

THE HIGHWAYS ACT 1980

AND

THE ACQUISITION OF LAND ACT 1981

THE NOTTINGHAMSHIRE COUNTY COUNCIL (B684 TO A612 LINK ROAD) A6211 GEDLING ACCESS
ROAD (SIDE ROADS) ORDER 2018

THE NOTTINGHAMSHIRE COUNTY COUNCIL (GEDLING ACCESS ROAD) COMPULSORY PURCHASE
ORDER 2018

PROOF OF EVIDENCE

OF

JOHN PATCHETT OF VIA EAST MIDLANDS LIMITED

ON BEHALF OF THE ACQUIRING AUTHORITY

1. QUALIFICATIONS AND EXPERIENCE

- 1.1. My name is John Patchett. I am an Incorporated Engineer and a member of the Institute of Civil Engineers.
- 1.2. I am a Principal Project Engineer in the Highway Design section of Via East Midlands Limited, formerly the Highway Design section of Nottinghamshire County Council. My role is generally two-fold: -
 - Design and delivery of new highway infrastructure projects for Nottinghamshire County Council (“**NCC**”); and
 - Checking of third-party design submissions that impact on the highway network which is controlled by NCC thus ensuring that the highway asset is protected.
- 1.3. I have over 37 years’ experience in the design and delivery of predominantly major and minor highway projects but also including other non-highway related civil engineering schemes.

2. INVOLVEMENT WITH THE GEDLING ACCESS ROAD

- 2.1. My involvement with the Gedling Access Road Scheme (“**Scheme**”) began in 2009 when I became involved in checking a developer led design for the Scheme. This involved checking the design for compliance with design standards current at the time. Subsequently I provided technical design support to White Young Green (“**WYG**”) leading up to their 2014 planning application, reference 2014/0915. My assistance included attending public exhibitions held prior to the submission of the planning application.
- 2.2. Since 2014, I have been the Principal Designer overseeing and managing key aspects of the design including taking ownership of the base information used by the design team. I am the lead on all highway design elements and have contributed to the Contractor procurement and development of the contract information and specification for the Scheme.

3. SCOPE OF EVIDENCE

- 3.1. This Proof of Evidence focuses upon the design considered for the proposed Gedling Access Road Scheme (“**Scheme**”), provides background to the design selected and responds directly to objections received to the Scheme. In preparing this Proof of Evidence I have focussed on relevant design principles and the alternatives considered.

4. PRINCIPLES OF DESIGN

- 4.1. Principally, the Scheme has been formulated and designed via careful preparation and design work carried out in line with the requirements of the Design Manual for Roads and Bridges (“**DMRB**”) [**CD13.2**] to ensure the safe and successful delivery and operation of the Scheme. The DMRB is a set of design standards, advice and other recognised published documents relating to the design and operation of new and existing highways. The DMRB is published by Highways England, who manage and maintain the Country’s Strategic Road Network.

- 4.2. A section of carriageway in between two junctions is referred to as a link. Where these links adjoin sections of the existing highway network or major development sites, the Scheme has been designed in accordance with the 6Cs Design Guide. This guide that was adopted by NCC in 2009 for new developments. The 6Cs Design Guide deals with highways and transportation infrastructure for new developments in the areas for which Derby City Council, Derbyshire County Council, Leicester City Council, Leicestershire County Council and Nottinghamshire County Council are responsible. NCC ceased to be a member of the 6Cs in September 2018, the document referenced is now known as the Nottinghamshire Design Guide ("**NDG**") [CD11.6]. The content of the NDG remains identical to the 6C's Design Guide.
- 4.3. While specific standards have been referred to within the NDG, it should be noted that these are not exhaustive and that during the process of the Scheme design, a number of additional design standards will have been referenced, including those within the following sections of the DMRB:
- Volume 6 – Road Geometry (Section 1 Links [CD13.4] Section 2 Junctions [CD13.5], and Section 3 Highway Features [CD13.6])
 - Volume 7 – Pavement Design and Maintenance (Section 2 Pavement Design and Construction [CD13.7], Section 5 Surfacing and Surfacing Materials [CD13.8])
 - Volume 8 – Traffic Signs and Lighting (Section 1 Traffic Signals and Control Equipment [CD13.9], Section 2 Traffic Signs and Road Markings [CD13.10], Section 3 Lighting [CD13.11], Section 5 Pedestrian Crossings [CD13.12])
 - Volume 10 – Environmental Design and Management (Section 1 New Roads [CD13.13], Section 3 Landscape Management [CD13.14], Section 4 Nature Conservation [CD13.15], Section 5 Environmental Barriers [CD13.16], Section 6 Archaeology [CD13.17])

5. DETAILED SCHEME DESIGN INFORMATION

Street Type and Function

- 5.1. The Scheme comprises a new 7.3m wide single-carriageway road, 3.8km in length which will provide a new strategic link between the A612 Trent Valley Road / Nottingham Road and the B684 Mapperley Plains. The Scheme will be classified as an 'A' road, becoming the A6211, with through traffic its primary function. The existing route of the A6211 including Arnold Lane, Main Road, Shearing Hill and Burton Road will become unclassified roads, whilst the A6211 Colwick Loop Road will be reclassified as a 'B' road, becoming an extension to the B686.
- 5.2. The Scheme incorporates seven key junctions along its length to integrate the new road with the existing highway network and provide accesses to the proposed mixed-use development at the former Gedling Colliery. The key features of the Scheme are:
- Single carriageway, 7.3m wide, 3.8km long;
 - Shared footway / cycleway for the whole length of the road;
 - Street lighting for the whole length of the road;
 - A climbing lane, approximately 900m long, at a gradient of 1:12.5 (8%) from its junction with the A612 and Burton Road for northbound traffic;
 - Two signal-controlled junctions at either end of the Scheme incorporating facilities for pedestrians and cyclists (toucan crossings);

- Two major / minor priority junctions;
- Two roundabouts; and
- One toucan and one puffin crossing.

5.3. A typical cross section, south side to north side, comprises:

- Cutting or embankment of varying width;
- Verge 1.0m to 4.0m wide;
- Carriageway 7.3m wide; with exceptions, described from A612 in a north-westerly direction:
 - Two lane approach from A612, 9.0m wide;
 - Three lane departure onto A612, 10.5m wide (overall width 25.5m including central refuge);
 - Three lane approach to Burton Road junction, 10.5m wide (overall width 22.1m including central refuge);
 - Climbing lane 3.4m wide (overall width 10.2m) from the junction with the A612 and Burton Road for approximately 900m for northbound traffic;
 - Dedicated right turn lane, 3.65m wide (overall width 11m) into Lambley Lane northbound;
 - Dedicated right turn lane, 3.65m wide (overall width 11m) into Lambley Lane southbound;
 - Two lane approach and departure from eastern roundabout;
 - Two lane approach to B684 Mapperley Plains, 6.5m wide (overall width 15.4m including central refuge);
- Shared footway/cycleway, 3.0m wide, with minimum 0.5m verge; and
- Cutting or embankment of varying width

5.4. A drawing showing typical cross section along the Scheme route is at **[CD4.4.7]**

Gradients

5.5. The maximum longitudinal highway gradients of 8% occur at the following locations:

- Climbing lane between Burton Road and Gedling Wood;
- New northern section of Lambley Lane; and
- Between the western roundabout and Mapperley Plains.

5.6. Where the Scheme is constructed on embankment, the gradient of the slope is generally 1:2. These embankments will be constructed to special requirements, using either, a combination of, suitable selected fill conforming to strict geotechnical properties, or selected fill reinforced with high tensile geogrid. Where possible, gradients have been reduced to 1:3 to mitigate against these requirements and such embankments are located along the length of the Scheme.

5.7. Where the Scheme is to be constructed in cutting, the gradient is generally 1:3. A gradient of 1:3 has been adopted based upon the results of extensive ground investigation carried out across the site. The results of the ground investigation indicated that the existing soils and sub-soils varied in shear strength. Based upon these results it was determined that a safe maximum cutting/embankment gradient was 1:3. The principal exception to this is located adjacent to Gedling House Wood where space within the available space for construction of

the Scheme is limited making the provision of a 1:3 gradient unachievable. At this location, soil nails or similar will be used to retain the cutting at a gradient of up to 70 degrees to the horizontal.

Boundary Treatments

- 5.8. The highway boundary treatment shall predominantly be in the form of timber post and four rail fencing. Alternative boundary treatments are required at a limited number of locations, for example at the Walled Garden (reconstructed wall), Carlton-le-Willows Academy (palisade fencing to match existing), land adjacent Whitworth Drive (highway boundary not defined with fencing however acoustic barrier is proposed on land between the Scheme and Whitworth Drive) and where the Scheme is in close proximity to Clementine Drive (acoustic barrier).

Visibility

- 5.9. Visibility requirements including visibility splays have been designed in accordance with the DMRB. The design speed for the Scheme is 70kph with the exception of the following which have a design speed of 60kph:
- New southern section of Lambley Lane;
 - Section of the Scheme between the east and west roundabouts;
 - Access into the Keepmoat development at [xxx] from the east roundabout;
 - Access to Alkane Energy's methane plant and future development area; and
 - New Arnold Lane links onto the west roundabout.

Junctions

- 5.10. All the junctions along the Scheme including the tie in junctions at both ends have been designed (including determination of type, size and all user inclusion) in accordance with DMRB, using bespoke junction modelling software including (ARCADY, PICADY and LINSIG) to satisfy forecast traffic flows. ARCADY and PICADY are used to predict capacities, queues, deltas and safety risk at roundabouts. LINSIG is used to model and assess the impact of the introduction of traffic signals at a junction. A detailed assessment of the traffic impact of the Scheme is set out in the Proof of Evidence of Michael Barnett **[MB01]**. The description and location of the junctions are as follows starting at the Mapperley Plains end of the Scheme. Where the term chainage is used, this is a way of referencing the proposed locations of a feature or asset during the design phase and is an imaginary line starting at 0 (Mapperley Plains Road) and in this instance, is measured in intervals of 10m. Junction details are as follows:

5.10.1. The existing signalised Plains Road / Arnold Lane/ Gedling Road junction will undergo physical alterations and adjustments to signal phasing including a banned right turn from Plains Road into Arnold Lane. Signal Controlled pedestrian and cycle facilities are incorporated into the junction layout;

5.10.2. A new signalised junction will be constructed on Mapperley Plains to access the Scheme (chainage 0). The traffic signals at this junction will be linked to the aforementioned signals at the Plains Road / Arnold Lane / Gedling Road junction to

maximise junction efficiency and traffic flow. Signal controlled pedestrian and cycle facilities are incorporated into the junction layout;

- 5.10.3. A 5-arm conventional roundabout (west roundabout) will be constructed to link the Scheme both east and westbound (chainage 640) to Arnold Lane (Arnold Lane to be realigned at this location to meet the roundabout). An additional arm off the roundabout will provide access to the Keepmoat development. The roundabout will have single lane approaches and exits, an Inscribed Circle Diameter (“ICD”) of 74m and a central island diameter of 62m, providing for a 6m circulatory carriageway width. Formal uncontrolled pedestrian and cycle crossing points are included within the layout, ensuring connectivity between Arnold Lane and the Scheme whilst including provision for linking Phase 2 of the Chase Farm development;
- 5.10.4. A 4-arm conventional roundabout (east roundabout) will be constructed (chainage 1,240) to provide access to Gedling Country Park and development land on the north side of the Scheme, and the Keepmoat Development on the south side of the Scheme. The roundabout will have two lane approaches and exits for the Scheme arms and single lane approaches and exits for the two minor arms, an ICD of 60m and a central island diameter of 43.2m, providing for an 8.4m circulatory carriageway width. A Toucan crossing will be installed on the Scheme arm south-east of the roundabout, utilising an elongated approach splitter island. This is primarily to facilitate non-motorised user access to and from the Gedling Country Park;
- 5.10.5. At chainage 2,000 a ghost island major / minor priority T junction with right turn lane and central refuge traffic islands on each Scheme approach, to provide access to and from Lambley Lane south of the Scheme (Lambley Lane being severed by the Scheme). The minor road arm of the junction is a new section of road re-routeing the south section of Lambley Lane to connect with the Scheme. A mini roundabout junction is to be formed on the existing Lambley Lane to facilitate the start of the re-routeing section. Formal pedestrian and cycle facilities are included within the layout, including formal uncontrolled crossing points ensuring connectivity between Lambley Lane South and the Scheme;
- 5.10.6. At chainage 2,430 a ghost island major / minor priority T-junction with right turn lane and central refuge traffic island on each Scheme approach will provide access to and from Lambley Lane north (Lambley Lane being severed by the Scheme). The minor road arm of the junction is a new section of road re-routeing the north section of Lambley Lane to connect with the Scheme. Formal uncontrolled pedestrian and cycle crossing facilities are included within the layout, ensuring connectivity between Lambley Lane North and the Scheme to the east and west of Lambley Lane junction;
- 5.10.7. At chainage 2,700 a simple major / minor priority T-junction will be constructed to provide access to and from Gedling Wood Farm, adjacent farmland and highway surface water attenuation ponds for the Scheme. Adjacent to this priority junction, a puffin crossing will be constructed at chainage 2,745 on the revised alignment of Carlton Footpath No. 2. The puffin crossing will provide a safe route for pedestrians using this public right of way;

5.10.8. A new signalised junction will be constructed between Burton Road, the Scheme and Nottingham Road (service road, providing access to Whitworth Drive and properties 230 to 246) at chainage 3,850. The right turn manoeuvre from the Scheme into Burton Road will be banned in order to ensure sufficient design capacity at this junction. The traffic signals at this junction will be linked to the revised A612 / Scheme traffic signal junction. Signal controlled pedestrian and cycle facilities are incorporated into the junction layout;

5.10.9. The existing A612 Trent Valley Road / Nottingham Road / Burton Road will be revised to incorporate the Scheme. This revised junction layout will be in the same location as the existing signals but will incorporate an additional right turn lane and a dedicated left turn lane from the A612 into the Scheme and has been designed to minimise the footprint of the Scheme. Burton Road will then be served from the aforementioned junction on the Scheme, as will Nottingham Road (service road). Signal controlled pedestrian and cycle facilities are incorporated into the junction layout. More detail on this particular junction design choice is given in the Proof of Evidence of David Pick [DP01].

Traffic Calming

- 5.11. Traffic calming on this scheme is provided by the road alignment (horizontal) and the presence and frequency of the junctions described above.

Transport Links

- 5.12. All types of passenger transport vehicles will be able to travel along the length of the Scheme but no bus stops will be installed directly on the Scheme. This is due to the strategic nature of the route, having a higher classification than the adjacent and adjoining roads, which will in effect cause it to be treated as a clearway. The Scheme will provide two high quality public transport access points into the Keepmoat Development via the west and east roundabouts. The two new high capacity signalised junctions with the B684 Mapperley Plains and the A612 Trent Valley Road / Nottingham Road combined with the new east and the west roundabouts providing linkage onto Arnold Lane and into the Keepmoat Development, will provide opportunity to enhance and re-route existing local bus routes.

Street Lighting and Street Furniture

- 5.13. The street lighting design will be undertaken in accordance with DMRB, BS5489-1:2013 Code of Practice for the Design of Road Lighting [CD13.25 and Nottinghamshire County Council road lighting specification and adoption standards [CD13.26].
- 5.14. The design will take into consideration the requirements of surrounding local wildlife and their habitats to reduce the impact of light pollution as much as possible, with reference to the Institution of Lighting Professionals 'Bats and Lighting in the UK' document [CD13.20] where existing roosts and bat routes are present.
- 5.15. The electrical connections to all lighting columns and illuminated street furniture will be a mixture of both Distribution Network Operator ("DNO") and Private Network supplies.

- 5.16. Street lighting will be installed along the whole length of the Scheme including the new roundabouts. The proposed column heights will be 10m and 8m with LED lanterns and be positioned to the rear of the adopted footway wherever possible. In a limited number of locations, cuttings, embankments, safety fencing and other mitigation measures may require the street lighting to be installed on the opposite side of the carriageway.

Tunnels to Assist the Movement of Fauna

- 5.17. Tunnels to assist the movement of amphibians and badgers have been incorporated into the design of the Scheme.
- 5.18. The amphibian tunnels will be Climate Tunnels (made by a company called ACO) or similar, installed flush with or just below the carriageway surface. The ACO Climate Tunnel system is designed to allow small animals to cross a road safely between different areas of their natural habitat. The tunnels will be used in conjunction with the ACO Guide Wall, ACO Climate Tunnel Entrance, and ACO Climate Stilt Tunnel to form a complete guidance and crossing system. No metal reinforcement is used in the construction, so animals are not disoriented by distortion of magnetic fields, while the non-absorbent surface has minimal thermal conductivity, providing an ideal surface for amphibians to move along.
- 5.19. The badger tunnels under the new road will be constructed from 600mm diameter concrete pipes. The tunnel entrances will be formed using pre-cast headwalls, proprietary, or a site-specific design to incorporate the necessary badger netting in order to guide badgers into and through the tunnels.
- 5.20. The location of amphibian and badger tunnels are based on the recommendations of the ecological surveys, the location of ecological features within the existing site, and the design of the Scheme drainage systems (highway and overland) which incorporate attenuation ponds.

Trees, Planting and Maintenance

- 5.21. Tree planting along the Scheme route will be native species in keeping with the local landscape character and includes woodland/wet woodland and woodland edge planting. Trees to embankments will be largely 400 – 600mm transplants to enable successful establishment. Extra Heavy Standards, Select Standards and Feathered trees will be planted in some locations. There will be no trees planted within 4m of the carriageway.
- 5.22. Native hedgerow planting will also be provided along sections of the highway boundary. Grass seeding includes species rich mixes and a wetland grass mix to the balancing pond areas. Native aquatic/marginal planting will also be carried out to the balancing ponds to help improve biodiversity.
- 5.23. Landscaping will be carried out along the whole length of the route. The construction contract will include five years of establishment maintenance, after which it will be handed over to NCC as the local highway authority or relevant landowner for future maintenance.

Drainage and rainwater run off systems, including SUDS

- 5.24. The methods utilised on this Scheme to catch, convey and outfall rainwater landing on the highway and, in some sections, adjacent land, have been designed in accordance with DMRB, the design philosophy for the Scheme is based upon a sustainable drainage system (“SuDS”) adopting principals of the SuDS manual (C753) 2015 as produced by CIRIA [CD13.27]. This guidance replaces the SuDS manual (C697) published in 2007 and was updated to incorporate the latest technical advice and adaptable processes to assist in the planning, design, construction, management and maintenance of good SuDS. The drainage systems have been hydraulically modelled using the “Microdrainage” computer drainage design suite in order to prevent any flooding of the carriageway or surrounding area and limits the overall discharge rate to 5 litres per second (l/s) (green field run off rate). Full details of the drainage systems were included in the Highway Drainage Strategy [CD13.24] which was submitted to successfully discharge condition 10 of the granted planning permission (“GAR Permission”) [CD6.1].
- 5.25. A system of kerbs and trapped gullies will catch and remove rainwater from the carriageway and footway/cycleway surfaces along the whole length of the scheme. The gullies discharge into a system of carrier drains (filter drains when in cutting in order to also drain the cutting slope) and catchpit chambers. All lengths of embankment (including noise bunds) will be drained at the toe with either swales (at the Mapperley Plains end of the Scheme to the east roundabout) or ditches (remainder of the scheme length).
- 5.26. To achieve the green-field run off rate of 5l/s per hectare, a series of attenuation ponds, two significant lengths of swale, a cellular storage tank and several hydrobrakes have been incorporated into the drainage system within the highway corridor.
- 5.27. There are four outfall points for the drainage system these being the Ouse Dyke half way between the east roundabout and Lambley Lane; existing Severn Trent surface water drain immediately north west of the disused mineral line on Lambley Lane; existing watercourse north west of Gedling Wood Farm and two existing ditches running along the east side of A612 Nottingham Road.
- 5.28. Where necessary the Scheme drainage system intercepts and diverts all the existing water courses, covered and open, crossing the line of the new road. In particular the existing Ouse Dyke is intercepted west of the west roundabout and is diverted on a new route within the new highway extents to re-join the existing Ouse Dyke downstream approximately halfway between the east roundabout and Lambley Lane. In addition, runoff from the existing hillside which slopes down to the new road between Mapperley Plains and just east of Lambley Lane will be picked up by the drainage scheme and allowed for in the drainage modelling.

Routeing of public utilities

- 5.29. All Statutory Undertakers (“SUs”) with apparatus in the highway have been consulted through the New Roads and Street Works Act (“NRSWA”). Resultant diversion works will be carried out as part of the scheme and details of the objections from SUs are discussed in the Proofs of Evidence of Michael Barnett [MB01] and Andrew Prowse [AP01] including reference to diversions already completed.

Maintenance and servicing

- 5.30. A number of features have been incorporated into the design of the Scheme to facilitate the future maintenance of the highway, including:
- Vehicular accesses off the main carriageway to all the attenuation ponds including the maintenance tracks around them;
 - A maintenance strip/track along the top of the cutting slopes and bottom of embankment slopes accessed from various points along the main carriageway;
 - Traffic signal maintenance bays / hardstanding areas adjacent the traffic signal junctions;
 - Maintenance hardstanding areas on both roundabouts to accommodate maintenance vehicles;
 - The carriageway is wide enough to accommodate standard lane closures to safely carry out edge of carriageway / verge maintenance works; and
 - Three-metre-wide shared use footway/cycleway can safely accommodate parking up off carriageway of small maintenance vehicles and safety zone and workspace for adjacent verge maintenance works.
- 5.31. The maintenance of the highway will be carried out in accordance with Highway Authority maintenance policies as set out in the Nottinghamshire Highway Network Management Plan **[CD11.8]**.

Refuse collection and bin storage

- 5.32. There is suitable vehicular access off the main carriageway to allow refuse lorries to carry out refuse collections; however, it is not anticipated any refuse collections will be required along the length of the Scheme and no facilities have been included for bin storage.

Review and revision of the Design Code

- 5.33. When the road is fully operational a Stage 3 Safety Audit will be carried out in accordance with NCC's Road Safety Audit Policy **[CD13.43]**, following the principles of DMRB GG119. If necessary, amendments may be made in accordance with the recommendations of the audit.
- 5.34. Following NCC'S Road Safety Audit Policy, once the road has been operational for one year, a Stage 4 Safety Audit will be carried out. If necessary, amendments may be made in accordance with the recommendations of the audit.

6. DESIGN IMPACT ON INTERESTS OF MR RECKLESS

- 6.1. The objection to the Scheme made by Mr Christopher Neville Reckless refers to insufficient explanation of the land required adjacent to his property interest.
- 6.2. The Scheme joins the A612 at an existing traffic signal-controlled junction. Over the course of the design process, many options were considered with various design iterations with a general trend of a reduction in the footprint of the overall scheme as refinements have been made, after initial design options included a roundabout which was discounted as a result of

various factors including road safety and cost. This is described in more detail in the Proof of Evidence of David Pick [DP01].

- 6.3. The proposed junction of the two roads, satisfies the forecast traffic and pedestrian demands. From the outset, this junction has been designed such that the Scheme could be added with the minimum of abortive work and expense, whilst still meeting the forecast traffic demands likely to be placed on it in the design year of 2034. The location of the Scheme junction with the A612 subsequently defines the route of the Scheme in a north-westerly direction as it is the interface with the existing highway network.
- 6.4. Horizontal alignment is at desirable minimum in the vicinity of the walled garden, constrained to the east by the Burton Road junction and to the west by the minimum desirable radius threading between Gedling House Woods and Gedling Wood Farm. A further constraint is the residential property called Woodside (also known as Ranch Kennels) immediately to the northeast of the walled garden and at the end of Whitworth Drive. The Scheme at this point passes through NCC land between the residual area of the walled garden and Woodside.
- 6.5. Due to the vertical alignment being challenging and a maximum 8% gradient being achieved past the walled garden, a maximum relaxation of the Stopping Site Distance (“SSD”) in the vicinity of Gedling Wood Farm / Gedling House Woods has been applied to keep the depth of cut at this location to a minimum. The vertical crest curve adjacent to Gedling House Woods is the constraining factor for the SSD and a key factor to the alignment of the road past the walled garden. Where the horizontal geometry is already at desirable minimum value, as in this case, DMRB does not allow further relaxations to the horizontal alignment in combination with relaxations that have been applied to the SSD.
- 6.6. The route choice and design maximises the use of land in the ownership of NCC. The total area of the walled garden that is required to deliver the Scheme is 1,434m² and 572m² of this (representing 40%) of plot 61 being acquired is under the ownership of Mr Reckless. Fifty percent (862m²) of the walled garden required is under the ownership of the acquiring authority. The total walled garden perimeter loss as a result of the Scheme is 108m of which NCC loss is 80% (86m) and Mr Reckless loss is 20% (22m).
- 6.7. The profile view of the Scheme in relation to the walled garden is shown at Figure 1 and shows highways features in relation to the location of the wall.
- 6.8. From the centre line of the carriageway of the Scheme adjacent to the walled garden, the westbound running lane plus the climbing lane width is 6.6m (these provide for traffic travelling from the A612 in a north-westerly direction). This width is in accordance with DMRB Standard TD9/93 Section 5 “Climbing Lanes”. The westbound channel is kerbed and no additional hard strips are provided thus keeping land take to a minimum (TD9/93 Section 5 “Climbing Lanes”).
- 6.9. At this location a Vehicle Restraint System (“VRS”) is incorporated into the design. In line with DMRB design standards, this is located at a set-back of 1.2m from the westbound channel front face kerb-line. This provides an area of run off to accommodate an errant vehicle, as well as an area which will allow refuge to vehicle occupants in the event of a broken-down vehicle. The VRS has a working width class of W3 adjacent to the walled

garden. A working width class of W3 allows the restraint barrier and associated posts to move by a maximum of 1.0m if impacted by an errant vehicle. The westbound verge adjacent to the walled garden is approximately 2.65m wide, allowing an errant vehicle to be restrained within the confines of the verge at the top of the embankment slope.

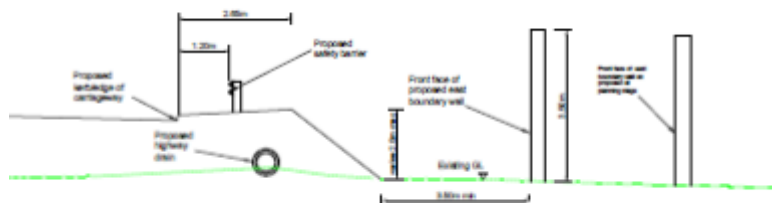


Figure 1

- 6.10. The sloped embankment at the back of the verge adjacent to the proposed rebuilt walled garden varies in gradient between 1:2 – 1:3 and the minimum distance between the toe of embankment and highway boundary fence line/outer face of the rebuilt east wall to the walled garden is 3.5m. This width is to allow sufficient access for highway verge/embankment maintenance and also sufficient access for future wall maintenance.
- 6.11. The proposed VRS through this section of the Scheme will provide a level of containment for an errant vehicle, to reduce the severity of any injuries in the event of the errant vehicle colliding with a roadside feature. The VRS is designed using DMRB TD19/06, TD27/05 and “Provision of Road Restraint Systems for Local Authority Roads” [CD13.28].
- 6.12. The performance requirements associated with the proposed VRS are determined by numerous factors and specified by the designer in line with the requirements in TD19 [CD13.3] which enables the Designer to establish the need for a vehicle restraint and its associated performance requirements. These performance requirements have an impact on the amount of land required which will enable the VRS to operate effectively and are summarised in the ensuing paragraphs:
- 6.12.1. **Visibility** - The VRS must not impede on the forward visibility of a driver; the driver must be able to see a hazard (permanent or temporary) and be afforded the correct amount of time (based on the expected vehicular speeds) to be able to stop to prevent a collision. The requirements stipulated in TD 9 [DMRB 6.1.1] [CD13.4] in respect of visibility, sightlines over and in front of safety barriers and Stopping Sight Distances must be complied with.
- 6.12.2. **Set-back** - TD 19 [DMRB 3.96] [CD13.3] states that the set-back at VRS must be in accordance with TD 27 [CD13.4] and a typical section is shown at Figure 2. Hazards, including VRS, located immediately adjacent to the edge of the paved carriageway result in drivers reducing speed and positioning their vehicles away from the hazard (edge shyness). The purpose of the set-back is to provide a lateral distance between

the VRS, and the carriageway which reduces the effect of the VRS on driver behaviour and edge shyness. A reduction in VRS set-back can exacerbate the likelihood of impacts and side-swipe collisions between vehicles in adjacent lanes; give rise to dangers to any pedestrians, cyclists, etc; difficulty with opening doors on broken down vehicles; and reduced space for maintenance vehicles and operatives.

6.12.3. **Working Width and Working Width Class** - This is defined in BS EN 1317-2 and there are no assets in the vicinity of the walled garden that would influence the working width to keep offsets to a minimum. The working width of any length of VRS is the lateral deflection (deformation) of the barrier that is required to contain an errant vehicle in the event of a collision. In essence, it is the amount the VRS will move and this will depend on its Working Width. The specified Working Width will depend on its location in the verge (set-back), the verge width from the front face of the VRS to the hazard (in this case the slope beyond the back of verge). For example, if the verge width behind the VRS available is 1.6m before the start of the embankment slope, this will dictate the working width classification of the proposed VRS as being WW4 (1.3m).

6.12.4. **Embankment Slope** – This varies between 1:3 and 1:2 at this location and its design is consistent with the approach adopted for the Scheme. The embankment width does not have an impact on the typical cross-section width at this location and the land required.

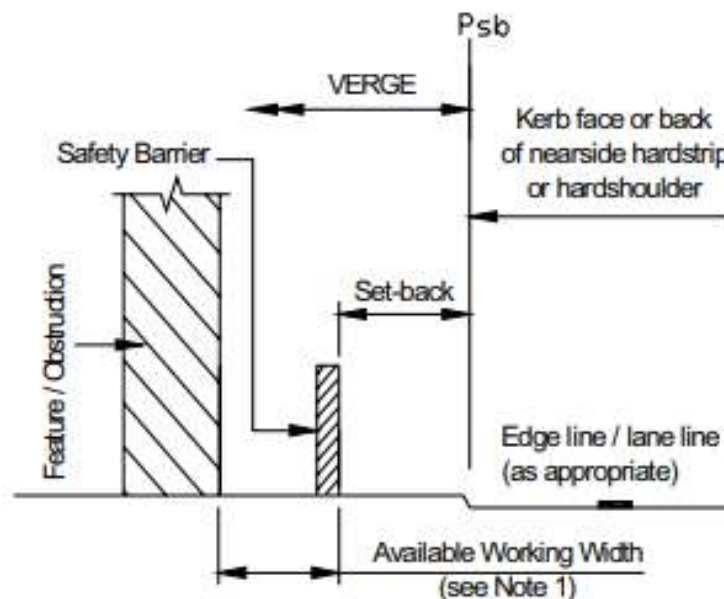


Figure 2

7. ALTERNATIVES TO THE DESIGN OF THE SCHEME AFFECTING MR RECKLESS

7.1. The design completed is in accordance with the relevant standards and guidance used and as described done in a way to maximise the use of land in the ownership of NCC and to limit as far as practical the amount of third-party land required.

- 7.2. Alternative options have been considered to reduce the land take at this location, including removal of the proposed climbing lane and provision of an integrated retaining wall within the rebuilt walled garden.
- 7.3. **Climbing lane** – the requirements for a climbing lane are covered in TD9/93 Section 5 [CD13.4]. However, given the vertical gradient at this point (8%) it is considered necessary to provide a climbing lane to facilitate overtaking of slower vehicles travelling from the A612. Without the climbing lane, overtaking is more likely and to ensure that the proposals are safe for all road users, central refuges and hatching would be required to prevent overtaking. This would require a similar width to the climbing lane. This arrangement is considered to reduce the likelihood of driver frustration and provide a safer opportunity to overtake slower moving vehicles.
- 7.4. **Integrated retaining wall** - an integrated retaining wall that is combined with the rebuilt walled garden has also been considered and shown in Figure 3. This would enable the east wall of the walled garden to be reconstructed 7.0m closer to the road at its northern end running approximately parallel to the alignment of the GAR carriageway. This option is feasible and was produced as an option to the objector in 2018. No responses to the proposal were received at the time. Subsequently the construction of the retaining wall (excluding the costs associated with reconstruction of the garden wall) was priced at approximately £68,000 more than the earth embankment option, this cost increases by another £130,000 if the retaining wall extends for the full length of the title interest. The Scheme is publicly funded, and it is considered that this does not provide a value for money option, even when considering a reduction in land take. Also, I consider that practically, this option would also not show any demonstrable visual difference to the option proposed within the Orders.

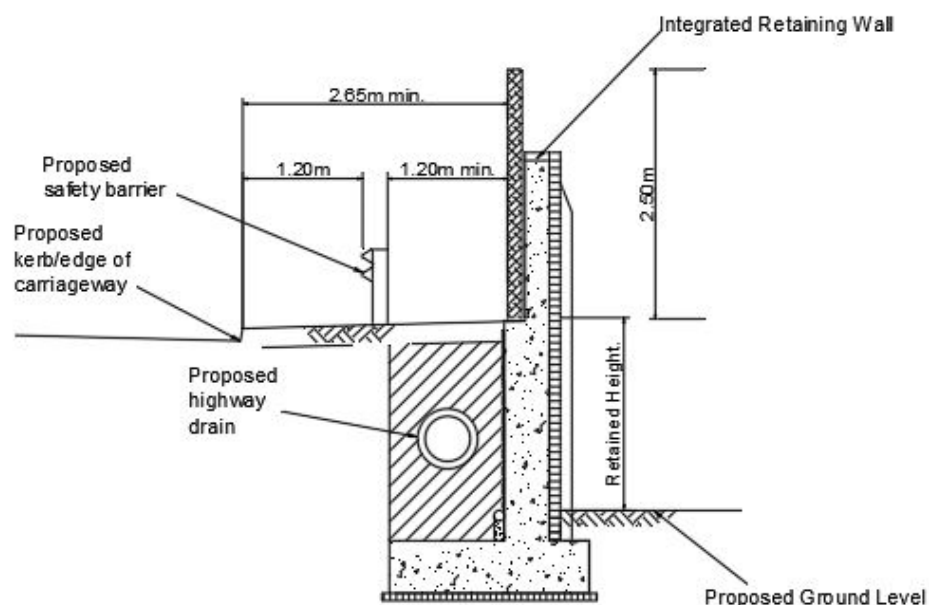


Figure 3

8. DESIGN SPECIFIC RELATED TO MIDLAND LAND PORTFOLIO OBJECTION

- 8.1. The design completed for the Scheme drainage is in accordance with the relevant standards and guidance and the location of the attenuation pond is as agreed within the approved planning application reference 2014/0915.
- 8.2. The attenuation pond that relates to the objection is situated at the lowest point on GAR and acts as the most downstream attenuation pond. Between Gedling Wood Farm and Burton Road there is a general fall in the existing topography of approximately 8% which precludes the practical installation of alternative attenuation ponds. Surface water drains out of the attenuation pond located within the property under the ownership of MLPL, controlled by a hydrobrake at an agreed discharge rate of 8.5/litres per second (as agreed with the local Flood Authority). The limit of 8.5/litres per second is the actual discharge rate from the attenuation ponds and a value of 5/litres per second is the permissible run off rate per hectare of land, limits are defined in the document "Rainfall runoff management for developments – Report SC030219" [CD13.19].
- 8.3. From the attenuation pond, the water drains under the A612 carriageway to the outfall and existing water courses on the south side of the A612, managed by Trent Valley Internal Drainage Board. The proximity of the outfall (low point) means that the water table at this location is particularly high. This coupled with the presence of existing statutory undertakers' apparatus at Burton Road, means that the pond is designed to be above ground within MLPL land to provide the correct invert level to allow the agreed level of discharge from the pond.

9. ALTERNATIVES SPECIFIC RELATED TO MIDLAND LAND PORTFOLIO OBJECTION

- 9.1. The pond in its proposed position stores a maximum of 796,000 litres.
- 9.2. Alternative options have been considered, including under-carriageway storage and storage in the vicinity of Carlton-le-Willows/Whitworth Drive area.
- 9.3. Under-carriageway storage – To achieve the same required storage as provided by the pond 796,000 litres of surface water run-off, a tank measuring approximately 50m long by 27m wide by 0.75m deep would be required. The tank would need to be set 0.6m below the carriageway; the depth below the carriageway needs to be very shallow due to outfall constraints meaning that the storage feature would have to be designed to enable significant prolonged traffic loading. The shallow nature of the tank would be inaccessible for the purposes of maintenance and inspections. Further the depth would allow very little space for the installation or diversion of utilities apparatus. The depth could also create difficulties for the installation of the necessary highway apparatus required for the signalisation and lighting of the junctions. An under-carriageway storage option also does not enable wider landscaping and ecology benefits offered by the existing pond option, in a much as supporting and encouraging a diverse habitat for flora and fauna
- 9.4. Storage within the Carlton-le-Willows site/Whitworth Drive area – Due to the local topography in the area, a series of small terraced attenuation ponds could be an alternative storage solution. The amount of earthworks involved in creating ponds cut into the hillside would be impractical, with little or no opportunity for redistribution of the cut earth

elsewhere on site. The environmental and financial implications relating to removal from site would be too great. In addition, due to the increased amount of impermeable surface between Burton Road and the A612 / Scheme junction, would create a need for a downstream pond at the low point i.e. in the proximity of the proposed location within MLPL land.

10. SUMMARY

10.1 I can confirm that the design of the Scheme has been undertaken in accordance with all relevant design standards. The Scheme's design is such that it optimises and effectively utilises all land already in public ownership and takes account of existing topographical features affecting the Order Land.

11. STATEMENT OF TRUTH

11.1. I confirm that I am able to give evidence in light of my relevant experience as summarised above. I can confirm that the evidence I prepared is in accordance with the guidance of my professional institution and that the opinions given are my true professional opinions.

Signed:

A handwritten signature in blue ink, appearing to be 'J. Hill', is written over a faint, light blue rectangular stamp or watermark.

Date:

21 May 2019