds and handholds must be provided when outfall pipe is of 500mm diameter or greater.

For manholes greater than 3.0m to invert a hot dipped galvanised low carbon steel ladder is to be provided.

3.3.17 Manhole Covers and Frames

Manhole covers and frames shall be double triangular, comply with BS EN 124 and have a clear opening of 600mm x 600mm.

Manhole covers shall be Class D400 150mm deep in carriageways and Class B125 100mm deep in footways and margins.

All manhole covers to have closed keyways.

3.3.18 Mortar

Mortar shall be mixed only as and when required and in the relevant proportions indicated below, until its colour and consistency are uniform. The constituent materials shall be accurately gauged, allowance being made for bulking of fine aggregate.

Mortar Class	Cement: Lime putty: fine agg	Cement: fine agg with plasticiser
M1	1: 0 to ¼: 3	1: 2 ½ to 3

Epoxy/Polyester resin mortars shall be two-part pre-batched and shall achieve a minimum 20N/mm² compressive strength after one hour of mixing and shall have a minimum working time of 15 minutes. The mortar shall be stored, mixed and used in accordance with the manufacturers instructions.

All mortar shall be conveyed fresh as required for use. Mortar that has begun to set or which has been site-mixed for a period of more than one hour shall not be used.

3.3.19 Manhole and other Cover Frames Bedding Material

The type of bedding material shall be as follows:-

- In highways and other areas where vehicular access is or may be required: -Polyester Resin Mortar
- In all other circumstances: - Class M1 Mortar.

3.3.20 Filling of Trenches and Pits

Trenches and pits shall be filled as soon as is practicable, but not until 36 hours after the placing of any concrete or brickwork.

Types of Fill

The type of fill shall be as follows:-

- Type 1 sub-base material to SHW Clause 803.
- Mix ST1 concrete with 20mm nominal size aggregate.

Spreading and Compaction of Fill in Trenches and Pits

Fill material shall be compacted in layers not exceeding 150mm in thickness after compaction in accordance with Table 9

Excavation Supports

Excavation supports shall be carefully removed as filling proceeds except where such support is required to be left in position but the stability of the trench side and adjacent ground must be maintained. The space left by the removal of the trench supports to be filled in the manner of the main fill.

Filling Around Manholes

Where space around a manhole or chamber does not allow access for compaction machinery, ST1 concrete shall be used as fill and compacted with hand rammers.

3.3.21 Types of Gully Chambers

Gully pots for carriageways shall be round street gullies with rodding eye and trap:-

- Unreinforced concrete to BS 5911 with minimum internal dimension of 450mm diameter x 900mm deep, with 150mm diameter outlet.

Gully pots for footways shall be round street gullies with rodding eye and trap:-

- Clayware to BS 65 with minimum internal dimensions of 300mm diameter x 600mm deep with 150mm diameter outlet.

3.3.22 Gully Gratings and Frames

Materials

For carriageways shall be of ductile iron to BS EN 124 Class D400 with minimum width of grating 450mm and minimum area of waterway 990cm².

For footways shall be of ductile iron to BS EN 124 Class B125 with minimum width of grating 325mm and minimum area of waterway 650cm².

Construction

Gully pots shall be set on and surrounded with 150mm minimum thickness of concrete Class ST2 to Clause 2602 to the top of the chamber and finished level.

Gully frames shall be set accurately for level and position, bedded on a full bed of mortar as detailed above, but without lime, on not less than 2 courses of Class B engineering brickwork with fully mortared joints, or purpose made precast concrete slab may be used. Brickwork to be corbelled as necessary to provide a full bed for the frame and shall be 225mm thick in carriageways and 112mm thick elsewhere.

Weep holes shall be left in the bottom course of brickwork by leaving two vertical joints unmortared.

Connections

Gully connections shall be 150mm in diameter.

Junction pipes for gully connections which are laid and not immediately connected shall be fitted with approved stoppers, the position of such connections shall be clearly defined by means of stakes or tracing wires properly marked and recorded.

3.3.23 Cleaning of Drainage Works

On completion of construction, internal surfaces of drains and manholes shall be thoroughly cleaned to remove all deleterious matter, without such material being passed into the existing public sewers or watercourses and shall be maintained in a clean and serviceable condition by the Developer until they are vested as public sewers.

3.3.24 Testing

Gravity pipelines shall be tested in lengths between manholes or in shorter lengths as the Engineer may approve. Testing shall be carried out before any concrete protection or backfilling is placed, other than may be necessary for structural stability whilst under test.

Pipes up to and including 750mm nominal diameter shall be tested by air or water test, pipes greater than 750mm nominal diameter by visual inspection.

The Developer shall give notice of his readiness to test to the Engineer and all tests shall be carried out in the presence of and to the satisfaction of the Engineer.

Air Testing

Gravity pipelines to be air tested shall have air pumped in by a suitable means until a pressure of 100mm head of water is indicated in a U-tube connected to the system. The air pressure shall not fall to less than 75mm head of water during a period of 5 minutes without further pumping, after an initial period to allow stabilisation. Failure to pass the test does not preclude acceptance of the pipeline if a successful water test can be carried out.

Water Testing

Gravity pipelines to be water tested shall be tested with water under a head of not less than 1.2m above the crown of the pipe at the high end and not more than 6.0m above the crown at the low end.

Steeply graded pipelines shall be tested in sections so as not to exceed the maximum head. After a minimum period of 2 hours after initial filling, to allow for absorption, the loss of water over a 30 minute period shall be measured by adding water at regular 10 minute intervals to maintain the 1.2m head and the amount of water added recorded. The pipeline will have passed the test if the volume of water added does not exceed 1.0 litre per hour, per linear meter of pipeline, per metre of nominal internal diameter.

3.3.25 CCTV Inspection

Where internal inspection of the pipeline by CCTV is required by the Engineer, the Undertaker or Council acting on its behalf shall provide, as part of the supervision fee, all equipment and personnel necessary for its operation.

The Developer shall provide all reasonable facilities for personnel employed in the execution of CCTV inspection work on site.

Where faults are discovered (by use of CCTV or other method) the cost of any subsequent inspection necessary to check the repair shall be borne by the Developer.

Before any CCTV inspection of a pipeline is carried out in relation to the issuing of a Final Certificate, the Developer shall confirm that all the following conditions have been met: -

- All planned connections have been made in accordance with the details above
- The pipeline and manholes have been cleansed in accordance with the details above
- All debris has been removed from connected pipework.
- Any highway construction proposed above the pipeline is complete save for its final surfacing.

3.3.26 Infiltration

Gravity pipelines and manholes shall be tested for infiltration, after backfilling. All inlets shall be effectively closed and any residual flow shall be deemed infiltration.

The pipelines and manholes shall be accepted as satisfactory if the infiltration, including infiltration into manholes, in 30 minutes does not exceed 0.5 litres per lineal metre per metre of nominal diameter.

Notwithstanding the satisfactory completion of the above inspection or test, if there is any discernible flow of water entering the system at a point that is located either by CCTV or visual inspection, the Developer shall take suitable measures to stop such infiltration.

3.4 CARRIAGEWAY CONSTRUCTION

3.4.1 General

Bituminous materials shall be sampled and tested in accordance with British Standards, and the results made available for inspection by the Engineer

Aggregates for bituminous materials and the mixed material shall comply with SHW Clause 901.

3.4.2 Order of Work

All drainage and sewerage works, statutory undertakers' mains and service cross-connections, and street lighting cabling and ducting for cross-connections shall be installed and all trenches and pits shall be filled in accordance with "Highway Surface Water Drainage: Filling of Trenches and Pits", before carriageway construction can commence.

3.4.3 Formation Preparation

Where the laying of sub-base does not immediately follow the preparation of the formation as in Section 3.2.5, the formation shall be prepared again by removing any wet, dusty, loose or deteriorated material, regrading with granular fill material and compacting by rolling

3.4.4 Sub-grade improvement

If as a result of poor sub-grade conditions a capping layer is required, Type 6F2 material to Tables 8 and 9, and compacted in accordance with Table 10, shall be used.

Table 8

Earthworks:Grading Requirements

Percentage by Mass Passing the Size Shown																		
Class	Size (mm) BS Series													Size (microns) BS Series				Size microns
	125	90	75	37.5	28	20	14	10	6.3	5	3.35	2	1.18	600	300	150	63	2
6F2	100	80-100	65-100	45-100				15-60						0-25			0-12	

Table 9

Acceptable Earthworks Materials, Classification and Compaction Requirements

Class	General Material Description	Typical Use	Permitted Constituents (All subject to Requirements of DOT Clause 601)	Material Properties Required for Acceptability (in Addition to Requirements on Use of Fill Materials in DOT Clause 601 & Testing in Clause 631)				Compaction Requirements in Clause 612
				Property (See exceptions in Previous column)	Defined and Tested in Accordance With:	Acceptable Limits Within :		
						Lower	Upper	
6F2	Selected Granular Material (Course Grading)	Capping	Any material, or combination of materials other than unburnt colliery spoil and argillaceous rock (Property (i) in the next column shall not apply to chalk) Recycled aggregate	(i) Grading	BS 1377: Part 2	Tab 6/2	Tab 6/2 Method 6	Tab 6/4
				(ii) Optimum mc	BS 1377: Part 4 (Vibrating hammer method)			
				(iii) mc	BS 1377 : Part 2	Optimum mc-2%	Optimum mc	
				(iv) 10% Fines Value	Clause 635			

3.4.5 Sub-base

Material

Sub-base shall be Type 1 granular sub-base material to SHW Clause 803.

Sub-base laying

The material must be spread evenly to the required profile and total thickness shown on the drawings approved by the Engineer, either by hand or machine in layer thicknesses suitable for the type of compaction machinery employed.

For light hand held machinery, the layer thickness shall not exceed 100mm after compaction. See Table 10 for compaction requirements.

For heavy, towed or ride-on machinery the layer thickness shall not exceed 150mm after compaction. See Table 10 for compaction requirements.

Should segregation take place during spreading, causing areas of coarse stone, then these areas shall be blinded with fines during compaction.

During compaction the surface profile shall be corrected by hand and trimmed so that when finished it is within a tolerance +10mm and –30mm of the proper surface profile. There shall be no space greater than 40mm beneath a 3.0m straight edge.

Table 10**Compaction Requirements for Granular Material Type 1(Clause 803)**

Type of Compaction Plant	Category	Number of Passes for Layers Not Exceeding the Following Compacted Thicknesses		
		110mm	150mm	225mm
Smooth Wheeled Roller or Vibratory Roller without Vibration	Mass/metre width of Roller			
	Over 2700Kg to 5400Kg	16	Unsuitable	Unsuitable
	Over 5400Kg	8	16	Unsuitable
Pneumatic Tyred Roller	Mass/Wheel			
	Over 4000Kg to 6000Kg	12	Unsuitable	Unsuitable
	Over 6000Kg to 8000Kg	12	Unsuitable	Unsuitable
	Over 8000Kg to 12000Kg	10	16	Unsuitable
	Over 12000Kg	8	12	Unsuitable
Vibratory Roller	Mass/m width of Vib Roller			
	Over 700Kg to 1300Kg	16	Unsuitable	Unsuitable
	Over 1300Kg to 1800Kg	6	16	Unsuitable
	Over 1800Kg to 2300Kg	4	6	10
	Over 2300Kg to 2900Kg	3	5	9
	Over 2900Kg to 3600Kg	3	5	8
	Over 3600Kg to 4300Kg	2	4	7
	Over 4300Kg to 5000Kg	2	4	6
	Over 5000Kg	2	3	5
Vibrating Plate Compactor	Mass/Sq M of Base Plate			
	1400Kg/m2 to 1800Kg/m2	8	Unsuitable	Unsuitable
	1800Kg/m2 to 2100Kg/m2	5	8	Unsuitable
	Over 2100Kg/m2	3	6	10
Vibro Tamper	Over 50Kg to 65Kg	4	8	Unsuitable
	Over 65Kg to 75Kg	3	6	10
	Over 75Kg	2	4	8
Power Rammer	100Kg to 500Kg	5	8	Unsuitable
	Over 500Kg	5	8	12

3.4.6 Base**Material**

Either:

- Asphalt Concrete AC32 dense base 100/150 grade bitumen to BS EN 13108-1 and SHW Clause 906

Or:

- Hot Rolled Asphalt HRA 60/32 base 40/60 grade bitumen to BS EN 13108-4 and SHW Clause 904.

Transportation and Installation

Transportation and installation of material to BS 594987 and SHW Clause 903.

The material shall be transported to site in insulated lorries and shall be sheeted so as to prevent an excessive drop in temperature and to ensure its protection from adverse weather conditions.

The material shall be delivered at a temperature which enables it to be compacted in accordance with the following requirements:-

- AC32 dense base 100/150:

Min temperature on delivery	120°C
Min temperature immediately prior to rolling	95°C

- HRA 60/32 base 40/60:

Min temperature on delivery	120°C
Min temperature immediately prior to rolling	85°C

Base laying

The sub-base shall be clean and free from standing water.

The base material shall be spread and laid by a paving machine. Hand laying is only acceptable in small areas inaccessible to a machine.

The material shall be spread evenly in layers not exceeding 100mm thick after compaction, to the correct profile and crossfall/camber to the total thickness shown on the drawings approved by the Engineer and compacted with an 8-10 tonne smooth-wheeled roller until no further compaction can be achieved.

Longitudinal joints shall be “knit” and rolled together, transverse joints and joints where the coated macadam abuts an existing surface shall be cut back to a vertical face that exposes the full thickness of the layer and painted with a thin uniform coating of 40/60 or 70/100 pen hot bitumen or cold applied thixotropic bitumen compound of similar grade before the adjacent width is laid.

The finished surface of the completed base course (roadbase) shall be within a tolerance of $\pm 15\text{mm}$ from true surface level and accuracy of finish shall be as Table 11 for the relevant layer.

3.4.7 Binder Course

Material

Either:

- Asphalt Concrete AC20 dense bin 100/150 grade bitumen to BS EN 13108-1 and SHW Clause 906

Or:

- Hot Rolled Asphalt HRA 60/20 bin 40/60 grade bitumen to BS EN 13108-4 and SHW Clause 905

The material shall be transported and installed as for base course materials

Binder Course Laying

The base course surface shall be clean and free from standing water and shall be acceptable to the Engineer prior to the laying of the binder course.

When a tack coat is required it shall be applied by spraying with a fine mist spray at a rate of 0.5 litres/ m².

The binder course material shall be spread and laid by a paving machine. Hand laying is only acceptable in small areas inaccessible to a machine.

The material shall be spread evenly in layers not exceeding 100mm thick after compaction, to the correct profile and crossfall/camber to the total thickness shown on the drawings approved by the Engineer and compacted with an 8-10 tonne smooth-wheeled roller until no further compaction can be achieved.

Longitudinal joints shall be “knit” and rolled together, transverse joints and joints where the coated macadam abuts an existing surface shall be cut back to a vertical face that exposes the full thickness of the layer and painted with a thin uniform coating of 40/60 or 70/100 pen hot bitumen or cold applied thixotropic bitumen compound of similar grade before the adjacent width is laid.

The finished surface of the completed binder course shall be within a tolerance of ± 6 mm from true surface level.

The finished surface shall be sealed with bituminous sealing grit immediately after rolling and before use by site vehicles.

3.4.8 Surface Course

Either:

- Hot Rolled Asphalt HRA 35/14 surf 40/60 grade bitumen with 20mm chippings to BS EN 13108-4 and SHW Clause 910 (note – for industrial or high-stressed areas, other options are available. The Developer should contact the LHA to discuss further)

Or:

- Close Graded Asphalt Concrete AC10 close surf 100/150 grade bitumen to BS EN 13108-1 and SHW Clause 912 (note – this material is not currently approved by Wirral Council for use in adoptable highways)

For these materials, the coarse aggregate shall have the following properties: -

- Minimum Polished Stone Value (PSV) to be 65.
- Maximum Aggregate Abrasion Value (AAV) to be 12
- Limestone aggregate is not acceptable in surface courses.

Transportation and Delivery

Transportation and installation of material to BS 594987 and SHW Clause 903.

The material shall be transported to site in insulated lorries and shall be sheeted so as to prevent an excessive drop in temperature and to ensure its protection from adverse weather conditions.

The material shall be delivered at a temperature which enables it to be compacted in accordance with the following requirements: -

- HRA 35/14 surf 40/60:
 - Min temperature on delivery 140°C
 - Min temperature immediately prior to rolling 85°C
- AC10 close surf 100/150
 - Min temperature on delivery 120°C
 - Min temperature immediately prior to rolling 95°C
- WBC recommend that the minimum temperature for laying asphalt is 6°C and rising. Temperatures below this can hinder proper compaction and curing of the asphalt.

Surface Course Laying

The binder course surface shall be clean and free from standing water and shall be acceptable to the Engineer prior to the laying of the surface course.

When a tack coat is required it shall be applied by spraying with a fine mist spray at a rate of 0.5 litres/ m².

The surface course material shall be spread and laid by a paving machine. Hand laying is only acceptable in small areas inaccessible to a machine.

The material shall be spread evenly to the correct profile and crossfall/camber to the total thickness shown on the drawings approved by the Engineer and compacted with an 8-10 tonne smooth-wheeled roller until no further compaction can be achieved.

Longitudinal joints shall be “knit” and rolled together, transverse joints and joints where the coated macadam abuts an existing surface shall be cut back to a vertical face that exposes the full thickness of the layer and painted with a thin uniform coating of 40/60 or 70/100 grade hot bitumen or cold applied thixotropic bitumen compound of similar grade before the adjacent width is laid.

The finished surface of the completed surface course shall be within a tolerance of ±6mm from true surface level.

Precoated Chippings

Precoated chippings shall be 20mm nominal size and comply with BS EN 13108-4 and SHW Clause 915, with a maximum AAV of 12 and a minimum PSV of 65. Limestone is not acceptable as a suitable material for chippings.

Precoated chippings with a minimum PSV of 68 may be required at high-risk locations. The Developer must discuss these sites with Wirral Council to determine the extent of high PSV surfacing required.

Precoated chippings shall be spread at rates described in BS 594987 and shall be applied with a mechanical chipping spreader. Spread rate of 12kg/m² for chippings. An unchipped channel not less than 150mm wide shall be left along the kerb to allow surface water to flow to the gullies.

The surface texture depth required is 1.5mm minimum. However, on low speed roads, the texture depth can be reduced to 1.2mm.

3.4.9 Horizontal Alignment

The horizontal alignment of the carriageway shall be constructed and all other parallel alignments shall be correct within a tolerance of 25mm from the design alignment (except for kerbs, channel blocks and edge lines), which shall be laid with smooth alignment within a tolerance of $\pm 13\text{mm}$.

3.4.10 Vertical Alignment

The design levels of the pavement course shall be calculated from the vertical profile, crossfalls and pavement course thickness described in this Specification.

The level of any point on the constructed surface of the pavement courses shall be the design level subject to the appropriate tolerances indicated below:

- Surface Courses $\pm 6\text{mm}$
- Binder Courses $\pm 6\text{mm}$
- Base Courses $\pm 8\text{mm}$
- Sub-bases $+10\text{mm}$
 -30mm

Notwithstanding the tolerances above, the cumulative tolerance shall not result in a reduction in thickness of the pavement, excluding sub-base, of more than 15mm from the specified thickness nor a reduction in thickness of the bituminous surface course by more than 5mm from that specified. Refer to SHW Clause 702.

3.5 KERBING AND EDGING

3.5.1 Precast Concrete Kerb and Edging

Materials

Precast concrete kerbs shall be to SHW Clause 1101 and BS EN 1340, in pressed concrete with hardstone aggregate.

Kerbs to provide a nominal 125mm kerbface shall be 125mm x 255mm Type HB2 half battered.

Bullnosed kerbs to provide a 25mm kerbface at domestic vehicle crossings and laid flush at pedestrian crossings shall be 125mm x 150mm Type BN.

Special taper kerbs Type DL1 and DR1 shall be used to reduce kerb face for crossings.

The correct radius kerb shall be used for radii of 12.0m or less.

Edgings shall be 50mm x 150mm Type EF flat topped to BS EN 1340.

Kerb Foundations

The kerb race shall be not less than 325mm wide by 150mm deep cast in situ using mix ST1 concrete, formed using formwork and compacted with a vibrating poker or tamped level with a rough face.

Kerbs shall be laid on not less than 10mm and not more than 40mm of bedding mortar to SHW Clause 2601.

Immediately after laying kerbs shall be backed and/or haunched with mix ST1 concrete.

Kerb bed and haunching concrete to be compacted by tamping.

All joints between kerbs shall be unpointed and not greater than 2mm wide.

Laying Edgings

Precast concrete edgings shall be laid by tamping each edging into a foundation of mix ST1 concrete 250mm wide X 200mm deep. The concrete shall be compacted by tamping.

3.6 FOOTWAY CONSTRUCTION

3.6.1 Order of Work

All drainage and sewers, statutory undertakers mains and street lighting cabling which runs along the footway shall be installed and all trenches and pits shall filled in accordance with “Highway Surface Water Drainage: Filling of Trenches and Pits”, before footway construction can commence.

3.6.2 Formation Preparation

The formation shall be prepared by moving all organic material, any wet, dusty, loose or deteriorated material, grading with granular material to the required level and compacting by rolling.

A total weedkiller shall be applied in accordance with the manufacturers’ instructions.

3.6.3 Foundation

Foundation material shall be Type 1 granular sub-base material to SHW Clause 803.

Laying the Foundation

The granular sub-base material shall be spread evenly by hand to the correct profile as follows:

- Normal Footways in one 100mm thick layer after compaction
- Industrial Footways in two 75mm thick layers to give 150mm total thickness after compaction
- Footway Crossings to domestic and industrial premises in two 100mm thick layers to give 200mm total thickness after compaction
- The material to be compacted in accordance with Table 10
- During compaction the surface profile and / or any areas of segregation must be corrected by spreading stone fines.
- The finished surface shall be within $\pm 12\text{mm}$ of the proper surface profile.

3.6.4 Binder Course

Material

Asphalt Concrete AC20 dense bin 40/60 grade bitumen to BS EN 13108-1 and SHW Clause 906

Laying the Binder Course

The sub-base shall be clean and free from standing water.

The material shall be covered with tarpaulins whilst being delivered and stored on site.

The binder course material shall be spread and compacted evenly to the required profile as follows:

- Normal Footways 50mm thick
- Footway crossing to industrial premises 75mm thick
- Footway crossing to domestic premises 75mm thick
- The material shall be compacted by rolling with a 3 tonne roller until no further compaction can be achieved. Joints shall be “knit” and rolled together.
- The finished surface shall be within $\pm 6\text{mm}$ from true surface level.

3.6.5 Surface Course

Material

Asphalt Concrete AC6 dense surf 160/220 grade bitumen to BS EN 13108-1 and SHW Clause 909

Limestone aggregate is not acceptable in surface courses.

Laying the Surface Course

The binder course shall be clean and free from standing water.

If required, due to settlement or in order to correct surface profile a separate regulating course of surface course material shall be laid to bring the surface within the required tolerances, and rolled.

If the binder course is dry and dusty or the binder has stripped, a tack coat emulsion shall be applied by spraying with a fine mist spray at a rate of 0.5 litres/m^2

The start and finish of the surface course and all construction joints shall be “keyed in” to the adjacent surface.

The material shall be covered with tarpaulins whilst being delivered and stored on site.

The surface course material shall be spread and compacted evenly to the required profile to a layer thickness of 25mm.

The material shall be compacted by rolling with a 3 tonne roller until no further compaction can be achieved.

The finished surface shall be within $\pm 6\text{mm}$ from true surface level and shall be 3-6mm above any kerb or channel block or gully frame.

3.7 TRAFFIC SIGNS

3.7.1 General

Traffic signs shall be in accordance with the “Traffic Signs Regulations and General Directions 2002” and amendments thereof

Traffic signs to comply with BS EN 12899-1.

3.7.2 Materials

Posts

Posts for permanent traffic signs shall be either tubular rectangular hollow section steel with base plates, shall be hot dip galvanised in accordance with BS EN 1461:2009 and comply with SHW Series 1900.

Signs

All signs unless otherwise specified are to be Class Ref 2 retroreflective, with a manufacturers guarantee of not less than 10 years.

The whole of the back surface to be covered with grey non-reflective plastic sheeting or other grey finish with a manufacturers guarantee of not less than 5 years.

3.7.3 Assembly and Erection

All brackets, “u” bolts and clips used in sign assemblies shall be manufactured in stainless steel, they shall be completed with stainless steel nuts and bolts and 2 No stainless steel washers and 1 No stainless steel spring washer for each bolt.

An arrangement to prevent forced rotation shall be provided for all signs mounted on a single post.

Unless otherwise agreed with the Engineer posts shall be installed centrally in 500mm diameter augered holes, backfilled with Mix ST1 concrete to within 100mm of ground. The planting depth shall be 600mm and for illuminated signposts with cable entry slots of 150mm x 150mm, the bottom of the slot is to be 500mm below ground.

Exact locations for signs must be agreed on site with the Engineer.

Except where a new sign is to be erected in exactly the same position as an existing sign, it shall be erected and fully operational before the sign it replaces is removed or masked.

3.8 CARRIAGEWAY MARKINGS

3.8.1 General

Carriageway markings shall consist of continuous or intermittent lines, letters, figures, arrows or symbols conforming with the requirements of the Traffic Signs Regulations and General Directions 2002.

All hot thermoplastic materials to comply with BS EN 1871 and BS EN 1436

All white markings shall be reflectorised with glass beads incorporated into the road marking mixture and to the wet surface of the marking.

The Road Marking Contractor shall be certified to BS ISO 9000 “Quality Assurance” for the application of his materials.

The Developer shall carry out road marking and remarking operations at the locations in accordance with the instructions of the Engineer.

If the Developer removes any yellow edge of carriageway markings, he shall provide “No Waiting Cones”, positioning them at 20m intervals and remove them once the markings are reinstated.

3.8.2 Laying and Removal of Markings

The Developer shall be responsible for thoroughly cleaning the carriageway surface, in the case of extensive removal of detritus and/or loose chippings the Engineer may require the Developer to use a mechanical sweeper.

Road markings shall be laid in accordance with SHW Clause 1212.

The removal of permanent road markings shall be done by mechanical means and in a manner that will avoid damage to existing road surface.

On concrete carriageways and where directed by the Engineer, a tack coat shall be applied in accordance with the manufacturers instructions.

The Developer shall protect newly laid markings from being trafficked by vehicles or pedestrians until they have cooled sufficiently to prevent damage to the markings or injury to the public.

Junction and mini roundabout markings to be laid a maximum of 2 days after the laying of the surface course

All other markings to be laid a maximum of 7 days after the laying of the surface course.

Standard Drawings

Wirral Borough Council Standard Details

<u>Drawing No'</u>	<u>Revision</u>	<u>Title</u>
HSC/100/01	0	Advanced Works Information Signs Type C
HSC/300/01	0	Single Rail Timber Fence
HSC/300/02	0	4 Rail Double Protection Timber Fence
HSC/300/03	0	Painted Steel Palisade Fencing Details
HSC/300/04	0	Rigid Mesh Fence
HSC/300/05	0	Painted Mild Steel 'Hurdle' Type Fencing
HSC/300/06	0	Painted Steel Palisade Gate Details
HSC/300/07	0	2 Hole Coastal Newel
HSC/300/08	0	3 Hole Coastal Newel
HSC/300/09	0	4 Hole Coastal Newel
HSC/300/10	0	Access Gate
HSC/300/11	0	Sand Fence Frame
HSC/300/12	0	Lockable Gate
HSC/400/01	0	'Visimax' Pedestrian Barrier System
HSC/500/01	0	Pipe Connections to Sewers Connection not greater than 225mm diameter
HSC/500/02	0	Type 7A & B Chamber
HSC/500/03	0	Heavy Duty Gully
HSC/500/04	0	Medium Duty Gully
HSC/500/05	0	Light Duty Gully
HSC/500/06	0	Side entry Gully

HSC/500/07	0	Polypropylene Footpath Gully
HSC/500/08	0	Brick Built Catchpit
HSC/500/09	0	Plastic Inspection Chamber
HSC/500/10	0	Carriageway Ironwork
HSC/700/01	0	Reinforced Concrete Bus Bay
HSC/700/02	0	Concrete Carriageway Reinstatement/ Widening
HSC/700/03	0	Mastic Asphalt Speed Cushion
HSC/700/04	0	Road Hump With A Flat Top And Ramp
HSC/700/05	0	Road Hump With A Flat Top And Tapered Sides
HSC/700/06	0	Road Hump With A Flat Top Extending Across Width Of A Carriageway
HSC/700/07	0	Road Hump With A Round Top And Tapered Sides
HSC/1100/01	0	HB Kerb, PCC and Timber edge
HSC/1100/02	0	Bus Access Kerb Typical Cross Section
HSC/1100/03	0	Bus Access Kerb 160mm Transition Kerb
HSC/1100/04	0	Trief (Containment) Kerb
HSC/1100/05	0	Edge Kerb
HSC/1100/06	0	Channel Detail
HSC/1100/07	0	Polymer Concrete Kerb Drain and Channel
HSC/1100/08	0	2 Part Concrete Kerb Drain
HSC/1100/09	0	Blister Tile
HSC/1100/10	0	Ribbed Tactile
HSC/1100/11	0	Adhesive Tactile (Blister)
HSC/1100/12	0	Adhesive Tactile (Corduroy)
HSC/1100/13	0	Typical Tactile Pavior At Uncontrolled In-Line Crossing

HSC/1100/14	0	Typical Tactile Pavement At Uncontrolled Crossing Away From Junction
HSC/1100/15	0	Recycled Plastic Bollard
HSC/1100/16	0	'Manchester' Bollard
HSC/1100/17	0	Steel Bollard
HSC/1100/18	0	Cycle Parking Stand
HSC/1100/19	0	Cycle Parking Stand With Plaques
HSC/1100/20	0	Tree Pit Detail (Paved Areas)
HSC/1100/21	0	Litter Bin (Single Fixing) Base Detail
HSC/1100/22	0	Highway Bench
HSC/1100/23	0	Coastal Bench
HSC/1100/24	0	Recycled Street Name plate
HSC/1200/01	0	Non Illuminated Sign Post
HSC/1200/02	0	Externally Illuminated Sign
HSC/1200/03	0	Transilluminated Sign Variable Fixing Height
HSC/1200/04	0	Transilluminated Sign Post Top Mounted
HSC/1200/05	0	Traffic Sign Diagram No. 606/515 Externally Illuminated
HSC/1200/06	0	Traffic Sign Diagram No. 606/515 Transilluminated
HSC/1200/07	0	Offset Brackets For Standard Traffic Signs
HSC/1200/08	0	Refuge Beacon (Not For Use At Zebra Crossing)
HSC/1200/09	0	Typical Traffic Sign Brackets
HSC/1200/10	0	Zebra Crossing pole and globe assembly
HSC/1200/11	0	Refuge Beacon With Keep Left Sign (Not For Use At Zebra Crossings)
HSC/1200/12	0	Zebra Crossing Supplementary Lighting Detail

HSC/1200/13	0	Transilluminated School Crossing Patrol Sign And Flasher
HSC/1200/14	0	Typical Type A Sign Lighting Unit
HSC/1200/15	0	Typical Type B Sign Lighting Unit
HSC/1200/16	0	Typical Type A Fully Ducted Baselit Bollard System
HSC/1200/17	0	Typical Type B Baselit Bollard System
HSC/1200/18	0	275mm Diameter Aspect Bollard Shell
HSC/1200/19	0	600mm Diameter Aspect Bollard Shell
HSC/1200/20	0	Self-Righting Bollard
HSC/1200/21	0	Solar Power Transilluminated Traffic Bollard With Battery In Base
HSC/1200/22	0	Solar Power Transilluminated Traffic Bollard With Battery In Shell
HSC/1200/23	0	Marker Post
HSC/1200/24	0	Pole Housing Unit
HSC/1200/25	0	Controller Unit Foundation
HSC/1300/01	0	Column, Sign, Bollard And Feeder Pillar Numbering
HSC/1300/02	0	Overhead Warning Notices For Lighting Columns
HSC/1400/01	0	Typical Private Cable Network Cut-out Layout Sheet 1 of 20
HSC/1400/02	0	Type A Cut-out Termination Sheet 2 of 20
HSC/1400/03	0	Type B Cut-out Termination Sheet 3 of 20
HSC/1400/04	0	Type C Cut-out Termination Sheet 4 of 20
HSC/1400/05	0	Type D Cut-out Termination Sheet 5 of 20
HSC/1400/06	0	Type E Cut-out Termination Sheet 6 of 20
HSC/1400/07	0	Type F Cut-out Termination Sheet 7 of 20

HSC/1400/08	0	Type G Cut-out Termination Sheet 8 of 20
HSC/1400/09	0	Type H Cut-out Termination Sheet 9 of 20
HSC/1400/10	0	Type I Cut-out Termination Sheet 10 of 20
HSC/1400/11	0	Type J Cut-out Termination Sheet 11 of 20
HSC/1400/12	0	Type K Cut-out Termination Sheet 12 of 20
HSC/1400/13	0	Type L Cut-out Termination Sheet 13 of 20
HSC/1400/14	0	Type M Cut-out Termination Sheet 14 of 20
HSC/1400/15	0	Type N Cut-out Termination Sheet 15 of 20
HSC/1400/16	0	Type O Cut-out Termination Sheet 16 of 20
HSC/1400/17	0	Type P Cut-out Termination Sheet 17 of 20
HSC/1400/18	0	Type Q Cut-out Termination Sheet 18 of 20
HSC/1400/19	0	Type R Cut-out Termination Sheet 19 of 20
HSC/1400/20	0	Type S Cut-out Termination Sheet 20 of 20
HSC/1400/21	0	Typical Chamber Installation Sheet 1 of 12
HSC/1400/22	0	Footway Access Chamber 930mm x 450mm Sheet 2 of 12
HSC/1400/23	0	Footway Access Chamber 450mm x 450mm Sheet 3 of 12
HSC/1400/24	0	Signal Pole Cable access chamber 450mm x 450mm Sheet 4 of 12
HSC/1400/25	0	Signal Pole Cable access chamber 290mm x 275mm Sheet 5 of 12
HSC/1400/26	0	Signal Pole Detail Sheet 6 of 12
HSC/1400/27	0	Signal Pole Replacement Unit detail (Flexible Connection) Sheet 7 of 12
HSC/1400/28	0	Footway Access Chamber 600mm x 450mm x 520mm Sheet 8 of 12
HSC/1400/29	0	Footway Access Chamber 600mm x 450mm x 680mm

		Sheet 9 of 12
HSC/1400/30	0	Footway Access Chamber 600mm x 450mm x 820mm Sheet 10 of 12
HSC/1400/31	0	Footway Access Chamber 450mm x 450mm x 520mm Sheet 11 of 12
HSC/1400/32	0	Footway Access Chamber 450mm x 450mm x 830mm Sheet 12 of 12
HSC/1400/33	0	Carriageway Reinstatement of Typical Ducting Arrangement Sheet 1 of 9
HSC/1400/34	0	Footway Reinstatement of Typical Ducting Arrangement Sheet 2 of 9
HSC/1400/35	0	Verge Reinstatement of Typical Ducting Arrangement Sheet 3 of 9
HSC/1400/36	0	Footway Reinstatement of 4-way Street Lighting Duct Arrangement Sheet 4 of 9
HSC/1400/37	0	Footway Reinstatement of 4-way Traffic Signal Duct Arrangement Sheet 5 of 9
HSC/1400/38	0	Carriageway Reinstatement of 4-way Street Lighting Duct Arrangement Sheet 6 of 9
HSC/1400/39	0	Carriageway Reinstatement of 4-way Traffic Signal Duct Arrangement Sheet 7 of 9
HSC/1400/40	0	Footway Reinstatement of Combined Street Lighting and Signal Duct Arrangement Sheet 8 of 9
HSC/1400/41	0	Carriageway Reinstatement of Combined Street Lighting and Signal Duct Arrangement Sheet 9 of 9
HSC/1400/42	0	Traffic Signal Controller Root Base Foundation Detail
HSC/1400/43	0	Mini Feeder Pillar
HSC/1400/44	0	Cast Iron Service Feeder Pillar

HSC1400/45	0	Typical Earth Electrode and Inspection Pit Detail
HSC/1400/46	0	Steel Service Feeder Pillar
HSC/1400/47	0	Feeder Pillar, Terminations and Cable Labelling Details
HSC/1700/01	0	Concrete Repairs
HSC/2300/01	0	Bridge Expansion Joint Type A – Elastomeric rail
HSC/2300/02	0	Bridge Expansion Joint Type B – Plug Joint
HSC/2300/03	0	Bridge Expansion Joint Type C – Nosing Joint
HSC/2300/04	0	Bridge Expansion Joint Type D – Buried Joint

Wirral Council -Development Special Details

No. Ref	Special Detail Title
WBC/0700/01	Adoptable Carriageway Construction Details
WBC/0700/02	Carriageway Edge Reinstatement
WBC/0700/03	Typical Tie-In & Strip Widening Detail
WBC/0700/08	Flexible Carriageway & Footway Trench Reinstatement
WBC/1100/01	Footway Detail-Flexible Construction
WBC/1100/40	Vehicular Crossing Concrete (Commercial)
WBC/1100/41	Vehicular Crossing HRA (Commercial)
WBC/1100/42	Vehicular Crossing Flexible Construction
WBC/1200/10	Shared cycleway traffic sign
WBC/1200/11	End of cycleway traffic sign

