

5. The Proposed Scheme

5.1 Introduction

- 5.1.1 As described in earlier chapters, the Scheme is being prepared in accordance with the Standard TD 37/93 Scheme Assessment Reporting. Stages 1 and 2 have been completed and reported and the Preferred Option that resulted from that work was announced in June 2006. The Preferred Option will widen the existing Shore Road from Shore Avenue (University) to Station Road and provide a new inland road from there to Seapark where it will rejoin the A2 at the existing dual carriageway. The completed road will be a dual carriageway.
- 5.1.2 This chapter sets out the Scheme that has been developed from the Preferred Option. Firstly, some background information is given to explain how the Scheme is being procured and the implications of that process.
- 5.1.3 The design has been developed in more detail using current best advice and design standards. The key elements of this are explained. The Scheme is then described along its length, starting at the south end, and then some particular elements of the Scheme are further described. Finally there is an explanation of how the Scheme might be constructed, any restrictions that might apply to the construction process and the overall anticipated construction programme.

5.2 Scheme Procurement

- 5.2.1 The statutory procedures governing the construction and improvement of trunk roads are contained in The Roads (Northern Ireland) Order [1993 No. 3160 (N.I. 15)].
- 5.2.2 Article 67A of The Roads (Northern Ireland) Order 1993 as inserted by regulation 2 of the Roads (Environmental Impact Assessment) Regulations (Northern Ireland) 1999 provides that the Department must publish any determination made by it as to whether or not a relevant project should be made subject to an environmental impact assessment in accordance with Council Directive No. 85/337/EEC as amended by Council Directive No. 97/11/EC.
- 5.2.3 A Direction Order, under Article 14 of The Roads (Northern Ireland) Order 1993 provides that, where the Department considers it expedient for the purpose of extending, improving or reorganising the trunk road system that any road should be designated as a trunk road; the Department may direct that (a) any existing road (b) any road in the course of construction or (c) any road proposed to be constructed shall become a trunk road and the trunk road system should be modified accordingly. Planning approval for a trunk road is not required, as each Scheme is subject to public consultation during the Direction Order procedures.
- 5.2.4 The A2 Shore Road at Greenisland is a trunk road. Part of the road will be improved and a new length of trunk road will be constructed and part of the A2 Shore Road will cease to be a trunk road. A draft Direction Order has been prepared for the construction of the new trunk road, for the de-trunking of part of Shore Road and for other changes to the road network arising from the Scheme.
- 5.2.5 A Vesting Order under Article 113 of The Roads (Northern Ireland) Order 1993 provides that, where the Department desires to acquire any land otherwise than by agreement, the Department may make an order vesting the land in the Department. As

the Scheme will require significant areas of land, a draft Vesting Order has also been prepared for the vesting of land required for the construction of the Scheme.

5.2.6 The improvement of the existing road will have a direct impact on a number of properties on the route. It requires the demolition of a number of properties but also requires the acquisition of parts of a number of gardens. The boundaries of the gardens will not only be moved but will change in form where new walls are provided to either retain the remaining garden where that will be above the widened road or to retain the widened road where that will be above the garden. The changes in level between the road and gardens will require the alteration of driveways and pedestrian accesses.

5.2.7 Consequently, significant accommodation works are required at many properties. In order to advise those with an interest in the property about the likely changes, design work has included the provision of new or altered access to properties. Discussions have been held with those interests to give information and assurances about how their interests would be served, e.g. how they would gain access to their property and how the new boundaries could be treated. The level of design required, and the assurances and agreements reached with interested parties, will put a significant constraint on the further development of the design and this would be reflected in any future contract for construction.

5.3 Design of Preferred Route

5.3.1 It was determined that the preferred option should be based on the combination of online widening with a partial bypass. It can be considered in the two sections, as there are significant differences between them. The Scheme is shown in Figure 5.1 – Preliminary Scheme Design.

Online Section (Improvement of the existing road)

5.3.2 The critical factor in the design of the online improvement is that it will remain an urban road with direct accesses to residential properties, accesses into small estates and an access to Belfast High School. Thus the road has to provide facilities for high flows of traffic, for pedestrians and cyclists, for bus services and not least for access to adjacent properties.

5.3.3 The existing 40mph speed restriction will remain, in line with Shore Road to the south of the Scheme. It has thus been designed with a 70kph (40mph) design speed though it will closely follow the alignment of the existing road in order to minimise impact on adjacent property.

5.3.4 A balance had to be found for the operational needs of traffic and non-motorised road users, for the safety of all road users and the impact of widening on adjacent properties. It was determined that the most appropriate provision is a road with a 2 + 2 urban dual carriageway. The proposed carriageway width of 6.75m is not a standard cross-section but would be adequate for predicted traffic flows and would help minimise land take. This could be arranged as a 3.5m nearside lane adjacent to the kerb and a 3.25m offside lane adjacent to the central reserve.

5.3.5 It is proposed that there will be a 3.5m shared footway / cycleway on the lough side of the road, which would be continuous and a 2.5m footway on the landward side (driveways would cross at footway level on both sides of the road). A central reserve of 2.5m width will be provided and this will facilitate pedestrian movements across the road.

- 5.3.6 In total, the width of road would be 22m wide. Boundary works would lie outside those limits. The widened road generally follows the vertical alignment (or levels) of the existing road but changes in level would be accommodated in most cases by retaining walls to minimise impact on adjacent property.
- 5.3.7 The natural fall of the land is from landward to shoreward and as a result at some properties, the widening to landward will cause the remaining driveway to be both shorter and with an increase in height difference to the normal parking area of the driveway. In order to ease the difficulty of retaining vehicle access to property in those situations, it is proposed that the improved road will have a constant crossfall from landward side to lough side to match the natural situation as that would tend to reduce the height difference.
- 5.3.8 An essential element of the improvement is to leave accesses better (safer) than they are at present. Having a 2.5m footway and a 3.5m shared cycleway/footway will bring an improvement in visibility for drivers leaving their premises. Where accesses are otherwise altered due to land acquisition, other improvements are incorporated. Single dwelling accesses for example will have improved visibility to pedestrians by splaying wing walls at the entrance.
- 5.3.9 The online section of the Scheme is summarised as follows. There will be no changes to the first approximately 250m of the road from the Jordanstown Junction. The road will thereafter be widened to give an improved approach to the Shore Avenue (University) Junction and across the access to The Grange residential estate. The road will be widened to the dual carriageway standard described above from the Shore Avenue (University) Junction to the Station Road Junction. North of Station Road the improved road would link to the new offline section of road.

Offline Section (The new trunk road)

- 5.3.10 The new offline section of the road will run from Station Road Junction to the Seapark Junction. It is proposed that the offline new road will be provided as an extension of the existing rural 2 + 2 dual carriageway to the north. Thus it will have dual 7.3m carriageways, which will be kerbed as in the dual carriageway to the north, and the verges and central reserve will be grassed.
- 5.3.11 There will be no direct accesses to the road and where the road crosses a private road, Whinfield Lane, a bridge will be provided for the private road to cross over the new trunk road. There will be no footway or cycleway provision on the new road as the bypassed section of Shore Road would be a more appropriate route for pedestrians and cyclists.
- 5.3.12 It is proposed that the 50mph speed restriction on the existing dual carriageway be extended along the new road. It has thus been designed with an 85kph (50mph) design speed. The new road will therefore be provided with safety fences along the central reserve and at other locations as appropriate.

Junctions and Accesses

- 5.3.13 There will be four controlled junctions and a standard roundabout over the length of the Scheme. They are the existing Jordanstown Road traffic signals, which will remain unchanged, new 24hr operation signalised roundabouts at Shore Avenue (University), Shorelands and Station Road Junctions, and a new roundabout at Seapark where the new road reconnects with the existing A2 dual carriageway, replacing the existing traffic signalled junction.
- 5.3.14 The dual carriageway layout will prevent right-turning movements in and out of driveways and minor accesses and access to those premises will be restricted to left-in

/ left-out. Consequently, provision will have to be made at junctions to provide an opportunity for U-turn movements and the roundabouts will provide the required U-turn facilities for the properties that are limited to left-in / left-out. The Seapark junction will give access to the north end of the bypassed section of Shore Road.

- 5.3.15 Three of the roundabouts will have 24hr signal controlled entries (signalised roundabouts). This is partly to ensure that all traffic has a reasonable chance of entry but that the relatively minor flows on the side roads do not overly constrain the major flows coming from the north. By virtue of the 24hr controlled operation, a tighter design can be achieved that reduces the area of land required for the roundabouts.
- 5.3.16 There will be two uncontrolled junctions; one will be at The Grange just south of Shore Avenue, and the other will be just north of Station Road as a connection to the bypassed section of Shore Road. The Grange access will be restricted to left turns out of the access, south travelling vehicles will be able to U-turn at Shore Avenue roundabout.
- 5.3.17 The new access to the bypassed section of Shore Road will have restricted movements; to buses-only turning right into the old road and all vehicles turning left-only from the old road. No other movements will be permitted. In effect this means that motorised vehicles will only gain access to the bypassed section of Shore Road via the Seapark junction. To leave the old road they would be able to use either the Seapark junction or, if travelling southwards, the restricted junction just north of Station Road.
- 5.3.18 The purpose of the restrictions described above is that it was considered essential to provide access for bus services to continue to follow their route along the old road, but at the same time there is a desire to restrict the right turn movements across the dual carriageway for safety reasons and to avoid putting in another controlled junction that would delay the major flows on the A2. The proposals at this junction are considered to be a suitable balance.
- 5.3.19 All other significant accesses to groups of houses will be limited to left-in / left-out movements. It is proposed to divide accesses serving more than one dwelling into two types. Type A will be for accesses serving more than five dwellings and Type B for five or less dwellings. These have been drawn up specifically for this Scheme and are illustrated in Figure 5.2 – Modified Access Arrangements.
- 5.3.20 Langley Hall, Silverstream Banks, the access to property Nos. 18-18c, Neill's Lane and the access to property Nos. 90-104 will be Type A, that is with radius kerbs. The access to property Nos. 10-10a, Oldstone Close and access to property Nos. 74-82 will be Type B, which is laid out more as a footway crossing.
- 5.3.21 A number of properties will have their access modified due to the effects of widening the road into the property. The majority of modifications will take place within the boundary of the remaining area of the property. In some cases it will not be practical to do that and alternative arrangements will be made. Where there is no direct impact on a property, there will be no modification.
- 5.3.22 For reference purposes, a table of properties has been prepared which lists the anticipated changes. Many of the properties share an existing access and in some cases a modified access will serve a number of properties. Some of the listings may be subject to continuing discussion of accommodation works. Impacts on access are reported in Table 5.1.

5.4 Outline of the Proposed Route

- 5.4.1 The Scheme description commences at Jordanstown Road though it is not proposed to undertake any works at this junction. Similarly for the first 250m or so, no changes are proposed to the existing Shore Road and it will remain as a wide single carriageway with 4no. 3m wide lanes and ladder markings to separate conflicting traffic flows. There is also an existing lane for right turning traffic on the southbound approach to the Jordanstown Road junction.
- 5.4.2 Access to the dwellings 682-700 Shore Road on the landward side of the road will remain as at present. However, they would have the additional facility of being able to turn left out of their property and U-turn at Shore Avenue roundabout if turning right out of their driveway was proving difficult.
- 5.4.3 The road is widened to maintain four lanes past The Grange access and the approach to the new Shore Avenue roundabout. In addition a ghost island turning pocket will be provided for vehicles turning right into The Grange access. Vehicles leaving The Grange will not be permitted to turn right, but will be able to turn left and then make a U-turn at Shore Avenue roundabout.
- 5.4.4 At present, visibility to the right from The Grange access is restricted by the parapet of the culvert of a designated watercourse running down from the University. This culvert extends some distance to the lough. The described widening of the road at the junction will be undertaken on the lough side to ensure the visibility of The Grange is not reduced and to take advantage of the long culvert. The widening in this area will affect an area of communal gardens of The Grange and on the opposite side of the road an area of woodland and the frontage of No.737.
- 5.4.5 A roundabout will be provided at Shore Avenue, the main University access, and this will have 24hr signal controlled operation. Three properties on the lough side of the junction will be permitted access via a fourth leg of the roundabout but may not be controlled by signals as there would be very occasional use of the access. Assisted pedestrian facilities will be provided on the approaches to the roundabout. Land will be required on Shore Avenue, which is a private road of the University. An arrangement of walls and slopes will be required where there are existing steep slopes on Shore Avenue.
- 5.4.6 The whole of Shore Road between the Shore Avenue and Shorelands roundabouts will be widened on the landward side only, though there will be some minor works at some loughside boundaries and accesses. It will thus be possible to construct a second carriageway between the junctions while traffic is maintained on the existing carriageway. All properties and minor accesses will be limited to left-in and left-out.
- 5.4.7 Immediately north of Shore Avenue the road will be widened within the space left by the Langley Hall development except for a 40m length where the improved road will encroach into communal gardens of Langley Hall. The widening continues through the grounds of Belfast High School, through wooded gardens and the existing entrance and standing area for special buses. New measures will be required here which will involve relocating (service) bus stops on Shore Road, providing a new pedestrian crossing and a new access arrangement for the school that will include for the school special buses that currently enter the school grounds. Some of the works will affect the boundary line of the houses opposite, property Nos. 749-761 (shared with 763,765) but only to a minor extent.
- 5.4.8 The widening continues through land already set aside at Silverstream Banks but thereafter requires acquisition of dwellings and gardens on the landward side of the

- road. Property No. 6 has already been acquired. That and property No.8, Nos.12 – 26 (8) and No.34 will have to be demolished.
- 5.4.9 The existing access to the private road Neill's Lane will be improved and a staggered controlled pedestrian crossing will be provided across Shore Road. Bus stops will have to be relocated.
- 5.4.10 Remaining properties on the landward side to Shorelands will have vehicular accesses adjusted to the new alignment, except where it will not be a practical proposition to provide access to property Nos.38 – 44 (4). A rear access will be provided for those four properties and this will be taken from Shorelands. Adjustments will be made to the properties to reconfigure their access arrangements. Pedestrian access will be retained from Shore Road, by means of steps.
- 5.4.11 A roundabout will be provided at Shorelands Junction and this will have 24hr signal controlled operation. Two properties on the lough side of the junction will be permitted access via a fourth leg of the roundabout but may not be controlled by signals as there would be very occasional use of the access. Assisted pedestrian facilities will be provided on the approaches to the roundabout. Land will be required on the southwest corner of the junction. An arrangement of walls and slopes will be required where there are existing steep slopes on Shorelands.
- 5.4.12 The road will be then be widened to Station Road on both sides rather than one side only as on this section of Shore Road that concept will avoid the loss of dwellings. Property gardens and accesses will be affected from No. 74 onwards on the landward side and No. 33 onwards, with one or two exceptions, on the lough side of the road.
- 5.4.13 Immediately south of Shorelands the road will be widened on the landward side within vacant land. That land will also be utilised for a new rear access to serve property Nos. 74 – 82 as it would not be practical to provide a direct access to Shore Road for those five properties. Adjustments will be made to the properties to reconfigure their access arrangements. Pedestrian access will be retained from Shore Road, by means of steps.
- 5.4.14 A new rear access will be provided to serve property Nos. 90 – 104 as it would not be practical to provide a direct access to Shore Road for those eight properties. Adjustments will be made to the properties to reconfigure their access arrangements. Pedestrian access will be retained from Shore Road.
- 5.4.15 A roundabout will be provided at Station Road junction and this will have 24hr signal controlled operation. One property on the lough side of the junction will be permitted access via a fourth leg of the roundabout but may not be controlled by signals as there would be very occasional use of the access. Assisted pedestrian facilities will be provided on the approaches to the roundabout. Land from residential properties will be required on all sides of the junction and No. 112 will have to be demolished.
- 5.4.16 The new road then swings away to the west and this will require the demolition of the Spar shop and associated off-licence and will take a significant part of the large garden of the property No. 132. This section will include the largely bus-only junction described earlier in paragraph 5.3.17.
- 5.4.17 From there on, the new road runs across agricultural fields to where it connects back to the dual carriageway with the new roundabout at Seapark. The road runs in a wide arc in order to avoid dwellings on Whinfield Lane. The nearest corner of the end property will be 50m from the nearest part of the new carriageway, or 60m from the house itself.

- 5.4.18 As there will be no direct access to the new road, an accommodation bridge will be provided over the new road at Whinfield Lane. This will have rights of use by all parties currently having a right of access along Whinfield Lane and also for all landowners with land adjacent to Whinfield Lane and will generally serve the needs of the area through which the new road will run.
- 5.4.19 It is intended that the route of the replacement private road would cut through the existing gate area at the eastern end of Whinfield Lane. This will minimise damage to the established hedge system running along Whinfield Lane opposite the houses. Similarly the route west of the new road would run some distance parallel to Whinfield Lane before connecting back to the lane. This avoids both the established hedge and ditch system but also a sewer running alongside the hedge.
- 5.4.20 At the north end of the new road, the existing traffic signal junction at Seapark will be replaced by a new roundabout on the new alignment. The junction will continue to serve the former factory site at Seapark though amendments will be required to the access. The bypassed section of Shore Road will become the fourth leg of the junction. All movements will be permitted at the junction. Pedestrian facilities will be provided as appropriate.

5.5 Details of the Proposed Scheme

Road Lighting

- 5.5.1 The lighting on the existing road will be retained and this will be extended as far as the new largely bus-only junction north of Station Road. Road lighting will not be provided in the more rural offline section up to Seapark Junction. The new roundabout at Seapark will have road lighting.

Earthworks

- 5.5.2 The online section of the Scheme will as stated earlier follow the existing vertical alignment. However, the lie of the land with a fall from landward to shoreward means that widening of the road to the landward will cause road levels to be below adjacent gardens. This difference in height will generally be taken out by vertical retaining walls to minimise impact on property and in that case there would be no cutting slopes. There could be a mixture of slopes and walls at the Shore Avenue and Shorelands roundabouts as the works will cut into the significant cutting slopes alongside those roads.
- 5.5.3 Conversely, on the lough side the lie of the land will mean that any widening shoreward would cause road levels to be above the gardens. Again to limit impact on gardens, retaining walls will be used to retain the road rather than by embankment slopes.
- 5.5.4 The new road bypassing part of Shore Road will lie on or above existing ground level. Embankments will be approximately 3m high or less. The highest point of the road will be at the northern edge of the property No.132 and it will fall all of the way northwards to the tie-in at Seapark. The embankments will have 1:3 slopes.
- 5.5.5 The southern end of the new road will cross over an undesignated ditch along the boundary of No.132 and at the northern end, it will cross Jointure Bay Stream, a Site of Local Nature Conservation Importance. In between it crosses both designated and undesignated storm water (buried) culverts, minor ditches and a major foul sewer. This does present some restriction on the opportunity to lower the road into cutting.

- 5.5.6 At the accommodation bridge on Whinfield Lane, the approach ramps to the bridge will have embankments up to approximately 8m high. The embankments will have slopes of 1:3. The highest point of the approach ramps will be approximately 50m from the end property on Whinfield Lane, with a further 14m to the front of the house.
- 5.5.7 It is the intention to re-use any excavated material on site. There will be practical difficulties in that material coming from online widening works will only become available in small quantities at different times. This is due to the nature of the work and the difficulties working alongside live traffic in areas where there are house accesses and numerous utilities. Nevertheless opportunities would be taken to minimise material taken from site.

Structures

- 5.5.8 There are no significantly complex structures required for the Scheme but there is a significant volume of work in walls, bridges and culverts.
- 5.5.9 As described earlier, retaining walls will be required along virtually the whole length of the online widening, wherever the road is widened into adjacent property. Where the walls retain gardens, they would become part of that property but would face to the road. Hence, it has been determined that a style of wall facing should be consistently applied along the road to improve the townscape value of the road.
- 5.5.10 The walls are generally below 3m in height and many much lower than that. The construction method would take into account the required facing, whatever the height. The construction method would also take into account the proximity of houses and although boundary walls are generally not too close to houses, some of the accommodation works for new driveways will be relatively close.
- 5.5.11 Walls that retain the road will be part of the public road. The facing of the walls would be seen from the house and not from the road and the facing would be a compromise between construction requirements and visual impact from the house.
- 5.5.12 In some cases walls will be free standing, either to continue the townscape effect or to replace an existing free standing wall. In those cases they would be part of the adjacent property.
- 5.5.13 An additional wall is proposed at the rear of property No.134. This would avoid incursion of the new road to the garden of No. 134 and also a track and stream running along its boundaries. The wall would be less than 2m high.
- 5.5.14 There will be two bridges on the Scheme; Whinfield Lane accommodation bridge and the bridge to cross the Jointure Bay Stream. The need for the accommodation bridge has been described. The bridge at the stream would be designed to minimise damage and permanent impact on the stream.
- 5.5.15 The accommodation bridge will span over the new dual carriageway. Where it will cross the road, there is a major sewer running parallel to the east side of the dual carriageway and there is also a designated storm water culvert. The location of the bridge supports will have to take these into account and it is probable that the bridge would be multi-span so that it can initially cross the culvert and sewer before crossing the road.
- 5.5.16 The bridge over the stream would have sufficient height and span that would avoid unacceptable damage to the stream and its adjacent area. Those parameters would be determined following discussions with appropriate authorities.

- 5.5.17 A number of culverts cross Shore Road within the bounds of the online improvement and these will have to be extended. Again, the required works will be determined following detailed talks with the relevant authorities.

Surface Water Drainage

- 5.5.18 The general topography gives a gradual slope downhill from the foot of the escarpment to the shore of Belfast Lough. This topography means that watercourses that have developed in the study area generally flow from the northwest to the southeast and any Scheme running southwest to northeast will cross the majority of the watercourses present.
- 5.5.19 The Scheme passes through built up areas and open fields that are crossed by watercourses and sewers. The watercourses comprise natural streams, field ditches and storm systems, which are culverted in places. Towards the Belfast Lough the watercourses are culverted through the development either side of Shore Road and under Shore Road.
- 5.5.20 Some of the road run-off from Shore Road drains into combined foul and surface water sewers before going to a treatment works. At the request of the drainage authorities, and as it is recognised good practice, no water from the improved road will be drained to the public sewers. All road run-off will therefore be drained to nearby watercourses or culverts with appropriate measures as agreed with the authorities.
- 5.5.21 For any of the watercourses used as an outfall, a condition and capacity check will require to be carried out. Where appropriate, the flow of run-off will be constrained (attenuated) to avoid overloading the existing watercourse. Where appropriate, environmental protection measures will be adopted to avoid pollution of the watercourses and Belfast Lough. The drainage of the online improvement and off-line new road will follow the same principles though the practical implementation will be different in some respects.

Drainage of the online improvement

- 5.5.22 The drainage of the road will be by kerb and gully. These will feed to carrier drains. The gradients of the vertical alignment of the road will be low in some areas and with a number of crests it may prove to be prudent to use a combined kerb and surface water drainage system rather than individual gullies. Carrier drains and or combined systems will outfall to the nearest suitable watercourse.
- 5.5.23 As the improved road will fall from landward to shoreward, the drainage of the northbound carriageway will fall to the central reserve. Given the constraints and difficulties of construction on a live road with high traffic flows, the northbound carriageway will as far as possible be constructed first and 2-way traffic flows diverted onto it. The drainage of that carriageway would therefore have to be completed before works on the southbound carriageway can begin and be independent of further drainage works on the other carriageway.
- 5.5.24 It may be prudent to intercept water from some driveways and major accesses where that would avoid excessive water running across footways and carriageways. Also, special to this case, the lough side shared cycleway/footway will fall to the back of footway and that will require collection by suitable means before draining to the road drainage system.
- 5.5.25 As Shore Road is built up on both sides, it will not be necessary to intercept run-off from the land other than as described above. It may be prudent to provide some subgrade drainage to safeguard the carriageway construction. This could be achieved

by adding a filter medium to the carrier drains and connecting that to the carrier drain outfall.

- 5.5.26 As explained earlier, the vertical alignment will follow that of the existing road. At present there are low areas at Chainages 340, 690, 1090, 1300 and 1500 and this will be repeated on the improved road. There are culverts under Shore Road near each of these locations and they will provide an opportunity to outfall the road drainage.
- 5.5.27 As the improved road will fall from landward to shoreward, the road drainage will naturally outfall to the downstream end of the culverts. The road drainage would not therefore be expected to add any demands to the culverts beneath Shore Road but would add demand to the watercourse or culvert between the road and the lough and attenuation measures may be necessary.
- 5.5.28 The area of road from which surface water runoff feeds to each culvert will vary. The measures necessary to attenuate flows will therefore also vary, subject to the capacity of the relevant culvert.

Drainage of the offline new road

- 5.5.29 As explained earlier, the high point of the new road will be at approximate Chainage 2100 at the northern edge of the property No. 132 Shore Road. South of that point, the road will drain to outfalls on Shore Road as described above. The falls towards Station Road are adequate for kerbs and gullies. The area of road to be drained will be significant and the choice of the appropriate outfall culvert will be determined by capacity checks and the condition of the available culverts.
- 5.5.30 North of the high point the new road will fall to a low point at approximate Chainage 3200, a considerable distance. The land alongside the proposed road whilst generally falling to the north does have undulations and does not mirror the constant fall of the road. It is proposed therefore to use a carrier drain system to collect the road runoff.
- 5.5.31 From Chainage 2100 to 2800, the road will fall at only approximately 0.55% (1 in 100). The road will be kerbed for reasons described earlier and therefore over the edge drainage, often associated with such low falls, would not be possible. It is proposed to employ combined kerb and surface water systems over that length at least. North of that the fall of the road will permit standard kerb and gully treatment.
- 5.5.32 Subject to the type of combined system chosen, it will at some point require to discharge into a carrier drain collection system. This will be provided within the structure of the road cross-section, for example in the verge and the central reserve as much of the road, on a curve, will have a constant superelevation.
- 5.5.33 It is recognised that some attenuation of the discharged flow will be necessary and it is proposed to provide that by provision of an attenuation pond on the approach to Jointure Bay Stream at approximate Chainage 3150. That would provide the opportunity for secondary attenuation and treatment, i.e. a sustainable urban drainage system (SUDS).
- 5.5.34 The low point of the road will be just north of the Stream and this low point drains an area from approximate Chainage 3400 where the connection to the existing road has been completed. The fall of the road in that area will be very low and a combined system would again be advantageous and would naturally outfall to Jointure Bay Stream, with appropriate measures.
- 5.5.35 On the new road section as a whole, appropriate drains will be provided to intercept any runoff from adjacent land and from groundwater that might weaken the subgrade of the new road. These will be fed to a suitable outfall.

5.6 Public Transport Facilities

5.6.1 A review of bus stop provision has been undertaken as a result of the online widening works. This is partly because the road itself will increase to a dual carriageway but also because the provision of new junctions and pedestrian crossing facilities will require existing stops to be relocated. The Scheme proposals indicate the changes.

5.6.2 It is proposed that where bus laybys will be provided where this can readily be achieved and at other locations buses will stop on the carriageway. The provision of bus laybys could not be achieved consistently without the acquisition of more residential land for that purpose and that would not be warranted.

5.6.3 It is proposed that the following provision of bus stops will be made.

- 2 retained stops in existing laybys either side of Jordanstown Junction,
- 1 existing stop placed in new layby at Loughshore Park,
- 1 decommissioned stop at The Grange,
- 2 new stops in new laybys at and opposite Langley Hall,
- 1 existing stop repositioned in new layby at Silverstream Banks,
- 1 retained stop opposite Silverstream Banks,
- 2 existing stops repositioned at Neill's Lane,
- 2 new stops in new laybys north of Shorelands Junction,
- 2 decommissioned stops opposite Nos. 76-82 Shore Road,
- 1 new stop opposite Nos. 98-104 Shore Road,
- 1 retained stop opposite No. 45 Shore Road,
- 1 existing stop (at Spar shop) repositioned in new layby north of Station Road,
- 1 new stop in new layby north of Station Road Junction,
- 2 new stops south of Seapark junction,
- 1 decommissioned stop in layby north of Seapark Junction.

5.6.4 Other stops within the bypassed section of Shore Road will remain.

5.6.5 It is intended that the bus stop facilities will be improved. In particular, shelters will be provided at all of the above locations and the footways will be wider than at present thus easing their provision and minimising disruption to other footway and cycleway users.

5.7 Construction Methods and Programme

5.7.1 The online improvement will be faced with the difficulty of maintaining traffic flows on the A2 whilst constructing the works. The construction issues and how they might affect the programme of works have therefore been considered. It confirms the special

nature of working not only alongside live traffic but dealing with numerous utilities diversions and connections to properties and maintaining access to the host of properties along the road. The key difficulty is the interface with numerous third parties (utilities, landowners, the school etc.) and how that requires work on site to be broken down into small items.

- 5.7.2 A construction strategy has been determined where the widening would be on the landward side only wherever possible, but giving due consideration to the effect on property. The approach would be to maintain traffic on the existing carriageway while the new northbound carriageway and footway are constructed. To create space, the existing carriageway would be narrowed down as much as possible whilst ensuring that an adequate footway was available on the shore side of the road, with specific crossing points for pedestrians. The working area would be protected by vertical concrete barriers with gaps for side roads and driveways from houses.
- 5.7.3 Access to the works would be from the side road crossings. Excavation around utilities and service connections to properties would be slow therefore as many sections as possible would be worked. Temporary connections and reconnections for services would be necessary as carriageway excavation and utility main apparatus diversions and the construction of new boundary walls and driveways all have to be co-ordinated in a confined space. Difficult as it would be, it is achievable and the main impact would be on the programme in that it is time consuming work.
- 5.7.4 Once the northbound works were completed, the traffic would be switched to that carriageway and the existing carriageway would be reconstructed to become the new southbound carriageway and shared footway/cycleway. Those works would not have side road access points as there are no side roads on the shore side, therefore access would have to be taken from the new carriageway opposite the new junctions. On the other hand, where widening is to the landward side only, there would be little in the way of accommodation works at the road boundary and work would be concentrated on utility connections and road construction.
- 5.7.5 Unfortunately, it has been determined that some widening will be on both sides and will follow a more meandering line through the existing corridor in order to avoid properties. As a result, working space would not be available as a constant width throughout the length of the works and the new northbound carriageway would be less than a carriageway width. Carriageway construction would be more difficult in those circumstances as would diversion of utilities and construction of highway drains.
- 5.7.6 This would present more difficult problems for maintaining traffic flows. The interfaces between third parties as highlighted in the landward side only widening would remain and be increased by the interface with the existing traffic and the associated traffic management. The main impact would be on time and disruption to the main A2 traffic as the traffic management is shuffled to suit service connections and reconstruction activities. Notwithstanding that, the aim would remain of keeping two lanes of traffic open for the majority of the working day and it may prove necessary to construct temporary carriageway on the shore side of the road to enable full construction of the northbound carriageway.
- 5.7.7 The steep nature of the land, falling rapidly away to the shore of the Belfast Lough, means that retaining walls would have to be constructed. These walls would be required on the shore side to retain the widened road above garden levels and on the landward side to retain gardens and property that are above the widened road. Subject to the form and height of wall construction, temporary access to land would be required which would be reinstated once the construction phase was complete.
- 5.7.8 Throughout all of the work, maintaining access to individual properties would be regarded as an essential target. Reconstruction of property boundaries and driveways,

which in many cases would involve the construction of retaining walls, would inevitably though lead to some degree of disruption. The same principle applies to services to the property, gas, water and electricity etc.

- 5.7.9 Aside from housing, there is a school (Belfast High School) on the landward side of the road. There are no level difficulties at those premises but there are specific access arrangements that would have to be considered. It is acknowledged that at the school, construction of the works whilst maintaining access for students, staff and visitors would present significant safety issues. Discussions would be held with the school to draw up arrangements acceptable to all parties.
- 5.7.10 In other ways, construction of the works so close to residential properties would require special measures for the works to be tolerable to residents. Noise and vibration as well as working hours would be restricted and would have to be monitored vigorously along the entire length of the works to minimise the construction activities effects on local residents and residences.
- 5.7.11 The clear advantage in construction terms of the Scheme being partly offline is that the construction difficulties in comparison with widening along the whole length are significantly reduced. Furthermore, there are no significant difficulties foreseen in constructing the offline new road between Station Road and Seapark as the road construction, drainage works, the accommodation bridge and associated items are fairly standard construction.
- 5.7.12 There could be diversions of storm water culverts and foul sewers, a number of which cross the line of the new road. The exact nature of these would be agreed with the appropriate authorities but services would be maintained during these works.
- 5.7.13 Access to land and property would be maintained throughout the works as on the online section. The works are not complex and no particular difficulties are foreseen in the construction. Impact on nearby property would be afforded the same consideration as on the online works but the difficulties will be minor in comparison.
- 5.7.14 On the online widening section, the lack of space would deem that excavated material would be removed off-site and all fill material would be imported. However, the offline section could provide space and construction requirements that could permit useful opportunities for the storing and re-use of excavated material. That could reduce the waste removal costs and also reduce the imported material costs and construction traffic to the site.
- 5.7.15 At this stage, the programme for the construction is estimated to be 24 months, which would be governed by the online widening works. Beyond that there would be a 12 months period of maintaining the new works and repairing any damage that transpires but that would not be expected to cause significant disruption to traffic or properties.

5.8 References

- Design Manual for Roads and Bridges, Volume 11, Environmental Assessment. Department of the Environment for Northern Ireland et al (August 1994, as amended up to August 2006).
- The Roads (Northern Ireland) Order 1993 [1993 No. 3160 (N.I. 15)].
- The Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 1999.

- The Roads (Environment Impact Assessment) Regulations (Northern Ireland) 1999.

Table 5.1: Impacts on Property Access (continued over)

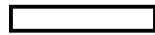
The Property	Access Unchanged	Access Modified	Total Demolition	Observations
Landward				
682 Shore Road	✓			
684 Shore Road	✓			
688 Shore Road	✓			
690 Shore Road	✓			
692 Shore Road	✓			
694 Shore Road	✓			
696 Shore Road	✓			
698 Shore Road	✓			
700 Shore Road	✓			
4 Shore Road		✓		
6 Shore Road			✓	One new access
8 Shore Road			✓	
10 Shore Road		✓		One new access
10a Shore Road		✓		
12 Shore Road			✓	One new access
14 Shore Road			✓	
16 Shore Road			✓	
18 Shore Road			✓	
18a Shore Road		✓		
18b Shore Road		✓		
18c Shore Road		✓		
18d Shore Road		✓		
20 Shore Road			✓	
22 Shore Road			✓	
24 Shore Road			✓	
26 Shore Road			✓	
28 Shore Road		✓		
30 Shore Road		✓		
32 Shore Road		✓		Access to Neill's Lane
34 Shore Road			✓	Access via Oldstone Close.
36 Shore Road		✓		Access via No.34

The Property	Access Unchanged	Access Modified	Total Demolition	Observations
38 Shore Road		✓		New rear access
40 Shore Road		✓		
42 Shore Road		✓		
44 Shore Road		✓		
74 Shore Road		✓		New rear access
76 Shore Road		✓		
78 Shore Road		✓		
80 Shore Road		✓		
82 Shore Road		✓		
84 Shore Road		✓		
86 Shore Road		✓		
86a Shore Road		✓		
88 Shore Road		✓		
90 Shore Road		✓		New rear access
92 Shore Road		✓		
94 Shore Road		✓		
96 Shore Road		✓		
98 Shore Road		✓		
100 Shore Road		✓		
102 Shore Road		✓		
104 Shore Road		✓		
106 Shore Road	✓			
108 Shore Road	✓			
110 Shore Road		✓		
112 Shore Road			✓	
Spar Shop			✓	
132 Shore Road		✓		New Access to Longville Gardens
Station Road				
1 Station Road		✓		Shared Access
1a Station Road		✓		
2 Station Road		✓		
3 Station Road	✓			
4 Station Road	✓			
Shoreward				

The Property	Access Unchanged	Access Modified	Total Demolition	Observations
737 Shore Road		✓		
739 Shore Road	✓			
739 a Shore Road	✓			
741 Shore Road	✓			
1 Lonsdale Court	✓			
2 Lonsdale Court	✓			
3 Lonsdale Court	✓			
4 Lonsdale Court	✓			
743 Shore Road	✓			
Former Boat Yard	✓			
Slip way		✓		
749 Shore Road		✓		
751 Shore Road		✓		
753 Shore Road		✓		
755 Shore Road		✓		Shared Access
755a Shore Road		✓		
755b Shore Road		✓		
755c Shore Road				
757 Shore Road		✓		
759 Shore Road		✓		Shared Access
761 Shore Road		✓		
763 Shore Road		✓		
765 Shore Road		✓		
1 Shore Road	✓			
1a Shore Road	✓			
3 Shore Road	✓			
3a Shore Road	✓			
3b Shore Road	✓			
5 Shore Road	✓			
7 Shore Road	✓			
9 Shore Road	✓			
11 Shore Road	✓			
13 Shore Road	✓			
15 Shore Road	✓			

The Property	Access Unchanged	Access Modified	Total Demolition	Observations
17 Shore Road	✓			
19a Shore Road	✓			
19 Shore Road	✓			
(Access for slipway)	✓			
21 Shore Road	✓			
21 a Shore Road	✓			
23 Shore Road	✓			
25 Shore Road	✓			
27 Shore Road	✓			
29 Shore Road	✓			Access to roundabout
29a Shore Road	✓			
29b Shore Road	✓			
31 Shore Road	✓			
31a Shore Road	✓			
33 Shore Road		✓		
35 Shore Road		✓		
37 Shore Road		✓		
37a Shore Road		✓		
37b Shore Road		✓		
37c Shore Road		✓		Shared Access
39 Shore Road		✓		
41 Shore Road		✓		
43 Shore Road		✓		
45 Shore Road	✓			
45a Shore Road	✓			
49 Shore Road		✓		
53 Shore Road		✓		Shared Access
53a Shore Road		✓		
53b Shore Road		✓		
53c Shore Road		✓		
55 Shore Road		✓		
55a Shore Road		✓		
57 Shore Road	✓			

Note:



The border highlighted in the properties column means that they are sharing the existing access.



The border highlighted in the observations column means that they are sharing the solution.