

NORTH AND EAST MELTON MOWBRAY DISTRIBUTOR ROAD

Proof of Evidence LCC 02:
Scheme Engineer

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60542201- LCC -GEN-GEN_GEN_ZZ_Z-PE-CH-0200

Leicestershire County Council

Project number: 60542201

Date: September 2021

Quality information

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Revision History

Revision	Revision date
P01	31-08-2021

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1. Introduction

1.1 Qualifications

- 1.1.1 My name is Martyn Glossop (BEng CEng MICE) and I am presenting a proof of evidence as Scheme Engineer in relation to the North and East Melton Mowbray Distributor Road (NEMMDR), on behalf of Leicestershire County council. I am a Chartered Civil Engineer and have been a member of the Institution of Civil Engineers for 24 years. I graduated in 1992 and have worked in highway related works since 1984.
- 1.1.2 I am currently a Technical Director at AECOM and have held this post for over 14 years.

1.2 Relevant Experience

- 1.2.1 I have considerable knowledge of new build, highway maintenance and highway improvement projects on both Highways England and Local Authority road networks. My project management expertise includes coordinating the input and timely delivery from diverse multi-disciplinary teams. I have prepared and reviewed tender documents, including framework documents, for Highways England and various local authority clients.
- 1.2.2 I'm experienced in client liaison and collaboration with JV partners to ensure that good working relationships are made and maintained to drive positive scheme outcomes.
- 1.2.3 My experience covers various aspects of highway design and construction on major new build schemes including Design and Build and DBFO projects. I also have extensive involvement in the design and construction of privately financed infrastructure and development works.
- 1.2.4 I have a detailed understanding of highway design codes, having designed many new build and highway improvement schemes. My experience includes the design of roundabouts and link roads.
- 1.2.5 I have been the AECOM Project Manager on the NEMMDR Scheme since April 2017.
- 1.2.6 Mersey Gateway, June 2014 to December 2020
- I was responsible for the project management of the landside works. These works included the upgrading of 7km of highway, seven new bridges and the upgrade of seven highway interchanges. The multi-disciplinary teams of engineers included geotechnical specialists, designing complex earthwork solutions and environmental specialists providing remediation measures in heavily contaminated areas and along the river estuary. I led the AECOM design input in collaboration with design joint venture partners, the construction joint venture, Mersey Gateway Crossing Board and Halton Borough Council. I represented AECOM at both design joint venture and client board meetings.
- 1.2.7 A38 Derby Junctions, July 2014 to August 2020
- I was Project Director and member of the Project Board collaboratively managing project delivery and mitigating risk. I worked proactively with the design team to drive delivery to time and budget, flexibly adjusting resources to meet programme requirements. I verified that design deliverables were audited to ensure they meet Highways England's and road users' needs and quality requirements. I used my considerable knowledge of highway improvement projects to add value in the development of an informed A38 design including roundabouts, highway links, river and rail bridges with constraints including the Derwent Valley Mills world heritage site.
- 1.2.8 Highways England (Project Support Framework), South East Region Capital Renewal Scheme Development and Design, Oct 14 to Aug 16
- I was Project Director responsible for the commercial control and resource management of this £4m design fee commission. This fast track project commenced in September 2014, taking proposed highway schemes through value management, with detailed design running in parallel. The commission provided Highways England with a bank of schemes for construction in the Area 4 forward programme. I co-ordinated the resources, which at their peak were in excess of 140 staff, from both

our UK and international businesses. I attended fortnightly progress meetings, liaising with the Client, Project Manager and discipline leads to achieve successful delivery outcomes.

1.2.9 Midlands Highways Alliance, Professional Services Partnership, Apr 2011 to Jun 2014

My responsibilities included the commercial control, resource management and project delivery for this commission. Under the Alliance, AECOM provided professional services to fourteen local authorities across the midlands. Schemes ranged from routine highway maintenance schemes, through to highway improvements and the provision of wider specialist design solutions outside of the highways discipline. I managed a team of 5 Delivery Managers who provided a first point of contact to the MHA member authorities to provide an effective, efficient and high quality multi-disciplinary service.

1.3 Involvement with the Scheme and contribution made

1.3.1 I am the AECOM Project Manager responsible for co-ordinating the delivery of the Scheme by the multidisciplinary design team including input from the Early Contractor Involvement (ECI) contractor. I have a client facing role working closely with Leicestershire County Council and am a member of the project board. I played a key role in obtaining funding for the Scheme through the successful application of the outline business case to DfT.

1.3.2 I led AECOM's initial package of work, which was briefed by LCC in April 2017, to assess the maturity of existing design information. This included assessing the original outline design developed by Jacobs, fast-tracking the commencement of ecological surveys and developing an outline programme for the future delivery of the Scheme. The brief was to develop the outline design for a major highway improvement to the north and east of the town which will unlock and support future development and growth in the town.

1.3.3 The LCC brief was clear in instructing AECOM to develop Option 1 (see Section 2.1; Scheme Development Prior to Planning Permission). I confirm that the LCC decision to develop this option was appropriate based on the convincing conclusion within the Option Assessment Report (See core document SAD1).

1.3.4 I led the development of Option 1, which is a 7.1km long, 7.3m wide (excluding hard strips) single carriageway, to the north and east of Melton Mowbray. This route links the A606 Nottingham Road, at St. Bartholomew's way to the A606 Burton Road, North of Burton Lazars. This option also includes the provision of 10 km of new shared footway/cycleway.

1.3.5 I have led the AECOM team in working collaboratively with the various Early Contractor Involvement (ECI) partners that have been appointed by LCC over the duration of our involvement.

1.3.6 I have chaired a weekly Highlights meeting, with LCC, AECOM discipline leads and ECI contractor attendees, over the duration of our involvement to ensure that issues are picked up and actions closed out effectively.

1.3.7 I have regularly attended board meetings to describe input requirements, provide detailed responses to questions and explain background information prior to decision making.

1.3.8 I led the development of the outline design and cost estimates for inclusion in the Outline Business Case which resulted in a successful application for funding from DfT's Large Local Major programme to support construction of the Scheme. In May 2018 we were awarded programme entry, in principle funding (see core document DM12).

1.3.9 I led work on a second design brief which followed in July 2017. This was to develop the Outline Design sufficiently to identify outline land take requirements for planning permission, CPO and SRO, leading through to Public Exhibition in September 2017, where the majority of responses were in favour of the proposal. The Outline Business Case was submitted to DfT at the end of December 2017. This was followed by a third brief from LCC, in February 2018, to take the design through to construction.

1.3.10 This proof of evidence covers the Drainage Design which was created by a drainage expert and is included in Annex A. I will draw on and reference this material as required within the document. The

Annex is set out in the form of a specific proof should it be necessary to call the individual witness to deal with specific matters. It also permits a complete understanding as to who is responsible for the drainage.

- 1.3.11 I co-ordinated the submission of the planning application and am responsible for the production of the preliminary and detailed design in accordance with the Design Manual for Roads and Bridges (DMRB). I have worked collaboratively with the Environment Agency (EA) and Natural England (NE), leading the design of an innovative solution to divert the River Eye within a Site of Special Scientific Interest (SSSI).
- 1.3.12 I led a detailed appraisal on the options available at the river crossing. Our team worked collaboratively with the EA and natural England to successfully agree the diversion of the River Eye and the extension of the Site of Special Scientific Interest and associated habitat creation and enhancement work.
- 1.3.13 I attended public drop-in events regarding the detail of the planning submission which were held in October 2018. This included an interactive 3D visualisation of the Scheme which enabled effective discussions with attendees.
- 1.3.14 I also led the AECOM team in providing further assistance to LCC in the development and making of orders.

2. Development of the Scheme

2.1 Scheme Development Prior to Planning Submission

- 2.1.1 Melton is a highly congested market town with large numbers of HGVs routing through the town centre. Congestion has been a long-standing issue recognised by both Leicestershire County Council and Melton Borough Council; this can be dated back to the late 1990's and early 2000's, and through successive Local Transport Plans. The congestion has become increasingly pronounced and is likely to be exacerbated by future traffic growth, and additional journeys associated with significant levels of growth planned for the town as part of the emerging Local Plan.
- 2.1.2 The Preferred Route that formed the Scheme for submission in the planning application was developed from an evidence and objective-led option identification process using the Leicester and Leicestershire Integrated Transport Model (LLITM) to model impacts, which assessed a range of options across travel modes, and examined different scales and routes of highway intervention.
- 2.1.3 The initial options assessment included examination of over 60 different interventions. Following the confirmation that an outer bypass would achieve the greatest level of benefits a more detailed Option Assessment Report (See core document SAD1) examined four outer distributor road options. The result of this appraisal was that the full Eastern route was convincingly the best option, concluding that: "A full Eastern route.... has the greatest impact and benefits on the key objective of congestion reduction across Melton town centre. Correspondingly it also has the greatest traditional level of transport benefits being double the size of those associated with its comparator, a full Western option."
- 2.1.4 The Jacobs' Concept Design Report (see core document SAD2), considered two options, both of which followed the same alignment from the A606 Nottingham Road, adjacent to Sysonby Farm, to the east of Thorpe Arnold. The options then split with:
- a) Option 1 running south, to the west of Shipman's Barn Stud and following the line of Lag Lane at the Leicester to Peterborough railway crossing, before turning south-west and joining the A606 Burton Road.
 - b) Option 2 running south-east to the east of Shipman's Barn Stud, crossing the railway line approximately 500m further to the east, prior to heading south-west back to join the A606 Burton road at the same point as Option 1.
- 2.1.5 AECOM's initial package of work, briefed by LCC in April 2017, was to assess the maturity of existing design information. This included assessing the original outline design developed by Jacobs, fast-tracking the commencement of ecological surveys and developing an outline programme for the future delivery of the Scheme. The brief was to develop the outline design for a major highway improvement to the north and east of the town which will unlock and support future development and growth in the town.
- 2.1.6 The LCC brief was clear in instructing AECOM to develop Option 1, as the impacts of both routes are similar, but Option 1 is 450m shorter than Option 2. Option 2 has the added complication that it passes directly through Brentingby Flood storage reservoir, with additional works associated with flood modelling, flood compensation and the crossing of the dam. The Environment Agency stated that they would view any proposal that directly impacted on the flood storage area very negatively. This was restated through the consultation.
- 2.1.7 Option 1 is a 7.1km long, 7.3m wide (excluding hard strips) single carriageway, to the north and east of Melton Mowbray, including the provision of new shared footway/cycleway. This route links the A606 Nottingham Road, at St. Bartholomew's way to the A606 Burton Road, North of Burton Lazars. The route runs via Scalford Road, to the north of Melton Country Park, across to Melton Spinney Road, continuing to the south-west of Twinlakes Park, crossing the A607 Thorpe Road to the north-east of Thorpe Arnold, continuing across the B676 Saxby Road, crossing the River Eye and railway line adjacent to Lag Lane prior to re-joining the A606 Burton Road immediately to the south-east of Melton Mowbray.

- 2.1.8 Outline design and cost estimates were developed for inclusion in the Outline Business Case (see core document SAD4) which resulted in a successful application for funding from DfT's Large Local Major programme to support construction of the Scheme. In May 2018 the Scheme was awarded programme entry, in principle funding (see core document DM12). Without the NEMMDR it is not feasible that the northern urban extension areas can be provided.
- 2.1.9 The highway has been designed to provide a 7.3m wide single carriageway road designed in accordance with the nationally recognised standards, namely the UK Design Manual for Roads and Bridges (DMRB). The highway design comprises the following:
- a) Six new roundabouts at the intersections of the Scheme with existing roads;
 - b) A speed limit of 40mph between the A606 Nottingham Road and Melton Spinney Road, adjacent to the proposed Northern Sustainable Neighbourhood, and a speed limit of 60mph between Melton Spinney Road and the A606 Burton Road;
 - c) Lanes with a width of 3.65m with an additional 1 m hard strip on the nearside edge of both lanes within the 60mph section;
 - d) Ten culverts will be required at watercourse crossings. Open span bridge structures will be required at Scafford and Thorpe brooks. Major structures are required at the River Eye (including for flood flow) and the Leicester to Peterborough railway line.
 - e) Six at grade roundabouts will be required at the intersection with existing roads. There will also be a left in/left out access arrangement adjacent to Roundabout 01 to provide access to the former Sysonby Farm development area.
 - f) Earthwork slopes with a typical gradient of 1:3;
 - g) A 3m wide off-carriageway shared footway/ cycleway adjacent to the north bound lane over the full extents of the Scheme and around the circumference of each roundabout.
 - h) The shared route will be separated from the carriageway by the kerb and a 0.5m paved separation strip within the 40mph section and by a 1m kerbed grassed verge within the 60mph sections;
 - i) A 1.5m verge at the back of shared footway/ cycleway and a 2.5m grassed verge on the opposite side of the road to the shared way. The verge width on both sides of the road is increased as required to provide the appropriate sightlines around bends.
 - j) Further localised increases in verge width are also required to accommodate highway features such as signs and vehicle restraint systems;
 - k) Uncontrolled (un-signalised) non-motorised user (NMU) crossings have been provided by splitter islands at roundabouts or beneath the proposed open span structures where existing or proposed Public Rights of Way (PRoW) intersect with the highway;
 - l) No central reservation is included within the Scheme.
 - m) Safety barriers will be provided where required in accordance with the DMRB.
 - n) The highway has been aligned to minimise conflict with existing constraints and mitigate impacts on sensitive areas such as the River Eye, Melton Country Park, local communities and residences.
- 2.1.10 The Scheme proposals align with growth areas identified in the Strategic Growth Plan Leicester and Leicestershire (SGP) (see core document PPG4) in which Melton Mowbray is identified as a 'Key Centre for Regeneration and Growth'. The SGP recognises that significant new development cannot be accommodated within Leicestershire without significant investment in infrastructure services, including transport. This is necessary to unlock strategic scale sites and to help mitigate the impacts of future growth on Leicester's and Leicestershire's transport networks, for example in terms of traffic congestion.
- 2.1.11 AECOM's second design brief in July 2017 was to develop the Outline Design sufficiently to identify outline land take requirements for planning permission, CPO and SRO, leading through to Public Exhibition in September 2017, where the majority of responses were in favour of the proposal. The Outline Business Case was submitted to DfT at the end of December 2017 (see core document SA04).

- This was followed by a third brief from LCC, in February 2018, to take the design through to construction.
- 2.1.12 LCC instructed AECOM to undertake the design for the NEMMDR in accordance with the Design Manual for Roads and Bridges (DMRB) as published in 2018. Where deemed to be necessary due to existing site constraints, departures from standard have been identified and reviewed by AECOM and LCC as the Overseeing Authority during the design process.
- 2.1.13 The design teams worked collaboratively with the Environment Agency (EA) and Natural England (NE), to design an innovative solution to divert the River Eye within a Site of Special Scientific Interest (SSSI). This will enable the river crossing to be constructed in dry conditions remote from 132kV overhead powerlines. It also removes the need for diversion of the powerlines and enables the necessary safety exclusion zones from the powerlines to be maintained during construction (see SSSI Proof of Evidence LCC 06).
- 2.1.14 The AECOM design teams undertook a detailed appraisal of the options available at the river crossing. Our team worked collaboratively with the EA and Natural England to successfully agree the diversion of the River Eye and the associated habitat creation and enhancement work. This option also avoided the safety issues associated with diverting power lines and will enable the proposed river bridge abutments to be constructed remote from the power lines and in dry conditions (see SSSI Proof of Evidence LCC 06).
- 2.1.15 Three drop-in events regarding the detail of the planning submission were held in October 2018. The AECOM design team developed an interactive 3D visualisation of the Scheme using the highway design models and a drone video footage (available to view on the LCC planning portal). This enabled effective discussions with attendees as well as communication with an online audience many times greater than the number who attended the events in person.
- 2.1.16 Extensive environmental survey work was undertaken along the proposed route and within a 250-metre buffer zone either side of the Scheme to prepare the Environmental Impact Assessment and Environmental Statement, which is an essential part of the submission for planning permission.
- 2.1.17 The proposed Scheme alignment has been selected in line with local plan requirements and to minimise impact on existing dwellings. At the point of determination of the Scheme planning application the relevant Development Plan documentation comprised:
- The Melton Local Plan (MLP), adopted October 2018 (see core document P1);
 - Waltham on the Wolds and Thorpe Arnold Neighbourhood Plan, adopted June 2018. The plan is relevant for that part of the Scheme between approximately Chainage 2800 and Chainage 4600 (see core document PPG10).
- 2.1.18 During the Examination of the Draft MLP the Inspector summarised her view on the NEMMDR proposal at that time (a route to the north and east of the town), concluding that:
- “The transportation evidence that supports the NEMMDR, as part of a wider package of integrated proposals in the MMTS that would bring significant benefits to the Borough, is comprehensive and convincing.” and that;
 - “There is insufficient reason to doubt the conclusion drawn from this work that an outer distributor road (in this case a single carriageway, all-purpose A road) is required. And the evidence indicates that the Preferred Route around the north and east of the town, initially linking the A606 Nottingham Road with the A606 Burton Road, and finally linking to the A607 Leicester Road, flanking the Sustainable Neighbourhoods, is the most appropriate of the alternatives.”
- 2.1.19 A full planning application for the NEMMDR was submitted to Leicestershire County Council Planning Department in October 2018 (see core document P3). The development was permitted by Development Control and Regulatory Board in May 2019.
- 2.1.20 The route of the proposed road to the north of Melton Mowbray (between Roundabouts 01 and 03) bounds the outer edge of the Northern Sustainable Neighbourhood (NSN). The project team has worked closely with the developers of the NSN throughout the development of the Scheme.

2.2 Scheme Development Since Planning Submission

- 2.2.1 There has been no significant change to the horizontal alignment submitted within the planning application. The vertical alignment has been developed as part of detailed design to achieve an earthworks balance. Note that the vertical alignment was not included on the Planning General Arrangement drawings (See core document SAD17). There has been no change in relation to the proposed NEMMDR mainline speed limits. The vertical alignment of a road consists of gradients (straight lines at fixed gradients) connected by a series of vertical crest and sag curves. The vertical curves are designed of such radii to ensure that sufficient forward visibility is provided to enable vehicles to stop within a safe distance based on the speed limit of the road.
- 2.2.2 The drainage design has been developed. These works include detail of the pipe chamber and gully locations; detail of combined kerb and gully units; and chamber, headwall and ditch schedules; and finalising the location and size of balancing ponds including associated access tracks and earthworks. The detailed design also includes the provision of additional culverts required in the development of accommodation works. Further details of the drainage design is included in Annex A.
- 2.2.3 Detailed design has included the development of certain accommodation works in line with discussion with landowners to address matters of concern. This has finalised the location and size of accommodation tracks and accesses (including field accesses).
- 2.2.4 There has been no significant change to the structures.
- 2.2.5 There has been further development of the detailed landscaping proposals.
- 2.2.6 The Public Right of Way (PRoW) diversions and alignments have been finalised as shown in the SRO plans (see core document OL8). The only exception to this is the route of the new bridleway at Thorpe Brook where the route has been switched from the east to the west side of the brook. This change has been submitted under a Section 96a application and is under consideration by LCC (see Planning Proof of Evidence LCC 05 for further details). This item will be updated at the inquiry, but we do not expect any change to the land take required.
- 2.2.7 The only changes associated with the River Eye diversion has been finalising the location of flood compensation areas.
- 2.2.8 The detailed ecological requirements have included the development of detailed mitigation proposals for badgers, GCNs, bats and otters. See Ecology Proof of Evidence LCC 08 for further details.
- 2.2.9 The provision of rest lay-bys was raised with the NEMMDR project board who instructed Aecom not to install lay-bys on the Scheme due to concerns regarding the environmental impact of litter, antisocial behaviour and specific landowner concerns. However, there will be ample opportunity for motorists to access Melton Mowbray from each of the proposed roundabouts and the town centre provides car parking suitable for non-HGVs. There are also four petrol stations located on the A606 and A607 less than 1km from the NEMMDR, all of which are currently accessible by HGVs.
- 2.2.10 Bound surface material is specified for all access tracks on the approaches to the carriageway. Granular material is only specified away from the carriageway, beyond the gated access points. This minimises the risk of granular material being transferred onto live carriageways, whilst ensuring a cost-effective access track construction.
- 2.2.11 Further to a revised construction cost estimate submitted by the ECI contractor in December 2020, the forecast overall Scheme costs have increased to circa £85m. LCC have confirmed that funding is in place for the Scheme. Scheme benefits are as demonstrated through the analysis set out in the Promoter and Traffic Modelling Proofs of Evidence (see LCC 01 and LCC 03).

3. Description of the Scheme

3.1 Scheme Overview

- 3.1.1 The North and East Melton Mowbray Distributor Road (NEMMDR) will reduce town centre congestion. It will enable through traffic to avoid the town centre and improve access to the wider network which will improve journey times in and around Melton Mowbray.
- 3.1.2 The proposed Scheme alignment has been selected in line with local plan requirements and to minimise impact on dwellings. The speed limit of the section between Roundabouts 01 and 03, which will be adjacent to future housing (in line with the Melton Local Plan), will be 40mph. The remainder of the route is rural in nature and has been designed for 60mph traffic flow.
- 3.1.3 The proposed Scheme avoids the demolition of residential property over its entire length. The only demolition relates to the disused farm buildings at Sysonby Farm which are already under the ownership of LCC where the land is earmarked for future development.
- 3.1.4 The junction types were selected in accordance with DMRB requirements based on the forecast traffic flows along the proposed route. This requires the provision of roundabouts at all proposed junctions with the existing road network. It should be noted that a left in/left out access arrangement has been provided adjacent to Roundabout 01 for a proposed LCC development site on the former Sysonby Farm. The left in / left out arrangement removes the need for any right-turn manoeuvres.
- 3.1.5 A key factor in developing the vertical alignment for the Scheme was to achieve a cut/fill balance over the Scheme to prevent the unnecessary import/export of material. The earthworks design is effectively balanced over two separate sections either side of the River Eye. The cutting to the west of Roundabout 03 is the principal source of material for the construction of embankments from A606 Nottingham Road round to the river crossing. A similar balance is targeted to the south of the river. All material required for the embankment between the river and railway line will have to be transported over temporary structures constructed over the river and railway line.
- 3.1.6 A key component of the Scheme is to ensure that it caters fully with the development of the future urban growth areas where extensive residential development is anticipated within the Local Plan. A major driver of the Scheme is to enable such development and it depends on the planning permission as granted to ensure that takes place.

3.2 A606 Nottingham Road to Scaford Road (Roundabout 01 to Roundabout 02)

- 3.2.1 At its northern end the proposed NEMMDR commences at the existing junction of the A606 Nottingham Road with St Bartholomew's Way where new Roundabout 01 will be installed. The roundabout is situated almost entirely within land owned by Leicestershire County Council (LCC). The buildings at Sysonby Farm, which are also owned by LCC, are to be demolished to allow the construction of the Scheme and future development of the Sysonby Farm area. The proposed roundabout is to be built offline from the A606 to minimise impacts on traffic during construction, whilst mitigating the impacts on nearby residents to the west of Nottingham Road. The southern / eastern side of the roundabout is on embankment due to the slope of the existing ground. Landscaping is proposed to the west, north and south of the roundabout to mitigate visual impacts to residents.
- 3.2.2 There is a left in left out arrangement provided to access the LCC development plot to the north-east of Roundabout 01. Temporary traffic management measures will be installed to prevent the inadvertent use of the access and exit points to the development site by unauthorised vehicles prior to its opening.
- 3.2.3 Pedestrian and cyclist connectivity will be provided to the proposed developments that are part of the Northern Sustainable Neighbourhood (NSN), the existing NMU routes on the A606 to the south and St Bartholomew's Way to the West. Existing pedestrian and cycle facilities will link with the Scheme's shared pedestrian/cycle track. The current access to "The Cottage" will be removed and replaced with a new access further to the north of Roundabout 1
- 3.2.4 From Roundabout 01, the Scheme continues east with the majority of this section in cutting (approximately 600m), about 100m on slight embankment and the remainder at grade with the

surrounding topography. The position of the road reflects the allocation of development land in the Melton Local Plan (MLP), following the northern boundary of the allocation. The route bounds the outer edge of the NSN, running immediately to the south of Grammar School Farm, which is the closest property to the Scheme. The inclusion of an environmental barrier and landscaping mitigate the impact of the highway alignment on Grammar School Farm itself.

- 3.2.5 Roundabout 02 will be constructed offline, to the east of Scalford Road, close to existing ground level, to minimise impacts on traffic during construction and on Grammar School farm. The project team has worked closely with the developers of the NSN throughout the development of the Scheme since 2017. A fifth arm was included within the design for roundabout 2 in discussion with the developers in order to facilitate the NSN development by providing direct access to the development from the NEMMDR. This is consistent with the approach we have adopted for the NSN at Roundabout 1 where we have also provided a fifth arm to facilitate direct access to the development. The proposed 5-arm roundabout is justified in order to provide a safe and efficient means of access to the development. On 13th August 2021 Barwood Development Solutions Ltd submitted an outline planning application which conflicts with the Scheme for which we have planning consent. This application has been reviewed at a high level in the Planning Proof of Evidence submitted by Alison Leeder. However, since the application was not validated until the week commencing 23rd August, we have not been able to review in detail the conflict between our consented scheme and the outline planning application.

3.3 Scalford Road to Melton Spinney Road (Roundabout 02 to Roundabout 03)

- 3.3.1 From Roundabout 02, the route travels east, approximately at grade with the existing topography as far as vertical alignment constraints allowed. It continues across a disused railway embankment which runs perpendicular to the proposed highway. Although there is no legal right of way to walk along the disused railway, our surveys show that it is commonly used by walkers.
- 3.3.2 The Scheme passes to the north of Melton Country Park. To mitigate the impact on the park surveys were completed to understand the impact on the wildlife and user experience of the park and associated walking routes. We worked in consultation with 'Friends of the Country Park' to develop the landscaping proposals and structure design at Scalford Brook, where an open span structure rather than a culvert is proposed. This will provide an ecological corridor beneath the proposed road, enabling wildlife to safely commute between the country park and open countryside. These considerations also influenced the vertical alignment of the road and the landscaping proposals to minimise the impact of the road ecologically and aesthetically. The bridge underpass also accommodates the Jubilee Way, Footpath E18.
- 3.3.3 The proposed route continues east through deep cutting on the approach to Melton Spinney Road, minimising visual impact on the Country Park.

3.4 Melton Spinney Road to A607 Melton Road (Roundabout 3 to Roundabout 4)

- 3.4.1 Roundabout 03 will be constructed offline, to the east of Melton Spinney Road and immediately south of the existing Twinlakes theme park access. This will minimise impacts on traffic during construction and maintain year-round access to the theme park which generates periodic high levels of visitor traffic. The existing ground falls to the south, requiring Roundabout 3 to be constructed on embankment. Landscaping will be provided to screen the theme park and Thorpe Arnold from the Scheme. The proposed route passes to the south of the park, with a new access provided direct from Roundabout 03 replacing the park's existing Melton Spinney Road access. Traffic modelling shows that the majority of traffic accessing the park will use the proposed route rather than travelling through the town centre once the Scheme is complete. Pedestrian and cyclist connectivity will be provided to Twinlakes and to National Cycle Route 64 on Melton Spinney Road. Existing pedestrian and cycle facilities will link with the Scheme's shared pedestrian/cycle track.
- 3.4.2 The route continues in a south-easterly direction almost entirely on embankment, crossing Thorpe Brook via a single, open span bridge. The bridge is widened to accommodate a farm vehicle access, bridleway and ecological requirements beneath the bridge. The route continues reaching Roundabout 04 (A607 Waltham Road), which will be constructed in cutting and positioned at the approximate mid-point between the cottages to the east and the village of Thorpe Arnold to the west. Roundabout 04 will be constructed offline, to the west of A607 Waltham Road, to minimise impacts on traffic during construction. New private means of access will be provided to the properties located approximately

200 metres east of Roundabout 04 from the realigned A607 Waltham Road. Pedestrian and cyclist connectivity will be provided to the west towards Thorpe Arnold, and a footway will be provided towards the dwellings to the east. This will improve pedestrian connectivity between the cottages, footpath E3 and the village.

3.5 A607 Melton Road to B676 Saxby Road (Roundabout 04 to Roundabout 05)

- 3.5.1 The route passes to the north-east of Thorpe Arnold and is aligned to minimise impact on properties in the vicinity. This has been achieved by: adjusting the vertical alignment to avoid large embankments, where possible the use of landscaping features to shield the view of the road from nearby properties; and locating the road so that it sits the optimum distance away from the properties in Thorpe Arnold, considering all factors including the properties on the A607 north east of the Scheme.
- 3.5.2 The route then continues in a south-easterly direction on embankment before entering cutting, which continues for the majority of the section up to Roundabout 05 (B676 Saxby Road). The location of the cutting coincides with the route's closest point to Thorpe Arnold, helping to mitigate noise and visual impacts.
- 3.5.3 Lag Lane is located to the west of the proposed Scheme running from Thorpe Arnold down to Saxby Road. Lag Lane will be closed to public vehicular access as the new proposed route will create a much-improved route to Saxby road. Lag Lane will be downgraded to a bridleway with private access maintained for landowners. Lag Lane will be gated at the northern and southern ends to restrict vehicular access to Private Means of Access (PMA).

3.6 B676 Saxby Road to A606 Burton Road (Roundabout 05 to Roundabout 06)

- 3.6.1 The location of Roundabout 5 has been determined through consideration of the various constraints in the area, including the presence of two sets of powerlines, minimising impacts on properties at Thorpe Arnold, consideration of impacts to properties to the east of the proposed route and retention of an attractive route to drivers in terms of journey times. It is located offline to the north to avoid floodplain and poor ground conditions
- 3.6.2 The alignment on the approach to the River Eye is also impacted by the location of the river crossing which was considered in an options report prepared in March 2018 (see core document P18). A main consideration within the report was the potential diversion of overhead powerlines. This would be expensive (circa £1.25m), add programme uncertainty in placing reliance on a third-party diversion and involve hazardous work in completing the diversion.
- 3.6.3 The options report also considered diverting the river which removed the need to construct the bridge under the powerlines. Site surveys identified that the existing river morphology along this reach is degraded by re-sectioning (i.e. widening, and possibly deepening as well), and had been impacted by the weirs downstream, flood storage area upstream, and channel siltation (upstream sources and local bank poaching by livestock). The Scheme presented an opportunity for extensive environmental mitigation measures associated with the diversion of the SSSI River Eye, including hydro-morphological design, flood risk management and species and habitat translocation due to the sensitivity of the SSSI watercourse. The river diversion also provides programming opportunities to construct much of the new river structure away from the river channel. LiDAR data indicated that the River Eye is likely to have been diverted historically in the vicinity of Lag Lane to supply water to the former Melton to Oakham canal. The proposed diversion would enable restoration to a form similar to the pre-modified condition. See SSSI Proof of Evidence LCC 06 for further details.
- 3.6.4 Diverting the river minimises the risk of working beneath the powerlines as the proposed river structure will be constructed away from the powerlines. Note that control measures can be implemented to reduce the risk (eg. use of wagons with sliding floors in place of tipper wagons during construction). Diverting the river enables elimination of key H&S risks and is the most favourable from a CDM (Construction Design and Management Regulations 2015 – HSE) compliance perspective. The CDM Regulations are applicable to all construction projects and exist to ensure health and safety adherence, including strategic planning and management of projects. The proposed river diversion was discussed and agreed in collaboration with the EA and NE. The options report recommended an

alignment that determined the location of Roundabout 05, which in turn determined the alignment from the north, which remained in cutting past Shipman's Barn Stud.

- 3.6.5 A further factor was the span of the railway bridge, located immediately to the south of the river bridge. The span length is minimised by keeping the crossing square to the railway line. Minimising the span length reduces the beam depth and the impact of the structure and associated approach embankments on the skyline.
- 3.6.6 The embankments for the river and railway crossings require the deposition of a significant quantity of material. All material required for the embankment between the river and railway line will have to be transported over a temporary structure constructed over either the river or the railway line. The cuttings to the west of Roundabout 03, to the north of Roundabout 05 and the north of Roundabout 06 will be the source of material for the construction of these embankments. A key design constraint is the achievement of a cut/fill balance both to the north and south of the river.
- 3.6.7 After crossing the Railway, the route moves into cutting and back onto embankment on the approach to Roundabout 06 (A606 Burton Road).
- 3.6.8 Lag Lane will also be closed to traffic to the south of Saxby Road as will the full length of Sawgate Road except for private access and NMUs. This will create a new, attractive, off-road NMU route stretching 2.6km along Lag Lane from Thorpe Arnold to Burton Lazars.
- 3.6.9 Roundabout 06 is a 5-arm roundabout located on the A606 Burton Road. Its location is determined by the local plan. It provides twin arms to the south-west, one for future development (Southern Sustainable Neighbourhood), and the other for the proposed NEMMDR southern section. The location of these arms is fixed by the adjacent heritage site 'St Lazarus Hospital'. The constraints require Roundabout 06 to be constructed directly on A606 Burton Road at levels close to existing. Substantial landscaping is proposed at the location of Roundabout 6 to mitigate the visual impacts on housing and the Scheduled Ancient Monument. The large size of the proposed roundabout will enable a phased traffic management approach during construction, to minimise the impact on traffic flows and associated journey times.
- 3.6.10 A developer has asked for the provision of a 6th arm to access land to the east of roundabout 6. The plot for which they're asking access isn't in the local plan. A 6 arm roundabout of this size would be unusual and potentially cause driver confusion. Future access could be gained to this parcel with a left in /left out solution similar to that proposed adjacent to roundabout 1.

4. Highway Engineering

4.1 General Description

- 4.1.1 The following is a brief description of the highway design. The information provided centres around horizontal and vertical alignment parameters as defined in TD9 Highway Link Design (issued 1993), of the Design Manual for Roads and Bridges (DMRB) as published by the Department for Transport (DfT). The cross section for the Scheme is a standard 7.3m wide single carriageway.
- 4.1.2 The section from Roundabout 01 to Roundabout 03 has a design speed of 70kph (40mph) with a standard 2.5m wide verge on the north side. The south side has a 1.0m separation strip followed by a 3.0m wide shared footway/cycleway and an outer verge of 1.5m
- 4.1.3 The section from Roundabout 03 to Roundabout 06 has a design speed of 100kph (60mph) with 1.0m hard strips provided on either side and a standard 2.5m wide verge on the north/east side. The south/west side has a 1m separation strip followed by a 3.0m wide shared footway/cycleway and an outer verge of 1.5m.
- 4.1.4 A visibility assessment has been carried out to assess the forward visibility over the length of the proposed NEMMDR. The Scheme meets the Desirable Minimum Stopping Sight Distance (SSD) for the design speeds along the route. Verge widening has been included where necessary to achieve visibility requirements.
- 4.1.5 Overtaking opportunities are limited by the proximity of junctions due to the need for the NEMMDR to distribute traffic onto the existing road network as well as the constraints provided by the circular nature of the Scheme around Melton Mowbray. Note that the use of mid-range horizontal curves are not recommended for single carriageway schemes as they inhibit the design of clear overtaking sections. Section 7 of TD 9/93 categorises the curves into four bands, A (Straight & Near Straight Overtaking Sections), B (Right Hand Curve Overtaking Sections), C (Radii not recommended) and D (Non-overtaking sections). Band C curves should not be used for single carriageway design.
- 4.1.6 Road Restraint Risk Assessments (RRRAP) are required on all sections of road with a speed limit of greater than 50mph, so have been completed on all sections of the NEMMDR with a 60mph speed limit. Separate risk assessments have also been undertaken on the 40mph sections of the Scheme to ensure that road restraint systems are provided where appropriate. Road restraints have been provided wherever the risk assessment processes have identified that it is necessary.
- 4.1.7 Road Safety Audits (RSA)s were carried out for the Scheme by an experienced independent team in accordance with the DMRB document HD 19/15 'Road Safety Audit'. The objective of the road safety audit process is to provide an effective, independent review of the road safety implications of the design for all road users. It is not intended to be a technical check of compliance with design requirements.
- 4.1.8 HD 19/15 requires that a Stage 1 RSA is undertaken on completion of Preliminary design and a Stage 2 RSA is undertaken on completion of detailed design. A Stage 1 RSA was undertaken for this Scheme in 2018, followed by a Stage 2 RSA in November 2020. Design responses were provided to record how the recommendations of the safety audits are considered in the final design. Both the Stage 1 and Stage 2 RSAs, including designer's responses, are included at SAD18 and SAD19 respectively in the core documents.
- 4.1.9 Note that a Stage 3 RSA will be undertaken at the completion of construction (prior to road opening to traffic) and a Stage 4 RSA will be undertaken a year after opening to identify whether any unanticipated safety concerns have arisen during operation.

4.2 A606 Nottingham Road to Scalford Road (Roundabout 01 to Roundabout 02)

- 4.2.1 The existing Bartholomew's Way 'T' junction is replaced by Roundabout 01, a new five arm roundabout. The new roundabout maintains access along the existing routes with additional arms provided for the new NEMMDR and a residential access to the south-east. The topography and constraints associated with the existing road network require the proposed roundabout to be constructed on embankment.

- 4.2.2 There is a left in left out arrangement provided to access the LCC development plot to the north-east of Roundabout 01. The left in approach has been designed to a 70kph (40mph) standard in accordance with TD9 of the DMRB. The approach will be provided with an auxiliary diverge lane on the northern side of the NEMMDR with the roundabout splitter island extended to segregate traffic, preventing right turns into the junction by NEMMDR westbound traffic. The visibility splays required for vehicles exiting the development site on to the A606 Nottingham Road, to the north of Roundabout 1, sterilise a significant area of ground.
- 4.2.3 Mainline 1 east of Roundabout 01 is designed to a 70kph (40mph) design speed with a straight section followed by a desirable minimum Band D horizontal curve then a Band B horizontal curve of the same hand to give potential opportunity for overtaking provision. This section has an at-grade pedestrian crossing point with a 2.0m wide refuge island provided to maintain access to an existing public footpath. The carriageway has been locally widened in the vicinity of the refuge island to maintain standard lane widths.
- 4.2.4 The vertical alignment is also designed to a 70kph design speed where desirable minimum curvature requirements are met and desirable maximum gradients not exceeded.
- 4.2.5 This section ends at the existing Scalford Road where the proposed five arm Roundabout 02 is located. The new roundabout maintains access along the existing Scalford Road with additional arms provided for the new NEMMDR and a proposed residential development to the south-east.

4.3 Scalford Road to Melton Spinney Road (Roundabout 02 to Roundabout 03)

- 4.3.1 Mainline 2 east of Roundabout 02 is designed to a 70kph (40mph) design speed with a single desirable minimum horizontal Band D curve between two straights. This section has an at-grade pedestrian crossing point with a 3.0m wide refuge island provided for a future footway/cycleway link to a proposed residential development to the north of the Scheme. The carriageway has been locally widened in the vicinity of the refuge island to maintain standard lane widths.
- 4.3.2 The vertical alignment is also designed to a 70kph design speed where desirable minimum requirements are met and desirable maximum gradients not exceeded.
- 4.3.3 The cutting to the west of Roundabout 03 is the principal source of material for the construction of embankments from A606 Nottingham Road round to the river crossing. The depth of the cutting is determined by a combination of vertical alignment design standards, existing topography and achieving a Scheme wide earthworks balance to prevent the import of material from off site.

4.4 Melton Spinney Road to A607 Melton Road (Roundabout 3 to Roundabout 4)

- 4.4.1 Roundabout 03 is a new five arm roundabout located adjacent to Melton Spinney Road. The new roundabout maintains access along the existing routes with additional arms provided for the new NEMMDR and a relocated access to Twin Lakes Leisure Park.
- 4.4.2 Twin Lakes leisure park provides both full and part-time regional employment and generates a high level of visitor traffic. The proposed Scheme passes immediately to the south of the park, with a new access provided by a dedicated arm at Roundabout 03. The majority of traffic accessing the park will use the proposed NEMMDR rather than travelling through Melton town centre.
- 4.4.3 Mainline 3 southeast of Roundabout 03 is designed to a 100kph (60mph) design speed with a single desirable minimum horizontal Band D curve between two straights. With this being the shortest section along the route and the alignment being predominantly on a curve there is no provision for overtaking other than the exit width being maintained for 50m on exits from both Roundabouts 03 and 04.
- 4.4.4 The vertical alignment is also designed to a 100kph design speed where desirable minimum requirements are met and desirable maximum gradients not exceeded.

4.5 A607 Melton Road to B676 Saxby Road (Roundabout 04 to Roundabout 05)

- 4.5.1 Roundabout 04 is a new four arm roundabout located adjacent to the A607. The new roundabout maintains access along the existing routes with additional arms provided for the new NEMMDR.

- 4.5.2 Mainline 4 south of Roundabout 04 is designed to a 100kph (60mph) design speed with a desirable minimum horizontal Band D curve between two straights before a short length of a one step below desirable minimum Band D curve of the opposite hand entering the roundabout. With this section being predominantly on a non-overtaking right hand curve in the downhill direction and a left hand and uphill in the other direction there is no provision for overtaking other than the exit width being maintained for 50m on exit from both Roundabouts 04 and 05.
- 4.5.3 The vertical alignment is also designed to a 100kph design speed where desirable minimum requirements are met and desirable maximum gradients not exceeded.
- 4.5.4 The Scheme passes to the north-east of Thorpe Arnold and is aligned to minimise impact on properties in the vicinity. Further south it is constrained by the existing Lag Lane tributary and 132kV overhead electricity cables.

4.6 B676 Saxby Road to A606 Burton Road (Roundabout 05 to Roundabout 06)

- 4.6.1 Roundabout 05 is a four arm roundabout located on the B676 Saxby Road with an additional direct access onto the roundabout for land owner access only. The new roundabout maintains access along the existing routes with additional arms provided for the new NEMMDR. The proposed farm access/egress directly onto the roundabout provides a safe means of access to the adjacent plot, with relatively slow vehicle speeds. If the access was located away from the roundabout there would be the potential for right turning traffic to conflict with oncoming traffic.
- 4.6.2 Mainline 5 south of Roundabout 05 is designed to a 100kph (60mph) design speed with a straight section followed by a desirable minimum Band D horizontal curve then a Band A near straight/horizontal curve of opposite hand to give potential opportunity for overtaking provision.
- 4.6.3 The vertical alignment is also designed to a 100kph design speed where desirable minimum requirements are met and desirable maximum gradients not exceeded.
- 4.6.4 The alignment on the approach to the River Eye is impacted by the location of the river crossing which was considered in an options report prepared in March 2018. A main consideration within the report was the potential diversion of overhead powerlines. This would be expensive (circa £1.25m), add programme uncertainty in placing reliance on a third party diversion and involve hazardous work in completing the diversion. Any such works would take place within the SSSI. See SSSI Proof of Evidence LCC 06 for further details.
- 4.6.5 A further factor was the span of the railway bridge, located immediately to the south of the river bridge. The span length is minimised by keeping the crossing square to the railway line. Minimising the span length reduces the beam depth and the impact of the structure and associated approach embankments on the skyline.
- 4.6.6 Roundabout 06 is a five arm roundabout located on the A606 Burton Road. Its location is determined by the local plan. It provides twin arms to the south-west, one for future development, and the other for the proposed NEMMDR southern section. The location of these arms is fixed by the adjacent heritage site 'St Lazarus Hospital'. A developer has asked for the provision of a 6th arm to access land to the east of Roundabout 06. The plot for which they're asking access isn't in the local plan. A six arm roundabout of this size would be unusual and potentially cause driver confusion. Future access could be gained to this parcel with a left in /left out solution similar to that proposed adjacent to Roundabout 01.
- 4.6.7 There is also a proposed farm access/egress direct from Roundabout 06 onto the stopped up Sawgate Road. This provides a safe means of access at a location with relatively slow vehicle speeds compared with the adjacent sections of highway. If the access was located away from the roundabout there would also be the potential for right turning traffic to conflict with oncoming traffic.

5. Non-Motorised User (NMU) Provision

5.1 NMU Rights of Way

- 5.1.1 The NMU provision for the Scheme has been designed in accordance with the DMRB design standards as published at the point of design, including IAN 195/16 'Cycle Traffic and the Strategic Road Network' and 'Walking, Cycling & Horse-riding Assessment and Review' CD 143 revision 1 (2020).
- 5.1.2 The Scheme will significantly increase the length and connectivity of NMU routes within the locality. It will create over 10 km of new shared footway/cycleway in the vicinity of the proposed carriageway which is a major advantage offered by the Scheme.
- 5.1.3 The Scheme provides a new, dedicated bridleway for the enjoyment of pedestrians, cyclists and horse riders over Lag Lane and Sawgate Road, with vehicle use restricted to Private Means of Access (PMA) only (see Figure 5-1 below).

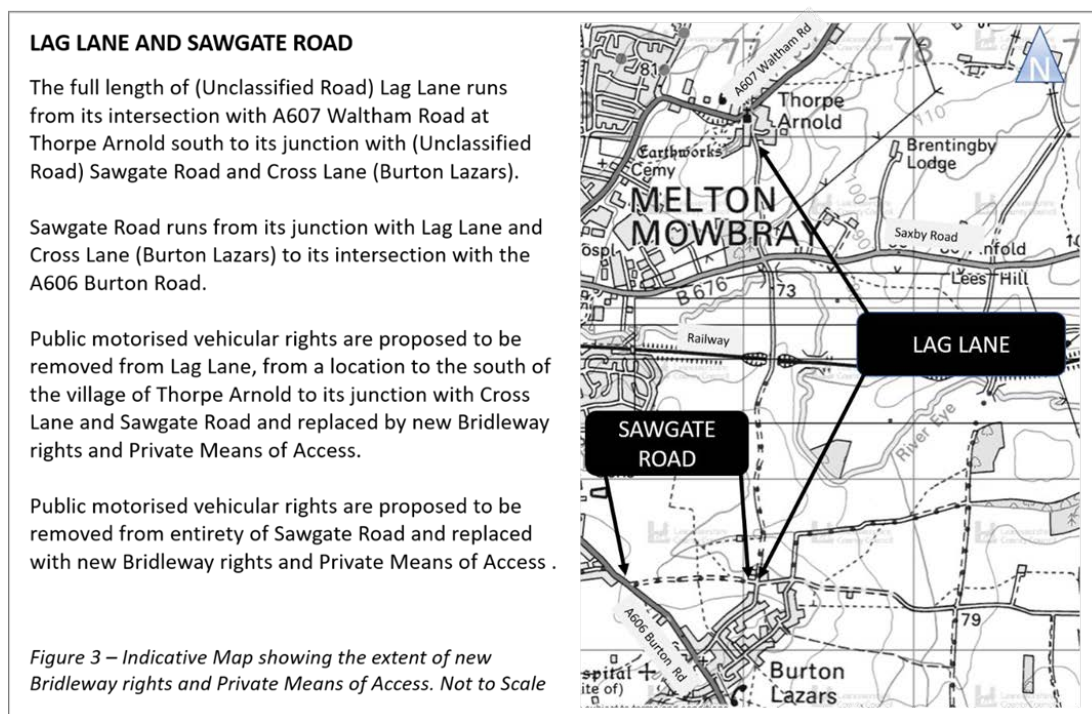


Figure 5-1 Extent of Lag Lane and Sawgate Road

- 5.1.4 The Scale of diversions proposed to enable Rights of Way to safely cross the Scheme have been minimised within design constraints. Although there will be some impact on the character of routes crossing the Scheme, the improvements to existing routes and new routes are considered to significantly outweigh these impacts with an overall significant positive impact on pedestrian, equestrian and cycle routes around Melton Mowbray. The proposals are set out in the Environmental Statement.

5.2 Rights of Way and National Cycle Routes:

- 5.2.1 Existing footpaths cross the Scheme at the locations described below. See core document OL8 which provides footpath location details.
- 5.2.2 Footpath E17 is located between Roundabouts 1 and 2 crossing the proposed Scheme approximately 290 metres west of Scalford Road.
- 5.2.3 Footpath E18 (Part of Jubilee Way) crosses the proposed Scheme approximately 120 metres east of the dismantled railway.

- 5.2.4 National Cycle Route 64 follows Melton Spinney Road, crossing the Scheme at Roundabout 3.
- 5.2.5 Footpath E25 runs between Melton Spinney Road and Thorpe Arnold. It will pass below the proposed Scheme at Thorpe Brook. Footpath E25 follows the route of an Unclassified County Road (UCR). See Paragraph 5.4.4 for further details.
- 5.2.6 Footpath E4 which follows the egress route of Twinlakes theme park.
- 5.2.7 Footpath F2 where it meets Waltham Road, approximately 110 metres north- east of Roundabout 4.
- 5.2.8 Footpath F3, at the point at which it meets Waltham Road, approximately 120 metres east of Roundabout 4.
- 5.2.9 Footpath E1, approximately 310 metres north of Sawgate Road at the point at which it intersects with the Scheme.

5.3 Shared Cycleway/Footway

- 5.3.1 A 7.1km, 3m wide off-carriageway Shared Cycleway/Footway (SCF) is proposed running along the south side of the proposed route and around the circumference of each roundabout. A separation strip between the SCF and the carriageway will be accommodated with a 0.5m paved verge within the 40mph section and a 1m kerbed grassed verge plus carriageway hardstrip within the 60mph sections.

5.4 NMU Crossings

- 5.4.1 NMU crossings will be provided throughout the Scheme, as follows:
- 5.4.2 Section 1 (40mph): Uncontrolled shared pedestrian and cycle crossings will be provided via dropped kerbs at the roundabout splitter islands. A pedestrian refuge is also proposed where Footpath E17 crosses the route approximately 290m west of Scalford Road. The NEMMDR speed limit is 40mph at both of these locations.
- 5.4.3 Section 2 (40mph): Uncontrolled shared pedestrian and cycle crossings will be provided via dropped kerbs at the roundabout splitter islands. A pedestrian refuge is also proposed approximately 250m west of Melton Spinney Road to facilitate NMU connectivity between proposed developments to the north and south of the NEMMDR. Where Footpath E18 (part of Jubilee Way) intersects with the route at Scalford Brook the open span structure enables the footpath to pass beneath the NEMMDR following the route of an accommodation track. This removes the conflict between motorists and footpath users crossing the NEMMDR.
- 5.4.4 Section 3 (60mph): Uncontrolled shared pedestrian and cycle crossings will be provided via dropped kerbs at the roundabout splitter islands. No at grade pedestrian crossings are proposed on the mainline due to higher vehicle speeds away from the roundabouts. Where Footpath E25 intersects with the NEMMDR at Thorpe Brook, following the route of an Unclassified County Road (UCR) the open span structure has been widened to allow a bridleway route on the west side of Thorpe Brook, segregated by the watercourse from the accommodation track which is on the east side. This removes the potential for conflict between motorists and non-motorised users wishing to cross the NEMMDR along the route of Footpath E25. The segregation of the bridleway from the accommodation track onto opposite sides of Thorpe Brook at the point where they pass beneath the structure also minimises the potential for conflict between farm vehicles and livestock and NMUs in this location. An additional minor bridge structure is proposed to the south of the NEMMDR to facilitate the bridleway crossing of Thorpe Brook. These works are a change from those submitted in the original planning application (see Planning Proof of Evidence LCC 05 for further details).
- 5.4.5 Section 4 (60mph): Uncontrolled shared pedestrian and cycle crossings will be provided via dropped kerbs at the roundabout splitter islands. No at grade pedestrian crossings are proposed on the mainline due to higher vehicle speeds away from the roundabouts. For this reason, minor footpath diversions are proposed to enable Footpath F2 and Footpath F3 to cross the NEMMDR via the splitter islands at Roundabout 4.
- 5.4.6 Section 5 (60mph): Uncontrolled shared pedestrian and cycle crossings will be provided via dropped kerbs at the roundabout splitter islands. No at grade pedestrian crossings are proposed on the

mainline due to higher vehicle speeds away from the roundabouts. However, a combined accommodation track and bridleway route provided beneath the southernmost flood relief span of the River Eye bridge enables bridleway and NMU connectivity east / west beneath the NEMMDR, removing conflict with motorists. The River Eye bridge has also been designed to allow connectivity for the approximately 3.5km long Lag Lane / Sawgate Road Bridleway over the River Eye via a combined bridleway / farm accommodation track alongside the shared footway/cycleway adjacent to the NEMMDR carriageway.

- 5.4.7 Equestrian crossings: Two signal controlled equestrian crossings are proposed, one on the B676 Saxby Road west of roundabout 5 and one on the A606 Burton Road south east of roundabout 6. These will be Pegasus crossings with parallel signal-controlled provision for pedestrians and cyclists as well as equestrians. The signal-controlled crossings are necessary in these locations to provide the minimum visibility distance required for equestrian crossings.

6. Justification of Land Acquisition

6.1 Scheme wide approach to land take

- 6.1.1 The making and confirmation of the Compulsory Purchase Orders (CPO) is to enable LCC to acquire the land and rights necessary for the construction and maintenance of the Scheme. The making and confirmation of the Side Road Orders (SRO) enables LCC to improve, raise, lower, direct or otherwise alter highways; stop up highways; stop up private means of access to premises required as a consequence of the construction of the Scheme; and to provide new private means of access to premises. The only exception to this is the route of the new bridleway at Thorpe Brook where the route has been switched from the east to the west side of the brook. This change has been submitted under a Section 96a application and is under consideration by LCC (see Planning Proof of Evidence LCC 05 for further details).
- 6.1.2 This section follows a similar format and builds on the information presented in sections 3, 4 and 5.
- 6.1.3 The Scheme has attempted, where possible and practicable, to reduce the impact on landowner and the land taken for the Scheme. This applies for those plots taken for permanent title and those plots where rights are only required. See core document OL5.
- 6.1.4 LCC and AECOM have had extensive discussions with all landowners affected (from January 2019 to present day) to provide the regular updates on Scheme design and, when it was appropriate, land take requirements. The Scheme design has been developed to respond specifically to landowner requests or requirements for access through the Scheme or to create new access from the existing infrastructure. During these meetings, several additional accommodation works were discussed and have been included within the design. The majority of these works fall outside of the land take defined by the CPO. Minutes of these meetings were distributed to landowners and their agents and a record is held by LCC / AECOM.
- 6.1.5 Key construction compounds have been included within the CPO Plot plans. They specify the compound locations necessary for the construction of the NEMMDR Scheme. Locations for further satellite compounds are to be negotiated privately between the ECI Contractor, Galliford Try, and individual landowners. These have not been included within the CPO as they were considered not essential for the Scheme although significantly beneficial for the construction works.
- 6.1.6 The overarching philosophy for the construction haul routes was to keep these within the Scheme footprint to minimise land take wherever possible. The sections below will describe those locations where this was not possible and justify the reasons why it was not. For safe and effective construction of the Scheme, haul roads should be wide enough to allow two construction vehicles to safely pass by each other travelling in opposite directions.
- 6.1.7 Storage of excavated earth is required at key locations across the Scheme. These areas have been included within the plot acquiring permanent title. It is likely that these storage areas will be required for a lengthy and continuous period during the construction activity for the Scheme from the construction start date.
- 6.1.8 No land title information was found for the land beneath the existing highways therefore riparian rights have been assumed on this land. It has been assumed that the adjacent landowners own the subsoil up to the midpoint of the existing highway. Therefore these lands form part of the compulsory purchase for title.
- 6.1.9 Within Section 6 The term “engineering Scheme footprint” refers to all works required for the construction of the Scheme including, but not limited to, the carriageway, drainage, lighting, kerbs, signs, embankments.
- 6.1.10 The entire length of Lag Lane (excluding within Thorpe Arnold) and Sawgate Road are to be purchased for the Scheme. This is to facilitate the establishment of new bridleway rights and private means of access rights for select landowners. At the ends of Lag Lane and Sawgate Road lockable vehicle gates are to be installed to prevent unauthorised vehicular access. Landowners who require access to their fields from Lag Lane or Sawgate Road will be able to unlock these gates. Additional access will be provided for NMU users adjacent to the lockable vehicle gates to allow them to use the route.

- 6.1.11 The extent of Lag Lane and Sawgate Road to be stopped up is based on Ordnance survey data and the creation of new rights is based upon topographical survey data.
- 6.1.12 Landowner access requirements including gate location and sizing has been discussed with individual landowners to ensure that the impact of the Scheme on their current activities is minimised.
- 6.1.13 Accommodation works to be constructed which are outside of the area where rights or title are acquired are not discussed in this section but may be referenced.
- 6.1.14 The outfalls for the balancing ponds have been included in plots where LCC need to acquire the title to the plot. This is for the ongoing maintenance of the outfalls. Adjacent to the balancing pond outfalls is a rights plot which is required for the construction of the outfall.

6.2 Justification for Side Roads Orders

- 6.2.1 The Side Roads Orders (SRO) show where existing highway is to be stopped up or improved, where new highway rights are to be created and where existing public rights of way are to be maintained. They also show where landowners will require new Private Means of Access (PMA) to their lands which may have been impacted by the scheme and the locations where their existing access will be stopped up.
- 6.2.2 The SRO plans and schedule describe where sections of the existing highways will be stopped up and sections to be improved to allow the new road to tie into the existing infrastructure. See core documents OL8 and OL9.
- 6.2.3 The majority of the SRO is within lands which are required for the construction, operation or maintenance of the scheme.
- 6.2.4 Sections of the SRO order do require additional land take for the stopping up of existing rights or the creation of new rights.
- 6.2.5 Notable locations where land is taken specifically for the creation or removal of rights are:
- Access to "The Cottage" north west of Sysonby farm where additional land is required to provide a new access and PMA on the SRO plans. See PMA 1 on Side Road Orders Plan 01;
 - A crossing of the disused railway embankment immediately north of the scheme to allow the landowner to access lands east and west of the embankment post scheme. See PMA 7A on Side Road Orders Plan 02;
 - Creation of a new access from the roundabout towards Twinlakes Leisure Park (See PMA 8) and part of the new route of bridleway N4, both shown on Side Road Orders Plan 03 and 3A;
 - Stopping up and then creation of new highway rights for the new bridleway route along the route of the existing UCR/Footpath E25 south east of Thorpe Brook towards Home Farm. See S5/N4 on Side Road Orders Plan 04 and 4A;
 - As described in section 6.1.10, the entire length of Lag Lane, south of Thorpe Arnold, and Sawgate Road will be purchased by the scheme. Existing vehicular rights over these highways will be stopped up prior to the establishment of new bridleway rights. Where landowners of Lag Lane or Sawgate Road have current access to their lands from these highways, the Scheme will ensure their rights are maintained through Private Means of Access rights. See PMA (15,16) and S (11, 13 and 14) and N (7[part], 8, 9 and 10[part]) Side Road Orders Plans 05, 5A, 6, 6A, 7, 7A and 7B;
 - Creation of new highway rights over realigned route of Footpath E1. See N11 on Side Road Orders Plan 07 and 7B.
- 6.2.6 The stopping up of existing PMAs have been included where necessary in locations where the adjacent highway is also to be stopped up.
- 6.2.7 New highway rights have been included between the edge of the existing carriageway and existing footpaths to maintain connectivity to all footpath routes across the scheme.

6.3 A606 Nottingham Road to Scalford Road (Roundabout 01 to Roundabout 02)

- 6.3.1 Roundabout 01 is located east of the A606 Nottingham Road junction with St Bartholomew's Way. The Roundabout and associated arms are located within land owned by Leicestershire County Council (LCC) or are as described in Section 6.1.7. All works west of the A606 carriageway fall within the existing highway boundary and the residents' properties are not impacted. Works to the east of the A606 fall within LCC owned land.
- 6.3.2 The existing access to "The Cottage", immediately north of Sysonby Farm, is to be stopped up and a new access provided. Title for this land is required in order to establish the new Private Means of Access Right for the property owner.
- 6.3.3 Sysonby Farm is owned by LCC and is to be demolished as part of the Scheme. See Section 3.2.1.
- 6.3.4 From Roundabout 01, the road heads eastwards. Land take required includes the engineering Scheme footprint.
- 6.3.5 The Scheme has been located as far north as practicable, with consideration to the business case and residents at Grammar School Farm, through discussion with the housing developer to the south.
- 6.3.6 Care was taken to minimise the impact of the Scheme on Grammar School Farm, due to the proximity of the property to the Scheme and sensitivities at the property, and this is reflected in the land take. The Scheme was designed such that the key parts of the existing drive/track aside the property, as well as the existing Scalford Road immediately east of the property are largely untouched. Albeit the right to use Scalford Road will need to be used during construction, hence has been included within blue plots.
- 6.3.7 Roundabout 02 is located to the east of Grammar School Farm and Scalford Road. The nature of the land ownership boundaries at his location are that the landowner to the west of Scalford Road, owns a strip of land immediately to the east of Scalford Road. Thus, they own the subsoil beneath the entire highway.
- 6.3.8 Plot 36, immediately north of Roundabout 02, is required for soil storage generated from the cut sections between Roundabout 01 and Roundabout 02. The location of the soil storage was originally located south of the roundabout, however; following extensive discussions with the landowner, their agent(s) and the housing developer, the location of the soil storage area was moved to the north of the road. This location is the most practical due to the proximity to the roundabout and that most of this material will be used to construct embankments to the east of Roundabout 02. It also forms an easy access to and from Scalford Road.
- 6.3.9 The land take to the south east of the roundabout is required for landscaping, aesthetic shielding from the existing properties in Melton Mowbray, to allow a ramp down from the earthworks for construction of the housing development or access to the lands from the stub post construction, to facilitate a haul route/construction access from Scalford Road to the east.

6.4 Scalford Road To Melton Spinney Road (Roundabout 02 to Roundabout 03)

- 6.4.1 Scalford Brook flows from north to south perpendicular to the proposed Scheme, crossing the proposed route immediately to the East of the disused railway line. The brook continues south passing under the disused railway embankment approximately 200m south of the Scheme.
- 6.4.2 Permanent land take has been minimised as far as practicable for the construction of the engineering works as well as an ecological enhancement area to mitigate the impact of an important bat roost within the existing disused railway bridge (detail of this to be covered in other proofs).
- 6.4.3 Plots 38, 39, 40 and 43, to the south of the disused railway bridge have been identified as areas required for construction work. These plots are required for the construction of a haul road and temporary crossing over Scalford Brook whilst the bridge construction works are ongoing. These may be capable of being offered back to the owners but where the CPO powers allow LCC to acquire the title of the land should they require. The haul road is best placed here for the following reasons:
- The relatively straight nature of the brook at this location;
 - The proximity to Scalford Brook bridge allowing a suitable construction base;

- As the haul road continues east (towards Melton Spinney Road/Roundabout 03) it must be located on the southern side of the route due to the existing topography and deep cutting required;
 - To facilitate the construction of the balancing ponds;
 - It offers improved construction programme.
- 6.4.4 Immediately north of the Scheme, at the location of the disused railway bridge, plot 37 has been identified as an area required for construction work which may be capable of being offered back to the owners but where the CPO powers allow LCC to acquire the title of the land should they require. This is to construct a new access for the landowner to access lands east of the disused railway line once the Scheme is in place. A private means of access has been provided over this land in the event that LCC acquire the permanent title to this plot. The landowner access is raised by 1 m above grade to minimise any adverse flooding affects in lands west of the disused railway line which could be caused by the creation of the access.
- 6.4.5 Between Scalford Brook and Roundabout 03 at Melton Spinney Road, the Scheme is predominantly in a deep cutting. The CPO is required for engineering works, other than a small section of landscaping in an enclosed field cut off from the rest of the landowners land (northern most land take in Plot 44) and landscaping on the southern side of the Scheme on the approach to Melton Spinney Road (Plot 46). The southern part of plot 46, where landscaping has been located, also forms part of the haul route.
- 6.4.6 Plot 47 has been identified as an area required for construction work which may be capable of being offered back to the owners but where the CPO powers allow LCC to acquire the title of the land should they require and follows on from the haul road justification provided in Section 6.3.3.
- 6.4.7 Plot 50 has been identified as an area required for construction work which may be capable of being offered back to the owners but where the CPO powers allow LCC to acquire the title of the land should they require. This area is required for the haul route and is needed to facilitate a safe crossing point over Melton Spinney Road, away from the roundabout and away from the access to Twinlakes Park. The location of this follows on from the haul road justification provided in Section 6.3.3.
- 6.4.8 Plot 49 has been identified as a soil storage area. It is required in this location due to the large cutting to the west. The material stored at the location will likely be used on embankments to the east, notably the embankment between Roundabout 03 (Melton Spinney Road) and Thorpe Brook. This location is the optimal location for a soil storage area. This soil storage location has been discussed extensively with the landowner, their agent and Taylor Wimpey (who have an interest on the land and are developing a housing Scheme predominantly to the south of the site). Moving the soil storage area to the south would conflict with Taylor Wimpey's Phase 2 development, moving it further west would cut the storage area from the haul road due to the large cutting and moving it to the east of Melton Spinney Road would increase large vehicle movements across and live carriageway.
- 6.4.9 Rights are required over plots 53, 54 and 55 to allow construction of the new access to Twinlakes Park and new bridleway alignment.
- 6.4.10 Plot 58 is required for a haul road and justification follows on from the haul road justification provided in Section 6.3.3. A haul road is required here due the construction of an embankment between Melton Spinney Road and Thorpe Brook. The haul road cannot be justified to the north as it would require destruction of a large area of wooded land and would be much less practical as the haul road would switch from south to north at this location. Additionally, further east (see Section 6.5.6) it would provide additional construction challenges to construct the balancing ponds in the vicinity of Thorpe Brook. Plot 58 has been identified as area required for construction work which may be capable of being offered back to the owners but where the CPO powers allow LCC to acquire the title of the land should they require.
- 6.4.11 Roundabout 03 has been designed offline to allow construction of the roundabout whilst maintaining traffic flow along Melton Spinney Road and not disrupting access Twinlakes Park. As the arms are constructed and tied into Melton Spinney Road and Twinlakes Park, the contractor will manage traffic flows in discussion with Twinlakes.

6.5 Melton Spinney Road to the A607 Melton Road (Roundabout 03 to Roundabout 04)

- 6.5.1 The Scheme has been located immediately south of Twinlakes Park. The carriageway starts off on an embankment which is to be planted with trees to reduce any visual impact. Planting of the embankment also serves to minimise land take requirements in the vicinity.
- 6.5.2 A new bridleway route is to be constructed along the existing Footpath E25/Unclassified County Road between Wold Farm House and Melton Spinney Road. Permanent title is required to establish the route of new highway, although this land has been identified as an area capable of being offered back to the owners after the Scheme has been completed.
- 6.5.3 Land take around the Twinlakes Access has been extensively discussed with the landowners who are aware that it may be able to be offered back to them upon Scheme completion. Last meeting minutes show that they are yet undecided on how they wish to proceed on this matter.
- 6.5.4 The rights required for Plots 56 and 64 are required to ensure that adequate tree protection can be implemented to mitigate the impact of the construction works. Plot 56 will also allow access for construction of new drainage works.
- 6.5.5 The rights required over plot 59 are to provide a soil storage area. This area is under discussion with the landowner as is a satellite compound in the vicinity.
- 6.5.6 Plots 58, 62 and 63 are required for a haul road, to facilitate the construction of the balancing ponds and to create a new bridleway route across Thorpe Brook. These areas have been identified as required for construction work which may be capable of being offered back to the owners but where the CPO powers allow LCC to acquire the title of the land should they require.

6.6 A607 Melton Road to B676 Saxby Road (Roundabout 04 to Roundabout 05)

- 6.6.1 This section excludes the land take required for the diversion of the River Eye, which will be covered in Section 6.7
- 6.6.2 Refer to section 6.1.9 for information on Lag Lane
- 6.6.3 From Roundabout 04 at the A607, the Scheme heads south on embankment. To minimise land take in this area, the embankments to the west have been identified for planting in the landscape design which will provide some visual screening to the village of Thorpe Arnold.
- 6.6.4 The land under the balancing pond and associated outfall to the watercourse to the south are required for permanent title (plots 69 (part), 70 and 74).
- 6.6.5 The rights taken over plot 72 is required to enable protection of the wooded area. No construction works are required on this plot.
- 6.6.6 The rights taken over plots 71 and 75 are required for construction access to build the drainage outfall, provide the tree protection to plot 72 and construct the landowner Private Means of Access.
- 6.6.7 As the Scheme crosses the watercourse, the land to the south rises sharply and the road forms a deep cutting. Land take is for the engineering Scheme footprint only.
- 6.6.8 At badger sett is required to be relocated and a new sett is to be constructed at Plot 78. Title to this plot is required and Leicestershire will need access to this area during the establishment period of the sett. Ability to acquire title to plots 77 and 79 are required as these areas will be fenced off during the construction to allow the badger sett to establish naturally. It is possible that these plots may be able to be offered back to the landowner after the completion of the Scheme and at a suitable time.
- 6.6.9 The rights over plot 80 are for a soil storage area.

- 6.6.10 The plot of land in-between the NEMMDR and watercourse is being purchased by the Scheme for purpose of ecological mitigation. This is part of Plot 76. Once the Scheme is in place, the residual area of this field would be too small to practically farm and remote from the other lands owned by the incumbent. This field was discussed with the landowner and options of culverting a long length of the watercourse and diverting the watercourse in this location were considered but due to topography, ecological and environmental constraints, none of these options were possible. Following this investigatory exercise, it was stated to the landowner that this area would be purchased by the Scheme.
- 6.6.11 Part of plot 82, northeast of Roundabout 05 is to be purchased by the Scheme for landscaping to provide a visual screen for the property from the roundabout.
- 6.6.12 Plot 82 also provides a link between Roundabout 05 and Lag Lane. This route will be owned by the council but will provide a private means of access for the landowners along Lag Lane, between Thorpe Arnold and the B676, directly from the roundabout.
- 6.6.13 Plot 91, north of the B676 realignment, western arm of Roundabout 05, is required for the establishment of new highway rights, the diversion of a watercourse and creation of the associated ecological mitigation area. This area forms an important part of the biodiversity on the Scheme and is included in further detail in other proofs of evidence.
- 6.6.14 The watercourse mentioned in 6.6.10 travels underneath the diverted B676 and outfalls into the River Eye via a further culverted section which is to allow a landowner to cross the watercourse. This land is to be purchased by the Scheme and a private means of access established over the culvert to allow the landowner to cross.
- 6.6.15 Right to plot 97 is required for construction vehicle access between the River Eye and balancing pond 08.

6.7 B676 Saxby Road to A606 Burton Road (Roundabout 05 to Roundabout 06)

- 6.7.1 This section excludes the land take required for the diversion of the River Eye, which will be covered in Section 6.8
- 6.7.2 Refer to section 6.1.9 for information on Lag Lane.
- 6.7.3 From Roundabout 05, the road travels south, on embankment, bridges the River Eye and travels through the floodplain towards the railway line where a new bridge will be constructed. The road then moves into a cutting to Roundabout 06, which is approximately at grade and online with the A606 Burton Road
- 6.7.4 Landscaping has been specified on the embankments to minimise the need for additional land take in plots 108, 112, 119 and 120.
- 6.7.5 Plot 107 is being taken for permanent title. The plot will be needed during the construction of the bridge and diversion of the River Eye. At the landowner's request, this plot may be offered back to the landowner after Scheme completion, but no access will be provided to this plot. This was made clear during meeting with the landowner and their agent.
- 6.7.6 Plot 115 is being taken for permanent title. The plot will be needed during the construction of the railway bridge, embankment associated ground improvement works. This plot may be offered back to the landowner after Scheme completion.
- 6.7.7 Right to plot 105 is required to allow the construction of headwalls and a culverted section of the cut off ditch. The headwall is set away from the outfall to the River Eye for hydraulic and hydromorphology reasons and to daylight as much of the ditches as possible. NB: daylighting is a term used to describe an open channel which can be grassed and not piped or culverted.
- 6.7.8 Plots 112, 116 and 119 will be required during the construction of the railway bridge. A haul road will also be constructed within plots 112 and 119 to provide connectivity from the north and south, respectively. All three of these plots may be offered back to the landowner following Scheme completion.

- 6.7.9 Rights to plots 113 and 114 are required for soil storage areas.
- 6.7.10 Rights are required, identified by Plots 117 and 118, across the railway line over land owned by Network Rail. This is to facilitate the construction of the new crossing and allow access at the location of the existing structure, respectively.
- 6.7.11 The area immediately south of the railway line, to the east of NEMMDR and either side of Lag Lane has been designated as landscaping and ecological mitigation and enhancement areas. The assessment of this land indicated that there is a optimum location for such an area due to the local biodiversity and floral and fauna. The land take was discussed with the landowner on several occasions who are fully aware of the land to be acquired and justification for it. The title to these plots will be acquired by LCC and these areas are key components of the biodiversity net gain for the Scheme.
- 6.7.12 The western most parts of plot 108 are required to construct a balancing pond (BP09) and its associated outfall. The balancing pond has been located so that it does not fall within the floodplain so that the carriageway drainage is effective during flood events. The orientation of the balancing pond is required to run along the contour lines to minimise overall land take and must be located on the west side of the Scheme.
- 6.7.13 South of the railway, a haul road is required on the west of the Scheme to connect access off the A606 Burton Road to the bridge construction compound location at plot 119. LCC require the right to acquire title to plots 119, 124, 130 and 132 for construction and use of the haul road. The plots may be offered back to the landowner after completion of the Scheme. In addition, parts of plots 126 and 129 will also need to be used for the same haul road.
- 6.7.14 Great Crested Newts were found in the pond within plot 130. These newts traverse the hedgerows and predominantly travel east and south towards other water bodies. The pond will be affected by the Scheme and new newt ponds are to be constructed. The existing pond in Plot 130 is scheduled to be removed by the Scheme. Following a detailed investigation, the optimum location for newt mitigation ponds was to the east of the Scheme, north eastern part of plot 129, where two hedgerows meet the Scheme forming a triangle of land. This plot was chosen as to make the field workable from an agricultural or pastoral perspective, significant lengths of hedgerow would have to be removed and even so, the resultant plot would be an awkward shape to effectively manage. The ecological net gain between removing the hedgerows and returning to the landowner for use against retaining the hedgerow and introducing new newt habitat and ecological mitigation is very significant.
- 6.7.15 Around the pond which is to be removed in Plot 130, a buffer zone is to be set up between the pond and the haul road, which passes the pond to the west. LCC need the ability to acquire title to this land, however; it may be offered back to the landowner once the newt mitigation is established and the pond in Plot 130 is no longer in use and/or removed.
- 6.7.16 A strip along the eastern part of Plot 129 is required for Newt mitigation and connects the aforementioned new newt ponds with an existing pond to the south. This strip of land is required and adheres to legislation governing the management of great crested newts and replaces the hedgerow and enhances the natural habitat which is to be removed by the Scheme. The extent of land take for newt mitigation has been minimised as far as possible and incorporates part of the embankment for provide the required land for the newts.
- 6.7.17 Part of footpath 129 is required to establish the route of the new highway for the realigned Footpath E1, which forms part of Jubilee Way. LCC require the right to acquire title to this land to establish highway rights over it but this may be offered back to the landowner once this is done. In addition, ongoing negotiations are being held with the land owner's agent to find an agreeable alternative to acquiring the land.
- 6.7.18 A primary construction compound will be located adjacent to Sawgate Road to the east of Roundabout 06. LCC need the right to acquire title to this land (133 and part of 142) for this purpose. The location selected is an optimum location for the following reasons:
- It is a requirement to have a compound area to the south of the railway bridge.
 - A compound is required adjacent to one of the major existing arterial routes.

- Construction traffic can access the compound along the A606 from the southeast without passing through Melton.
- It is located so construction traffic can directly access the haul road from the compound without having to cross the A606.
- The location selected ensures the compound is not located within the immediate vicinity of Melton Vale sixth form College.

6.7.19 Rights to Plot 131, adjacent to the compound and on the other side of Sawgate Road, is required for use for a soil storage area.

6.7.20 Ability to acquire title to plots 143 and 144 is required to construct the arms for the potential future housing development and southern section of the distributor road. These will be the embankments (without carriageway). These plots may be offered back to the landowner following completion of the Scheme. To allow uninhibited access to the future development sites, the highway boundary is to extend to the edge of these plots and no further access rights are required.

6.8 Diversion of River Eye

6.8.1 The River Eye diversion works consists of:

- Realigning the river channel;
- Creation of an inset floodplain adjacent to the channel to allow required enhancement to the SSSI and to control flooding on adjacent lands;
- Creation of three flood compensation areas, on a level for level basis, to manage flooding;
- Retention of part of the existing River Eye to act as a backwater; and,
- A connection channel between the new and old river alignment which will feed the backwater in times of high water levels in the realigned river.

6.8.2 The land required for permanent title associated with the River Eye Diversion and associated features consists of the permanent works, including: the inset floodplain and realigned river channel; flood compensation areas; backwater channel and connection channel; and, maintenance routes between all of the aforementioned areas.

6.8.3 In addition to the permanent land take, LCC require rights to access a strip of land between the main works, the B676 Saxby Road and all three flood compensation areas for haul route/construction access.

6.8.4 The land take for permanent title has been reduced as far as practicable as the vehicles used for maintenance will be smaller and better manoeuvrability compared to the vehicles used for construction.

7. Climate Change

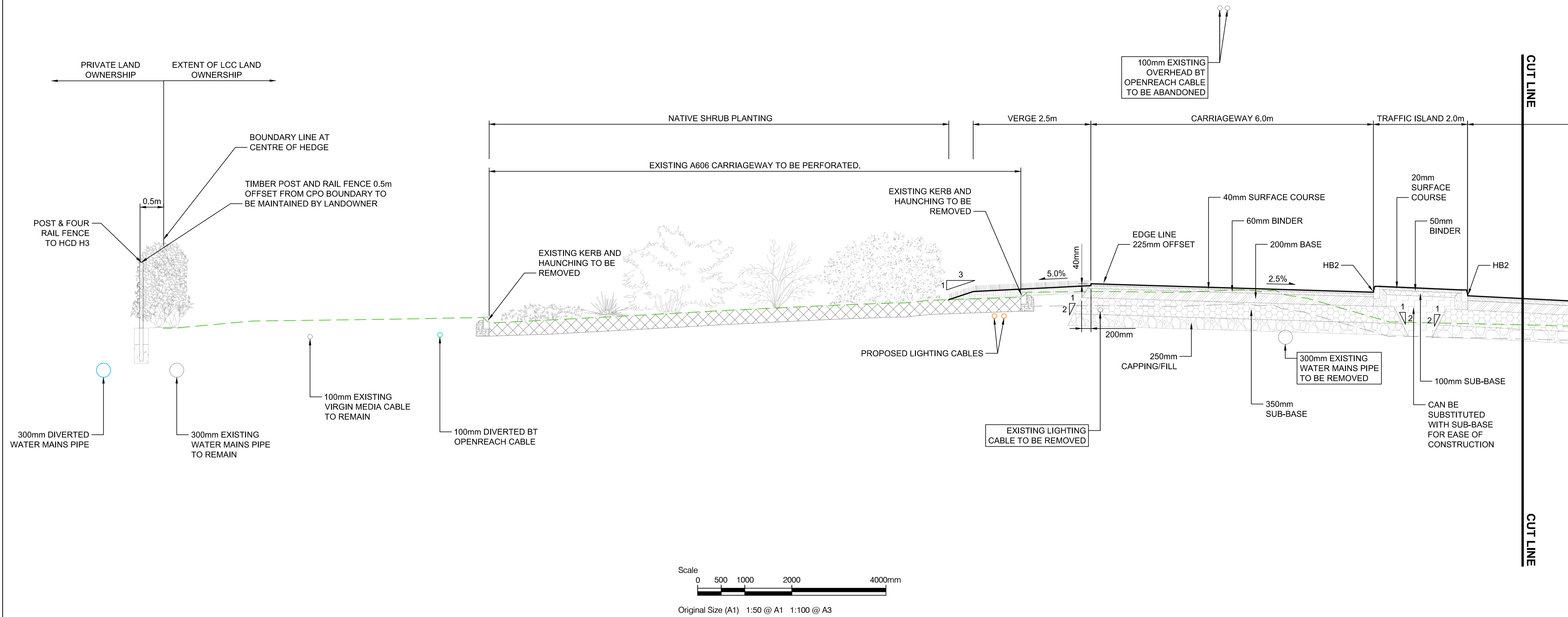
- 7.1.1 The design development of the Scheme since planning permission was granted hasn't changed the highway alignment, or speed limit. Thus there is no predicted potential change to the impacts of Greenhouse Gas (GHG) or climate change since it was considered and granted planning permission.
- 7.1.1 Various measures have been proposed to mitigate the impact of the Scheme on the climate and have been incorporated into the design and construction planning of the proposed Scheme.
- 7.1.2 The highway design optimises the cut/fill balance of site materials to minimise emissions from construction traffic and the need to import/export material.
- 7.1.3 A Construction Environmental Management Plan (CEMP) is being developed to minimise the impact of construction activities. The CEMP includes a Site Waste Management Plan which will lead to a reduction in emissions from the transportation and treatment of waste. Opportunities to re-use materials will be sought where practicable with waste arisings minimised and designed out where possible.
- 7.1.4 The appointed contractor will implement mitigation measures to manage construction phase traffic including the delivery of goods and materials. The contractor will also implement a travel plan that supports and encourages sustainable travel e.g. public transport, cycling, walking, and car-sharing.
- 7.1.5 Sustainable Urban Drainage and flood compensatory storage have been designed to account for the forecast impacts of flood risk due to climate change.
- 7.1.6 The appointed contractor will develop emergency response and contingency plans and the work force trained to take during severe weather events such as heatwaves and flooding.
- 7.1.7 Where feasible any vegetation removed will be replaced to minimise loss of carbon sink. Landscape planting and the appropriate use of SuDS will maximise the connectivity of habitats, reduce runoff, enable migration across corridors and enhance habitat creation.

8. Summary and Conclusion

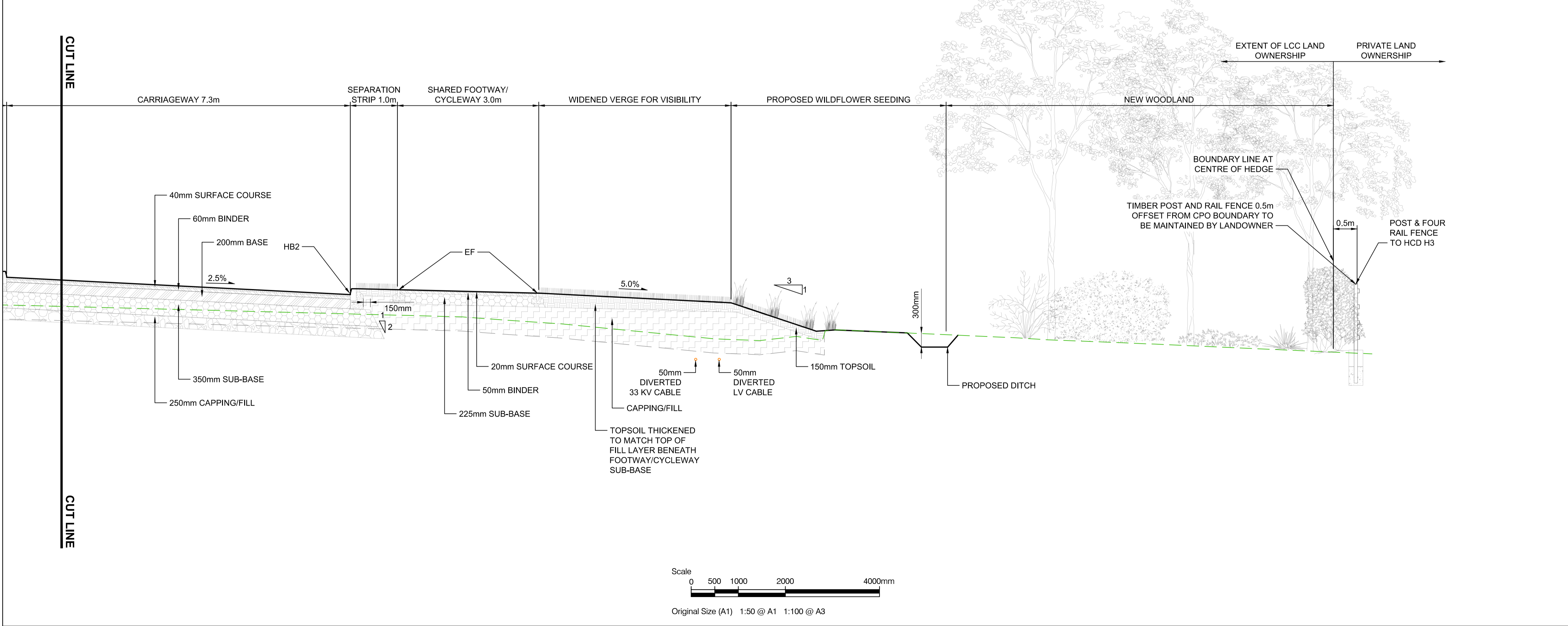
- 8.1.1 Based on my professional judgement and a thorough knowledge of the Scheme and the Engineering development of the design, I can confirm the following:
- 8.1.2 The Scheme is justified and has successfully completed all necessary stages of the planning process. A full planning application for the NEMMDR was submitted to Leicestershire County Council Planning Department in October 2018. The development was permitted by Development Control and Regulatory Board in May 2019.
- 8.1.3 The CPO and SRO are required to acquire the land and amend the existing highway network, all for the NEMMDR. As such one Order cannot stand without the other.
- 8.1.4 The land included within the CPO is both sufficient and necessary to enable the safe construction and operation of the Scheme.
- 8.1.5 The SROs for the Scheme are both sufficient and necessary to enable LCC to improve, raise, lower, direct or otherwise alter highways; stop up highways; stop up private means of access to premises required as a consequence of the construction of the Scheme; and to provide new private means of access to premises.
- 8.1.6 The Scheme has the support of the DfT demonstrated by the award of funding from the Large Local Major programme. The remaining funds required are covered by contributions from LCC and Melton Borough Council. Some of the LCC costs will be recovered in the future from developers as the adjacent housing schemes are built out. Further details are outlined in the Promoter Proof of Evidence LCC 01.
- 8.1.7 The NEMMDR is a key part of the Melton Local Plan, which has the full support of Melton Borough Council and LCC. Further details are outlined in the Promoter Proof of Evidence LCC 01.
- 8.1.8 The rationale for selection of the proposed NEMMDR route is justified since it has the greatest impact and benefits on the key objective of congestion reduction across Melton town centre and the greatest transport benefits. These scheme benefits are as demonstrated through the analysis set out in the Promoter and Traffic Modelling Proofs of Evidence (see LCC 01 and LCC 03).
- 8.1.9 The scheme will play a key part in enabling housing growth to take place in both the Northern and Southern Sustainable Neighbourhoods.
- 8.1.10 The scheme meets key planning objectives as set out in the Planning Proof of Evidence LCC 05.
- 8.1.11 The Scheme is based on sound engineering design principles and national design standards which will enable it to be constructed and operate safely.
- 8.1.12 The NEMMDR has planning permission, has funding in place and has the support of the DfT, LCC and MBC. The NEMMDR is also well supported by local businesses, Natural England and the Environment Agency.
- 8.1.13 In conclusion, it is my professional opinion that there is a compelling case in the public interest to confirm the Orders.

Appendix A - Typical Sections NEMMDR

CROSS SECTION AT CH40



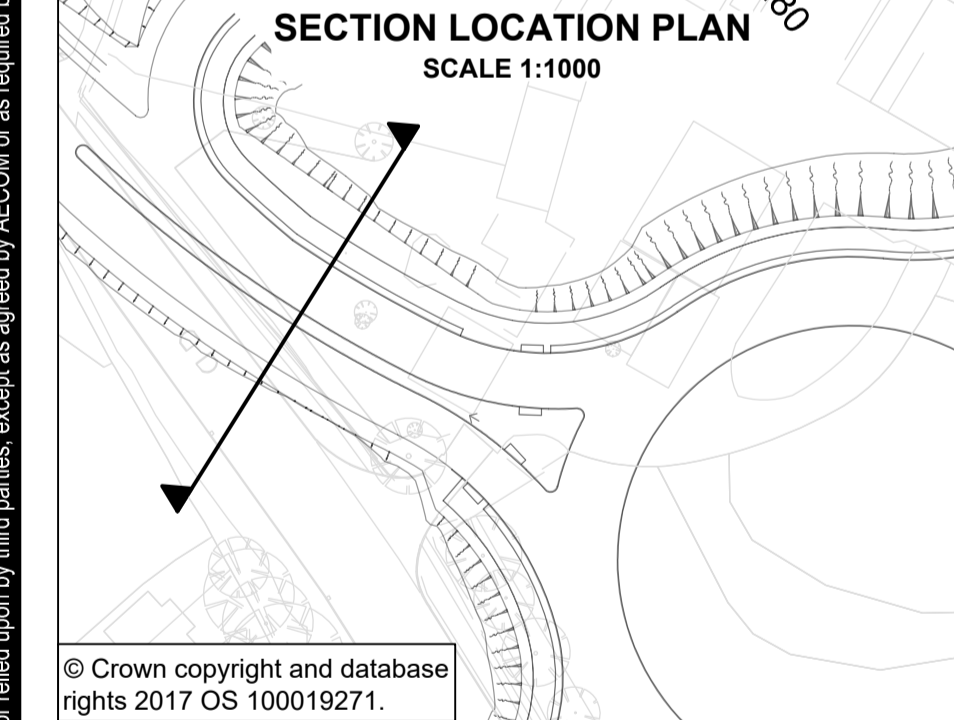
CROSS SECTION AT CH40



- NOTES**
- ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE.
 - EXISTING GROUND DATA IS BASED ON THE COMBINED AECOM AND LCC TOPOGRAPHICAL SURVEY.
 - THIS DRAWING IS BASED ON THE D1 DETAILED DESIGN HIGHWAYS ALIGNMENT MODELS (SPRING 2020) AND IS SUBJECT TO FURTHER DESIGN DEVELOPMENT.
 - FOR DETAILS OF SERVICES AND UTILITIES, SEE DRAWINGS 60542201-ACM-HUT-XX_XX_XXX_Z-DR-CU-0001 TO 0038.
 - PROPOSED UTILITY DIVERSION ARE SUBJECT TO DESIGN DEVELOPMENT FOLLOWING RESPONSES FROM STATUTORY UNDERTAKERS.
 - FOR DETAILS OF FILTER DRAINS, SEE DRAWING 60542201-ACM-HDG-GEN_ZZ_ZZ-SD-CD-0001.
 - SUB-BASE AND CAPPING TO BE CONTIGUOUS WITH FILTER DRAIN WHERE PRESENT. REFER TO CARRIAGEWAY EDGE DETAILS 60542201-ACM-HPV-GEN_ZZ_ZZ-SD-CH-0002.
 - EXISTING TOPSOIL WILL BE STRIPPED BEFORE PLACING FILL MATERIAL (INDICATIVELY SHOWN AS 300MM DEEP).
 - ENGINEERING FILL MATERIAL, AS SPECIFIED IN SERIES 600 SPECIFICATION, MAY VARY BETWEEN LOCATIONS.
 - FOR DETAILS OF STARTER LAYER, REFER TO DRAWING 60542201-ACM-EG-GEN_ZZ_ZZ-DR-GE-0121 OR THE SPECIFIC GROUND IMPROVEMENT DRAWING AND THE SERIES 600 SPECIFICATION.
 - HB2 AND EF DENOTE HALF BATTERED KERBS AND EDGING, RESPECTIVELY SEE DRAWING 60542201-ACM-HKF-GEN_ZZ_ZZ-SD-CH-0001 TO 0003.

KEY

- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- TOP SOIL TO BE REMOVED
- FILL MATERIAL
- CONCRETE
- TOP SOIL



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS
DESIGNED: II CHECKED: JS APPROVED: AS

INTERNAL PROJECT NUMBER SCALE
60542201 1:50

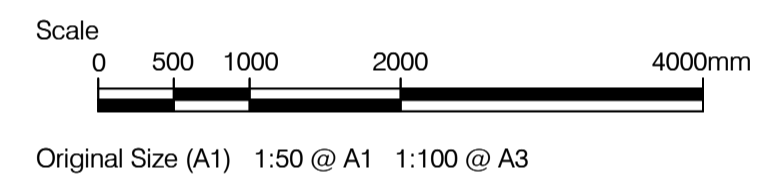
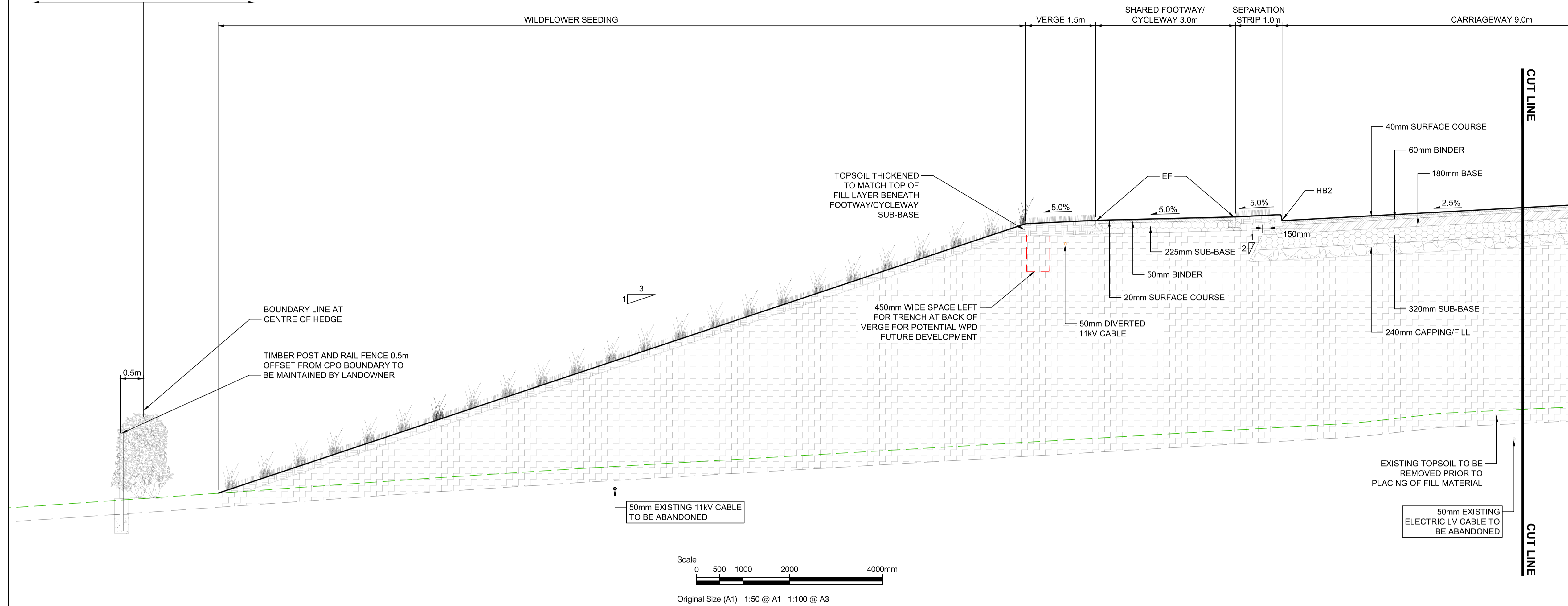
STATUS BS1192 SUITABILITY
FOR COSTING D1

SHEET TITLE
TYPICAL CROSS SECTIONS
ROUNDBOUT 1
A606 NORTH

DRAWING NUMBER	REV
60542201-ACM-HML-S1_JN_R01_Z	-DR-CH-0101 P01

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CROSS SECTION AT CH60



PROJECT
NORTH & EAST MMDR



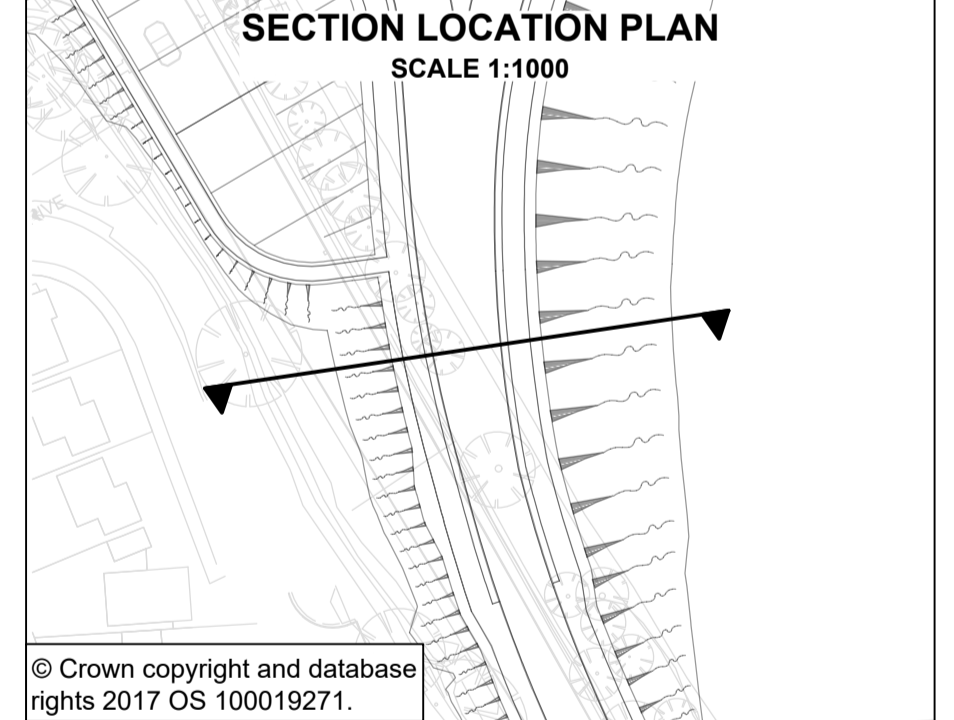
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www.aecom.com

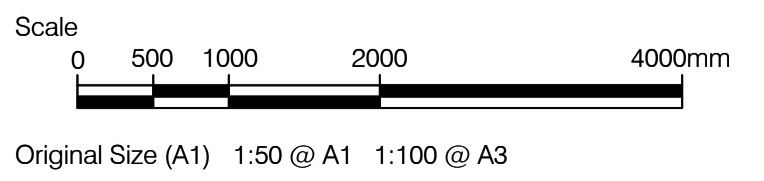
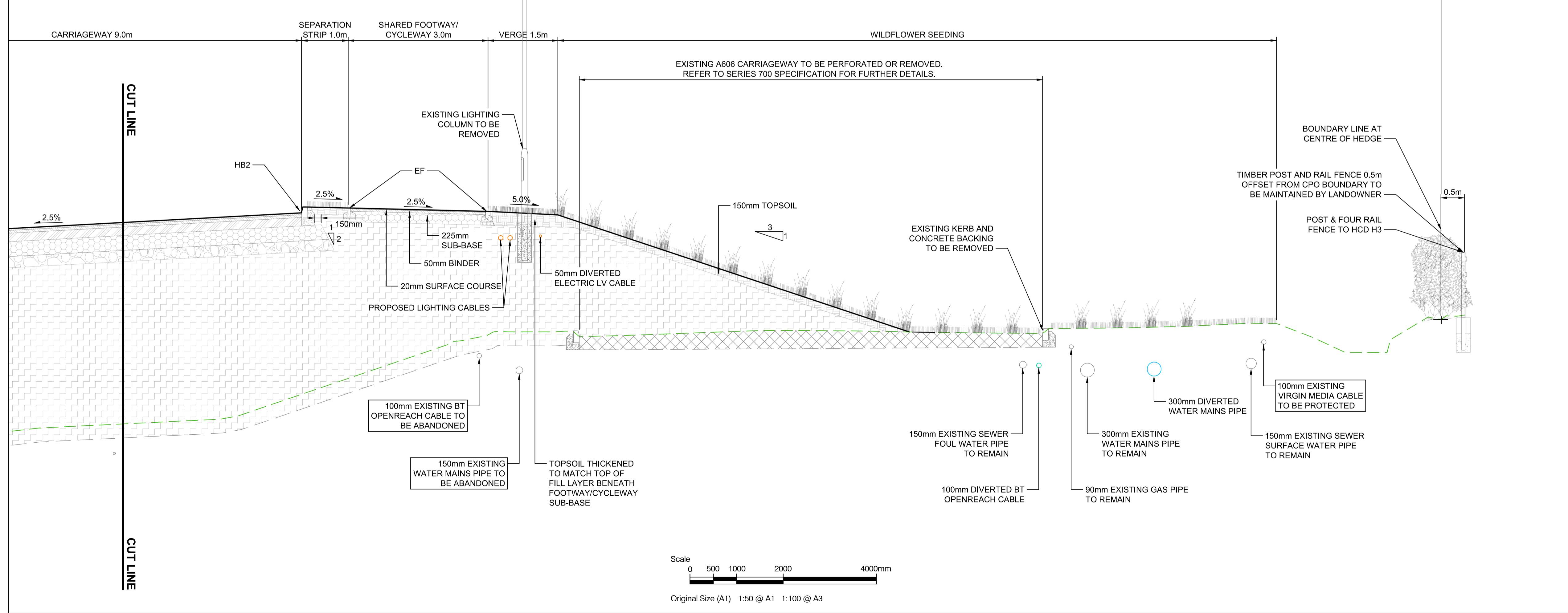
- NOTES**
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 - FOR DETAILS OF STARTER LAYER, REFER TO DRAWING 60542201-ACM-EGN-GEN_GEN_ZZ_Z-DR-GE-0121 OR THE SPECIFIC GROUND IMPROVEMENT DRAWING AND THE SERIES 600 SPECIFICATION.
 - HB2 AND EF DENOTE HALF BATTERED KERBS AND EDGING, RESPECTIVELY SEE DRAWING 60542201-ACM-HKF-GEN_GEN_ZZ_Z-SD-CH-0001 TO 0003.

KEY

	EXISTING GROUND PROFILE
	PROPOSED GROUND PROFILE
	TOP SOIL TO BE REMOVED
	FILL MATERIAL
	CONCRETE
	TOP SOIL



CROSS SECTION AT CH60



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS
DESIGNED: II CHECKED: JS APPROVED: AS

INTERNAL PROJECT NUMBER **SCALE**
60542201 1:50

STATUS **BS1192 SUITABILITY**
FOR COSTING D1

SHEET TITLE
TYPICAL CROSS SECTIONS
ROUNDBOUT 1
A606 SOUTH

DRAWING NUMBER	REV
60542201-ACM-HML-S1_JN_R01_Z	-DR-CH-0102 P01

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CROSS SECTION AT CH185



PROJECT
NORTH & EAST MMDR



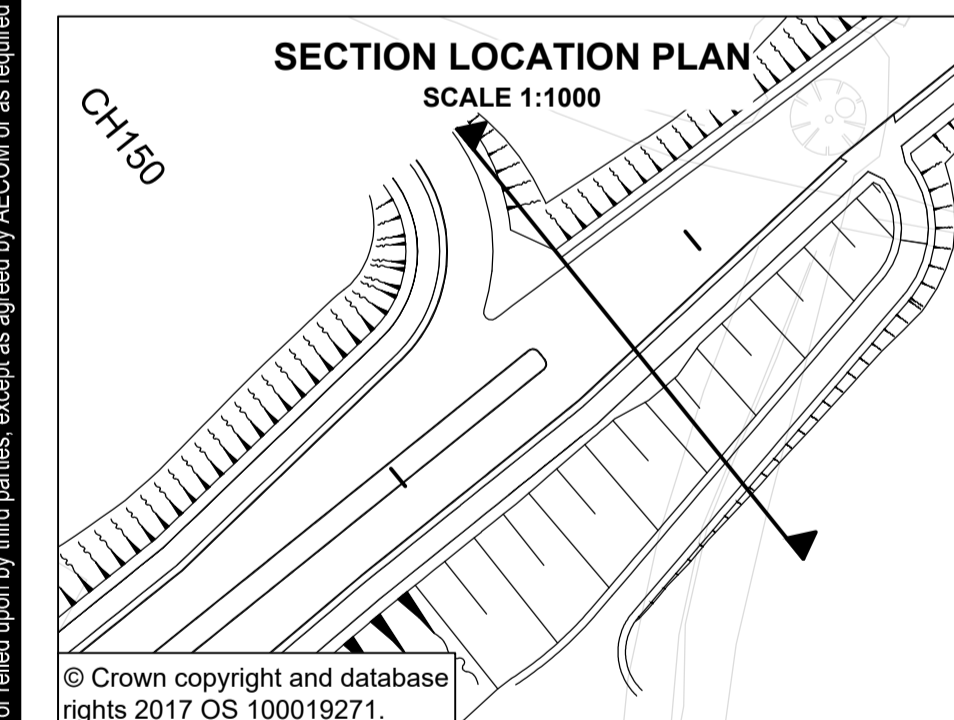
CLIENT
County Hall, Glenfield
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CONSULTANT
AECOM
12 Regan Way
Chetwynd Business Park
Chilwell, Nottingham, NG9 6RZ
tel: +44 [REDACTED]
www.aecom.com

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KEY

	EXISTING GROUND PROFILE
	PROPOSED GROUND PROFILE
	TOP SOIL TO BE REMOVED
	FILL MATERIAL
	CONCRETE
	TOP SOIL



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS

DESIGNED: II CHECKED: JS APPROVED: AS

INTERNAL PROJECT NUMBER **SCALE**

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STATUS **BS1192 SUITABILITY**

FOR COSTING D1

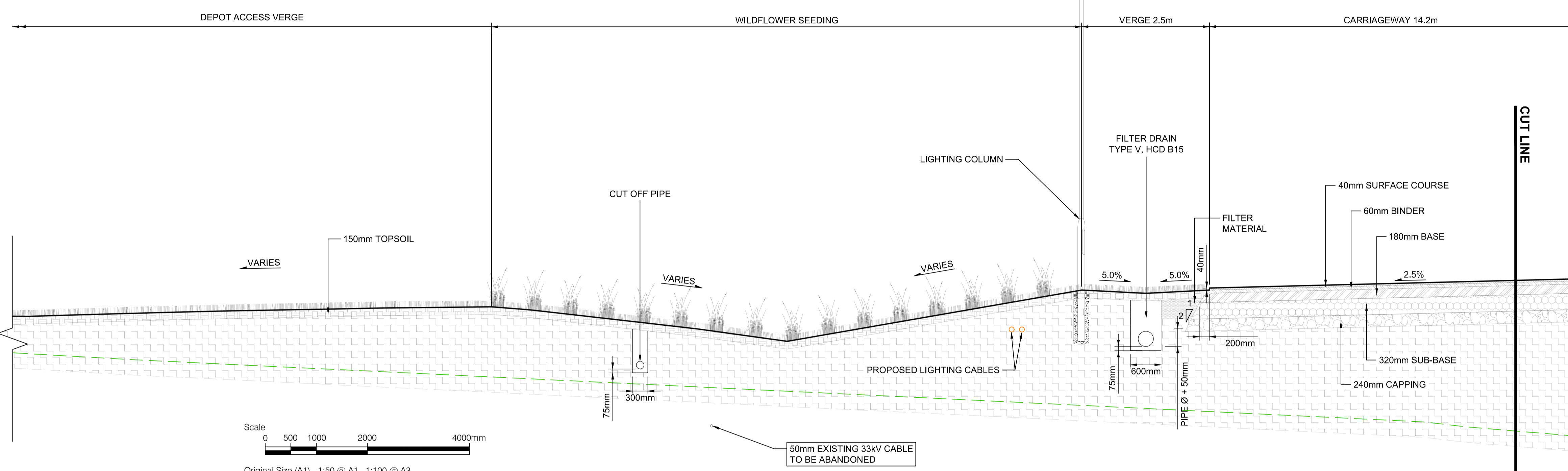
SHEET TITLE

TYPICAL CROSS SECTIONS
SECTION 1 MAINLINE
CH185

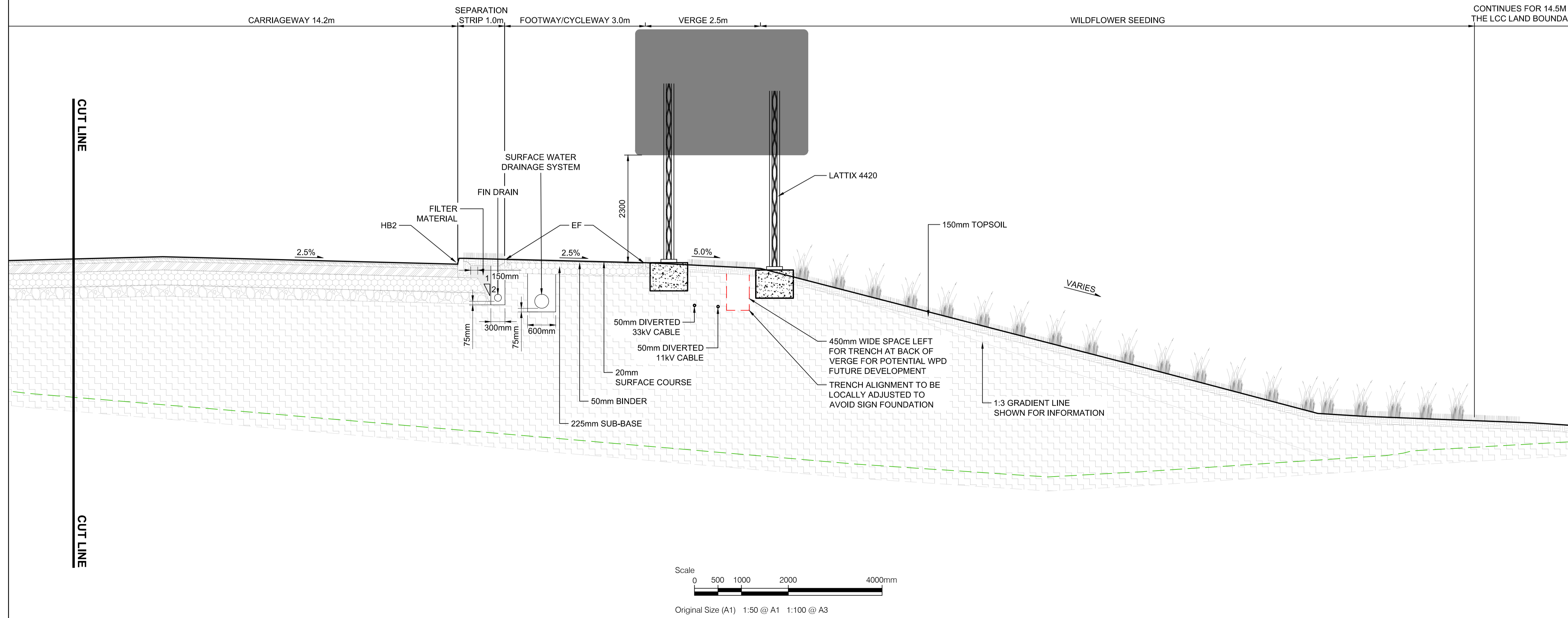
DRAWING NUMBER **REV**

60542201-ACM-HML -S1_ML_M01_Z -DR-CH-0101 P01

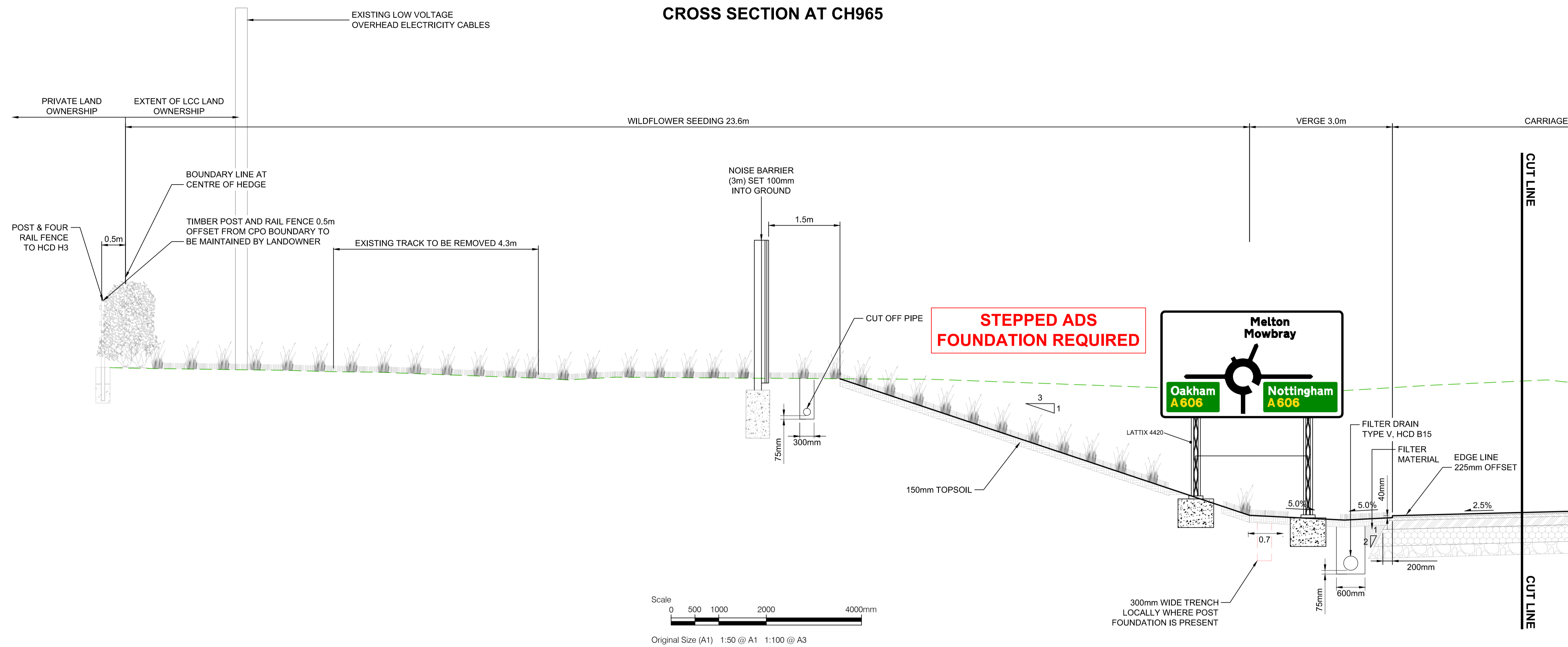
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CROSS SECTION AT CH185

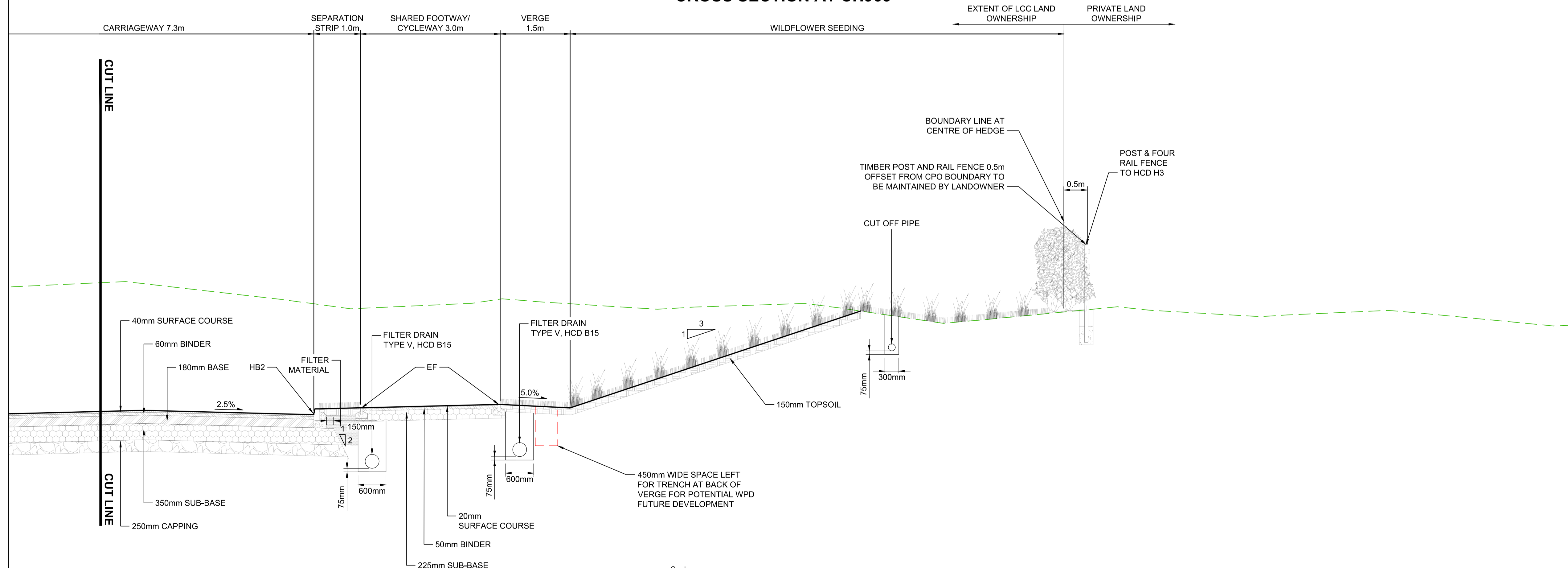


CROSS SECTION AT CH965



Scale 0 500 1000 2000 4000mm
Original Size (A1) 1:50 @ A1 1:100 @ A3

CROSS SECTION AT CH965

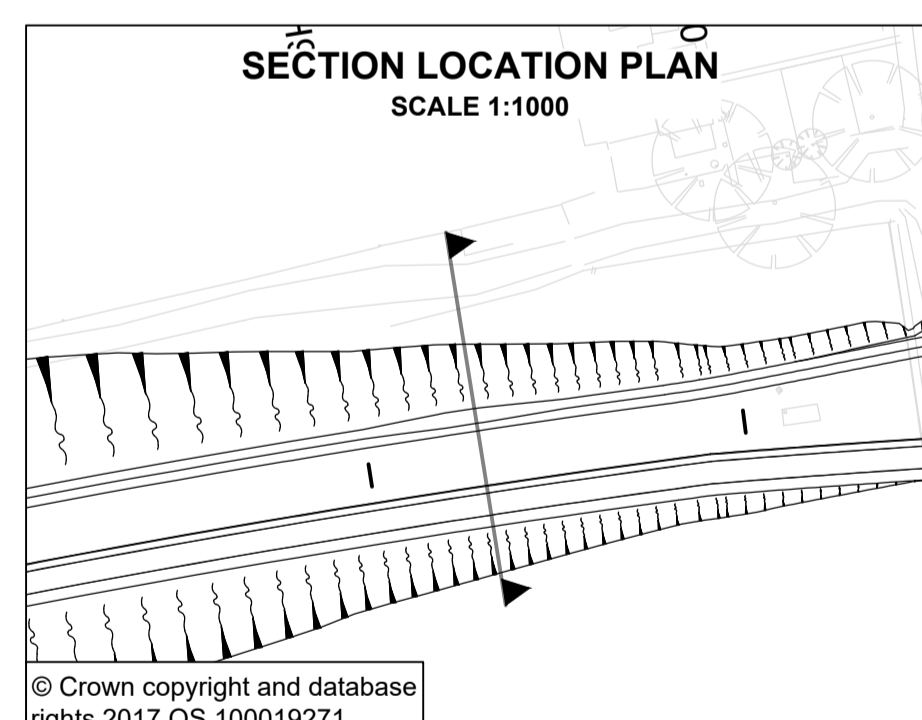


Scale 0 500 1000 2000 4000mm
Original Size (A1) 1:50 @ A1 1:100 @ A3

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 10. FOR DETAILS OF STARTER LAYER, REFER TO DRAWING 60542201-ACM-EG-GEN_GEN_ZZ_Z-DR-GE-0121 OR THE SPECIFIC GROUND IMPROVEMENT DRAWING AND THE SERIES 600 SPECIFICATION.
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KEY

	EXISTING GROUND PROFILE
	PROPOSED GROUND PROFILE
	TOP SOIL TO BE REMOVED
	FILL MATERIAL
	CONCRETE
	TOP SOIL



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS

DESIGNED: II	CHECKED: JS	APPROVED: AS
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INTERNAL PROJECT NUMBER **SCALE**

60542201	1:50
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STATUS **BS1192 SUITABILITY**

FOR COSTING	D1
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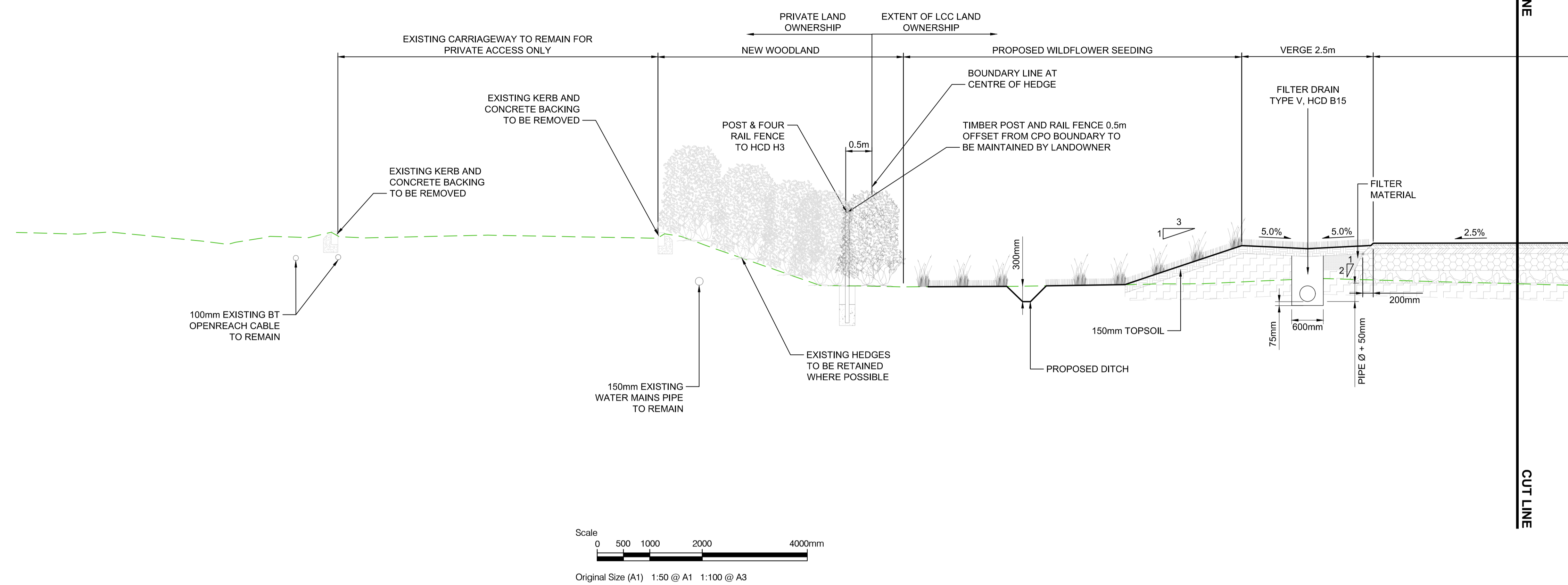
SHEET TITLE
TYPICAL CROSS SECTIONS
SECTION 1 MAINLINE
CH965

DRAWING NUMBER **REV**

60542201-ACM-HML-S1_ML_M01_Z	-DR-CH-0102	P01
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CROSS SECTION AT CH40



PROJECT
NORTH & EAST MMDR



CLIENT
County Hall, Glenfield
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www.leicestershire.gov.uk

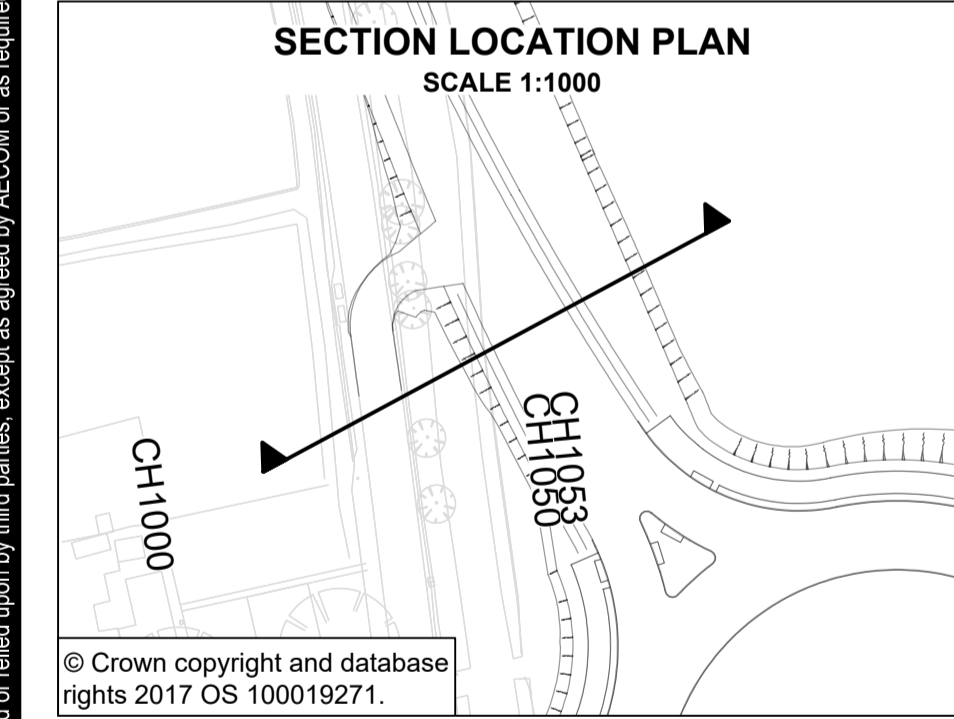
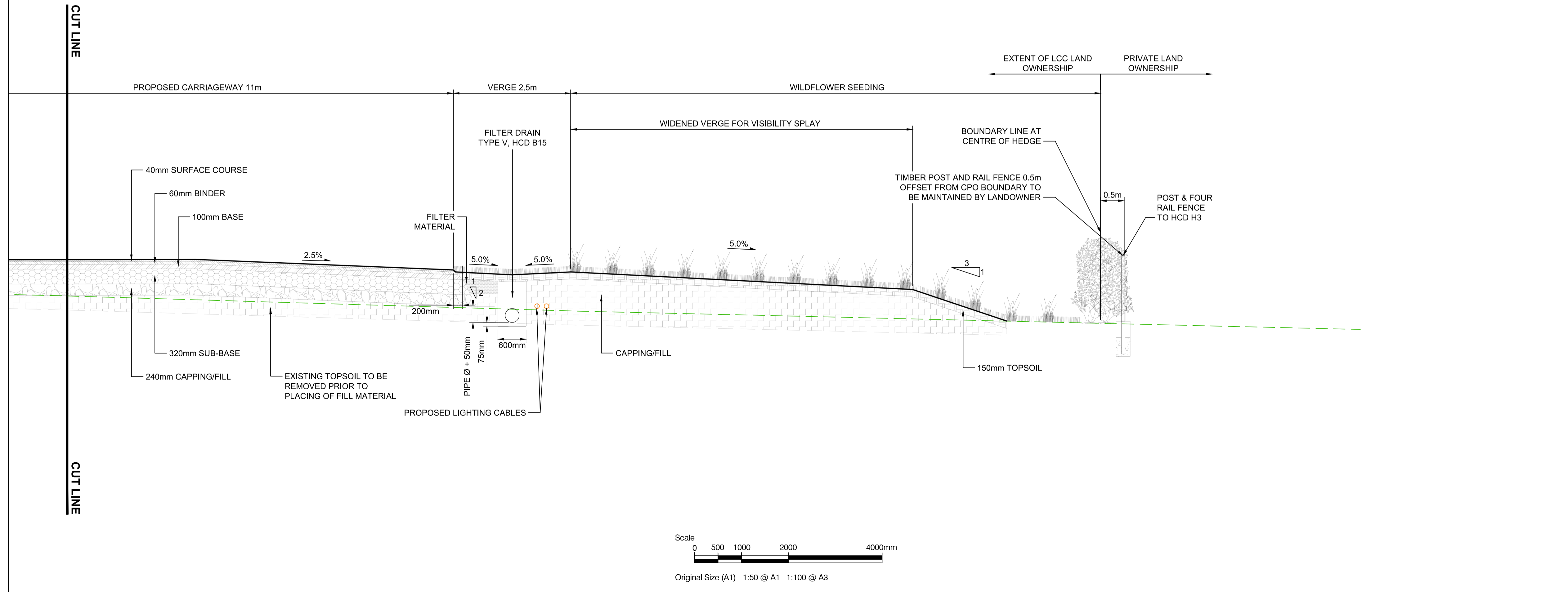
CONSULTANT
AECOM
12 Regan Way
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tel: +44 [REDACTED]
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KEY

- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- TOP SOIL TO BE REMOVED
- FILL MATERIAL
- CONCRETE
- TOP SOIL

CROSS SECTION AT CH40



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS
DESIGNED: II CHECKED: JS APPROVED: AS

INTERNAL PROJECT NUMBER **SCALE**
60542201 1:50

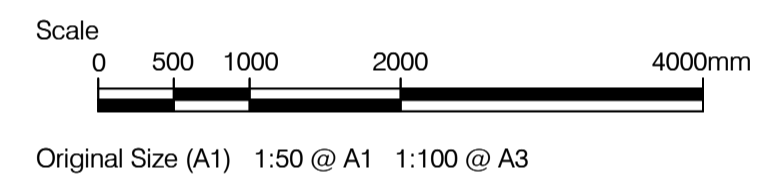
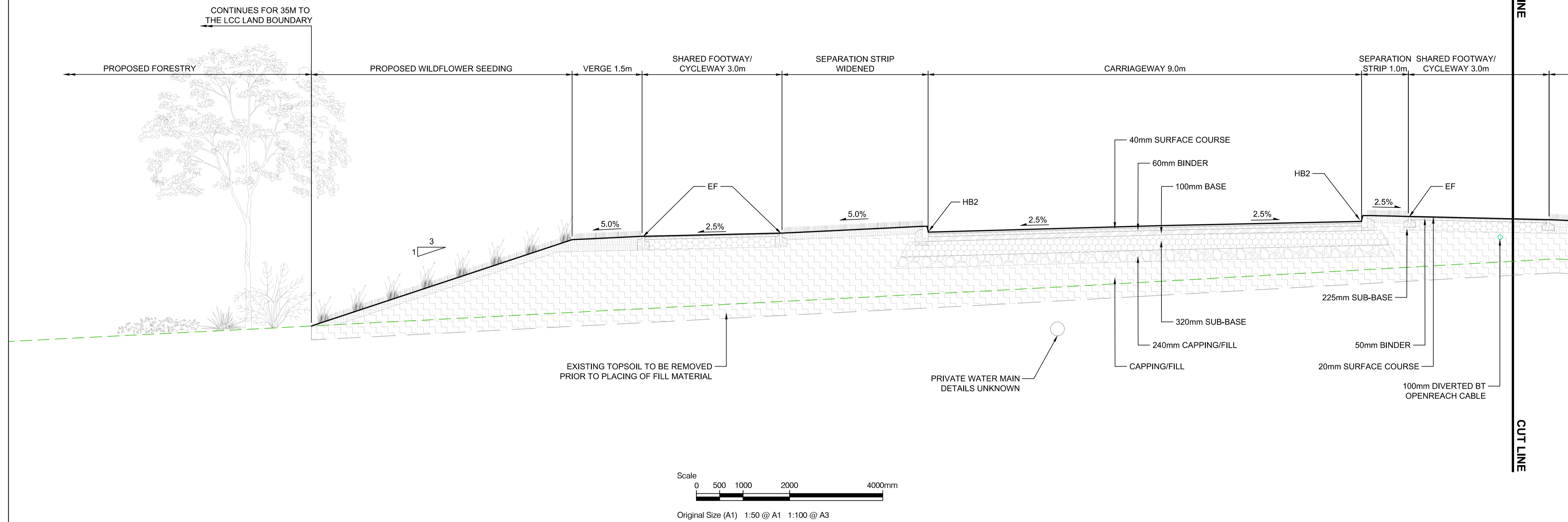
STATUS **BS1192 SUITABILITY**
FOR COSTING D1

SHEET TITLE
TYPICAL CROSS SECTIONS
ROUNDBOUT 2
SCALFORD ROAD NORTH

DRAWING NUMBER	REV
60542201-ACM-HML-S1_JN_R02_Z	-DR-CH-0101 P01

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CROSS SECTION AT CH40

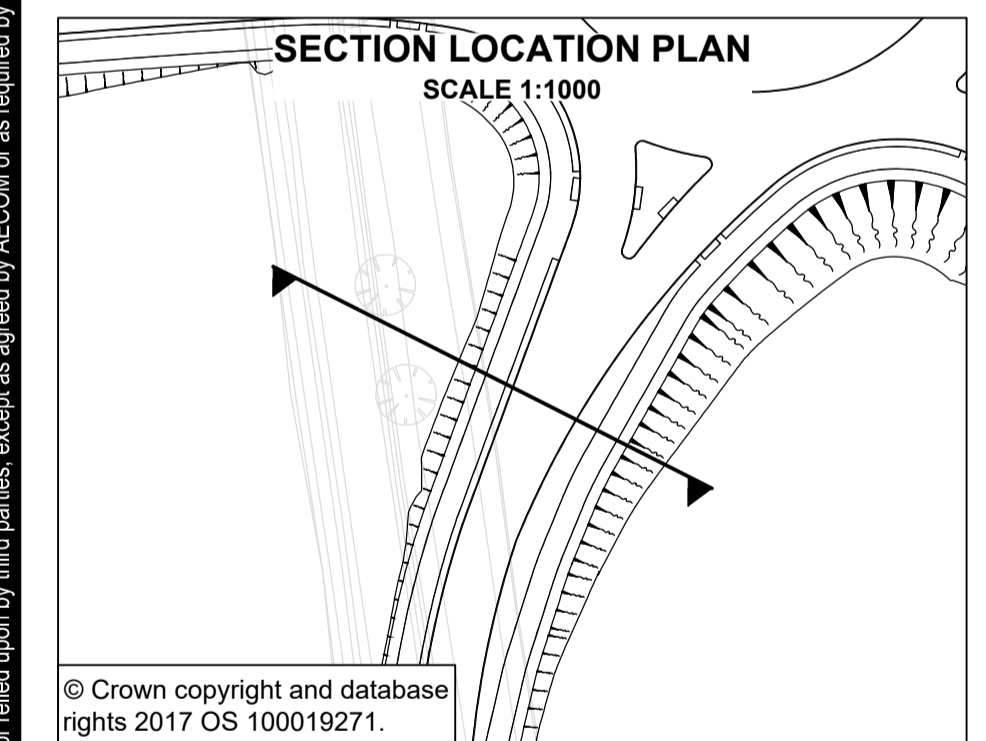
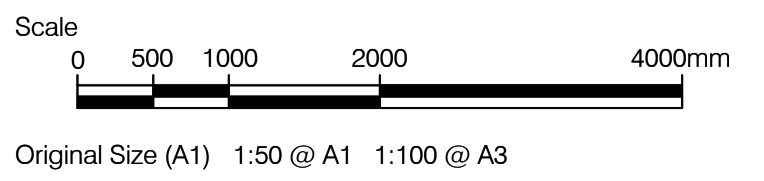
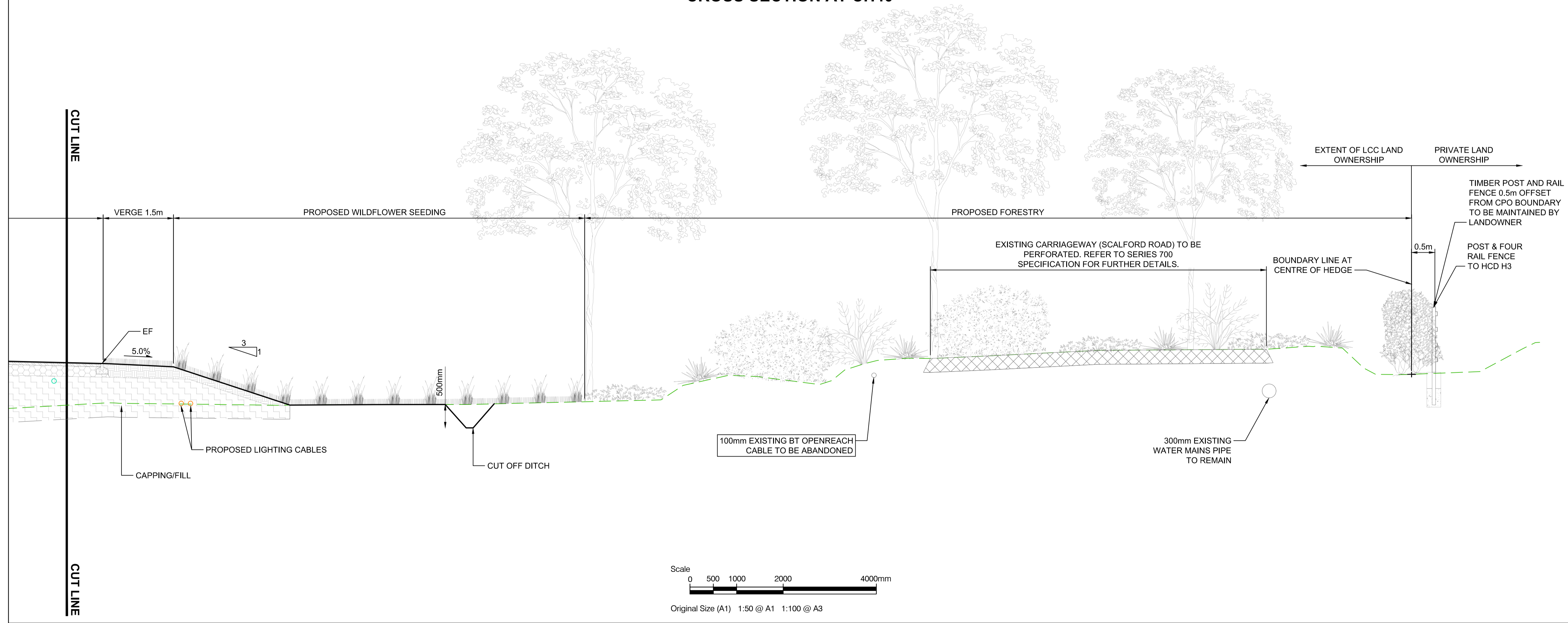


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KEY

	EXISTING GROUND PROFILE
	PROPOSED GROUND PROFILE
	TOP SOIL TO BE REMOVED
	FILL MATERIAL
	CONCRETE
	TOP SOIL

CROSS SECTION AT CH40



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DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS
DESIGNED: II CHECKED: JS APPROVED: AS

INTERNAL PROJECT NUMBER **SCALE**
60542201 1:50

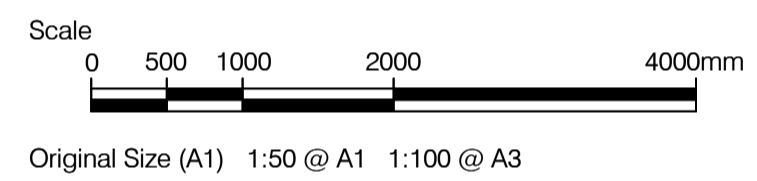
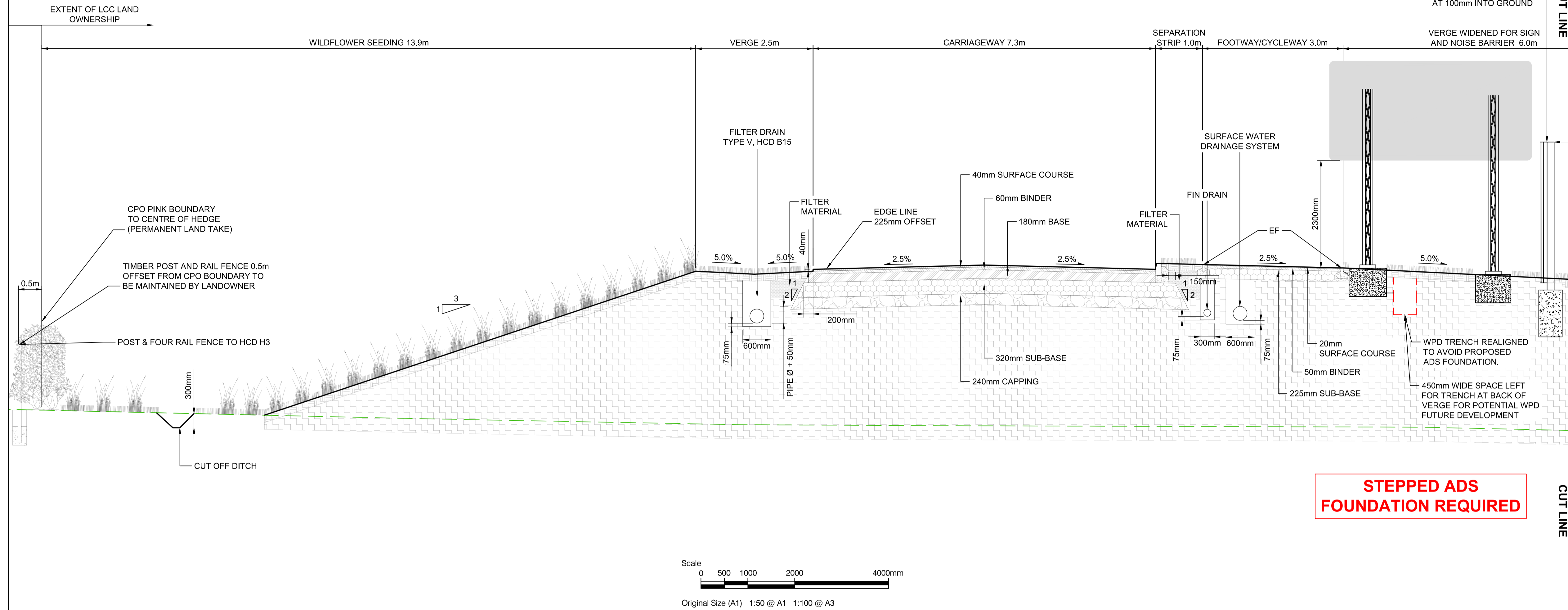
STATUS **BS1192 SUITABILITY**
FOR COSTING D1

SHEET TITLE
TYPICAL CROSS SECTIONS
ROUNDBOUT 2
SCALFORD ROAD SOUTH

DRAWING NUMBER	REV
60542201-ACM-HML-S1_JN_R02_Z	-DR-CH-0102 P01

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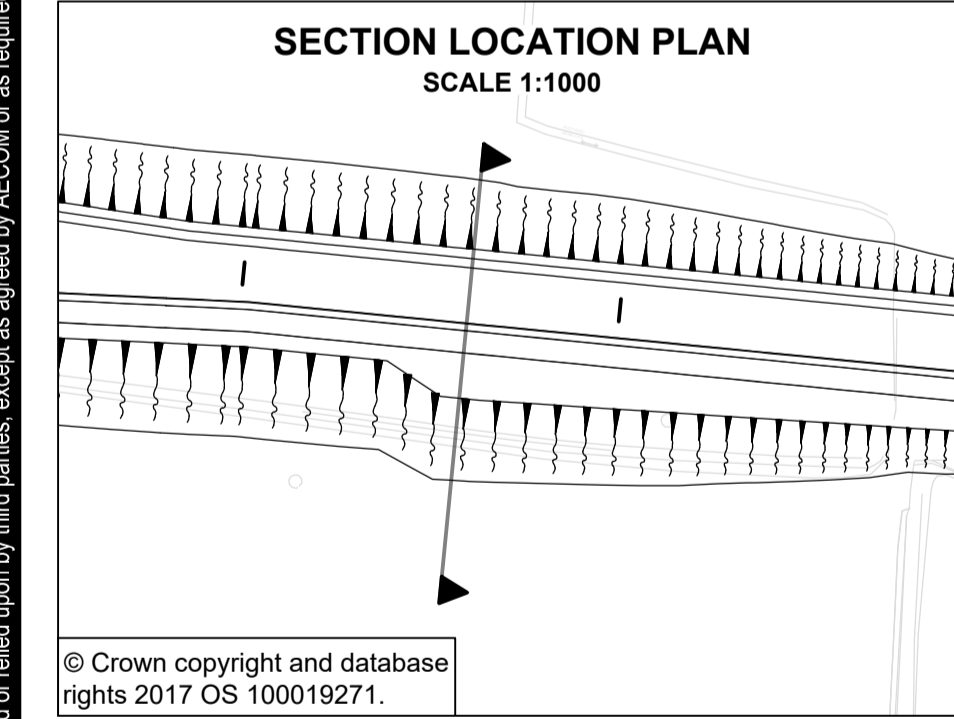
CROSS SECTION AT CH1230



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KEY

	EXISTING GROUND PROFILE
	PROPOSED GROUND PROFILE
	TOP SOIL TO BE REMOVED
	FILL MATERIAL
	CONCRETE
	TOP SOIL



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS

DESIGNED: II	CHECKED: JS	APPROVED: AS
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INTERNAL PROJECT NUMBER **SCALE**

60542201	1:50
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STATUS **BS1192 SUITABILITY**

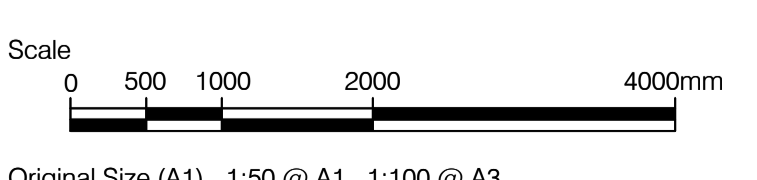
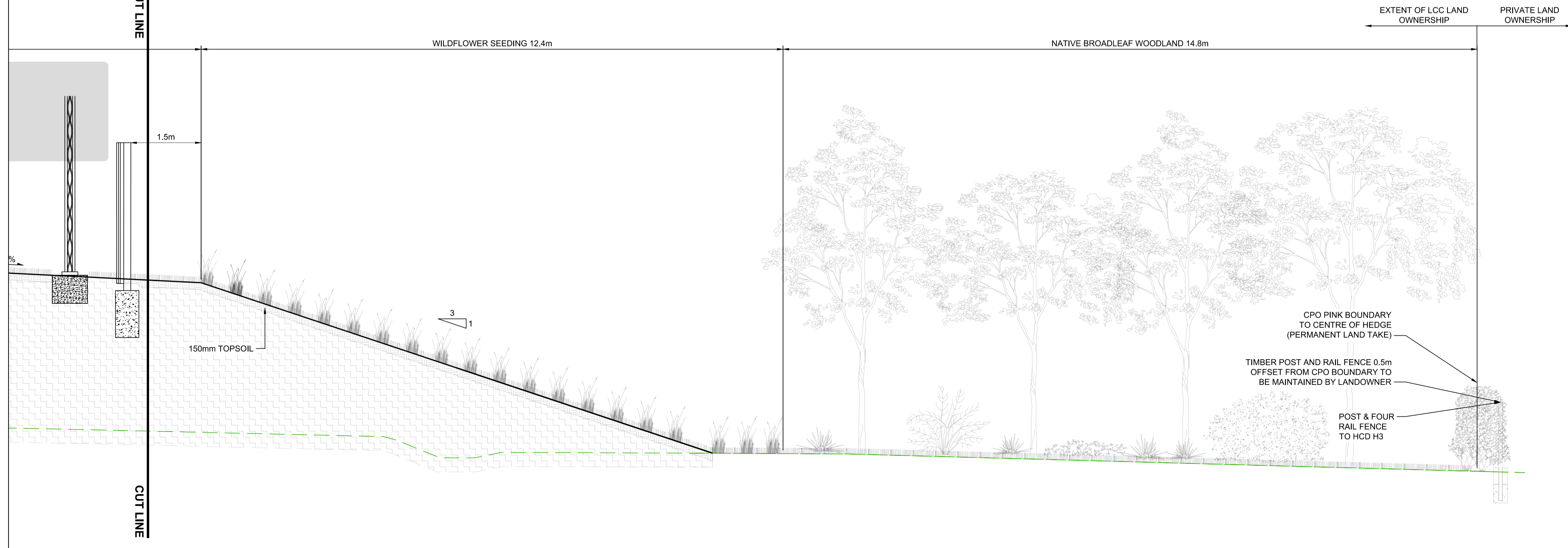
FOR COSTING	D1
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SHEET TITLE
TYPICAL CROSS SECTIONS
SECTION 2 MAINLINE
CH1230

DRAWING NUMBER **REV**

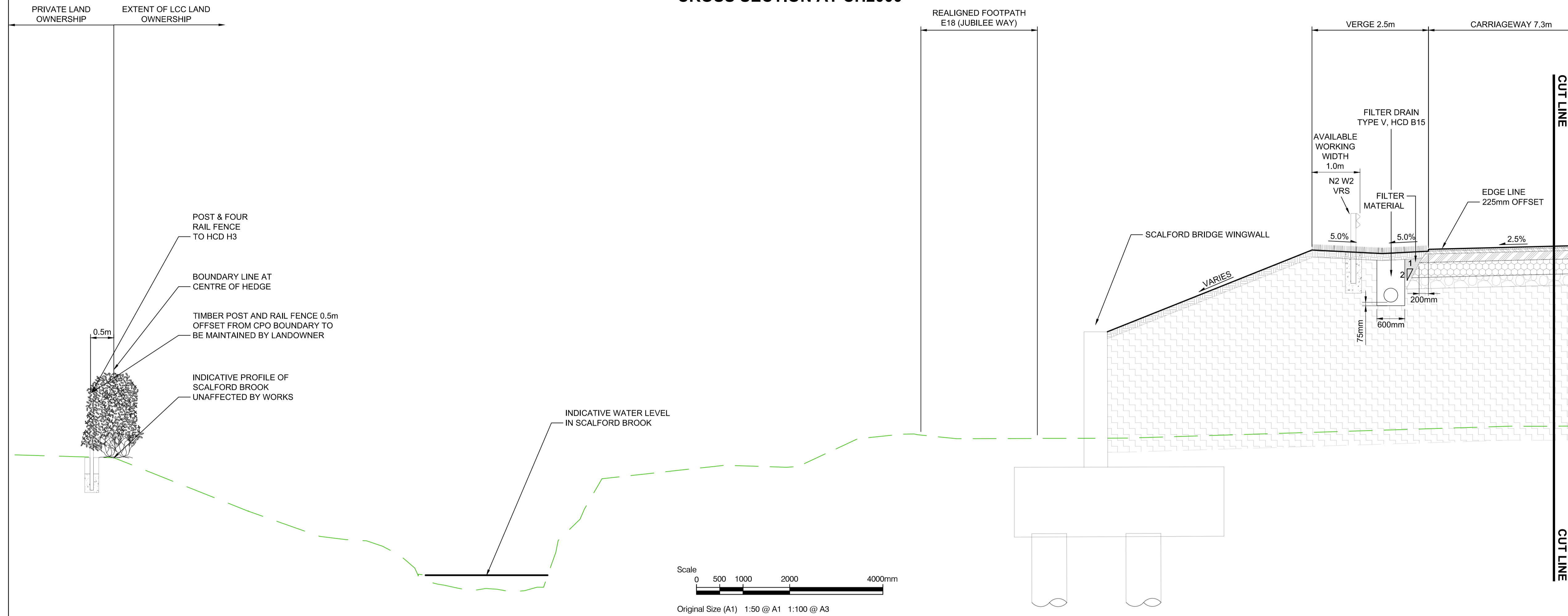
60542201-ACM-HML -S2_ML_M02_Z -DR-CH-0101	P01
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CROSS SECTION AT CH1230

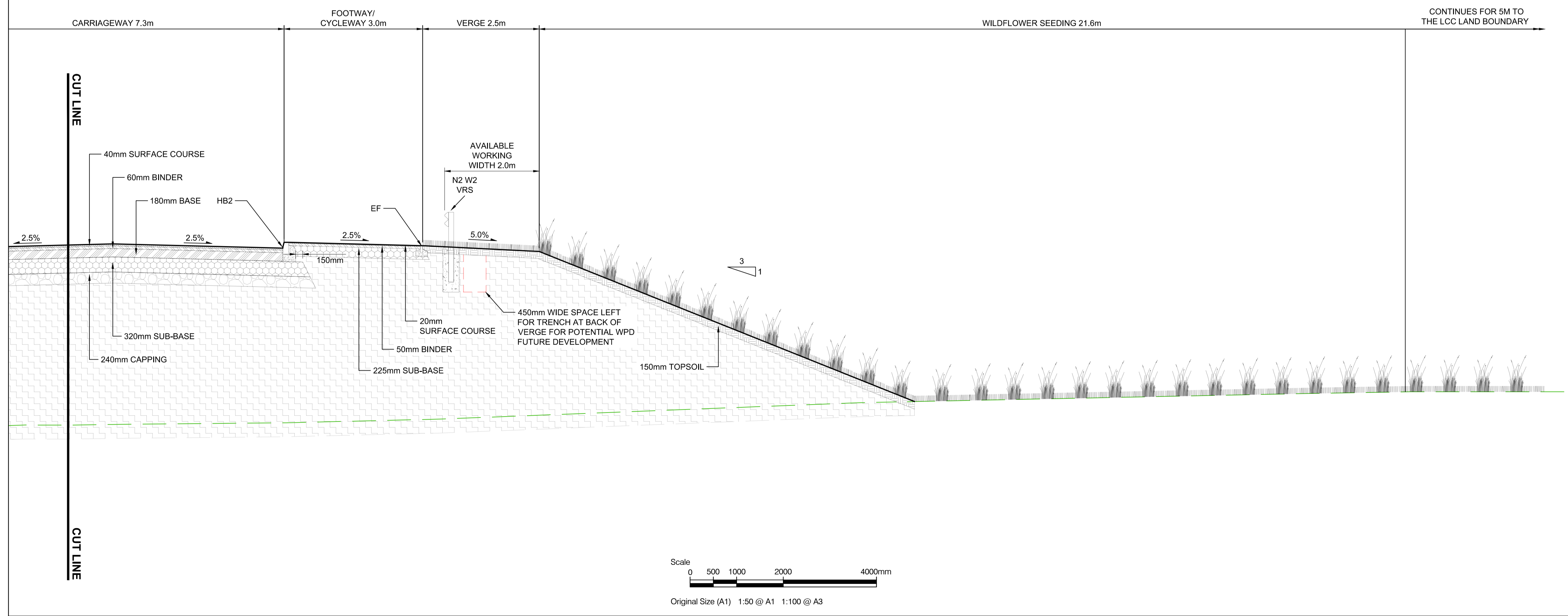


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CROSS SECTION AT CH2000



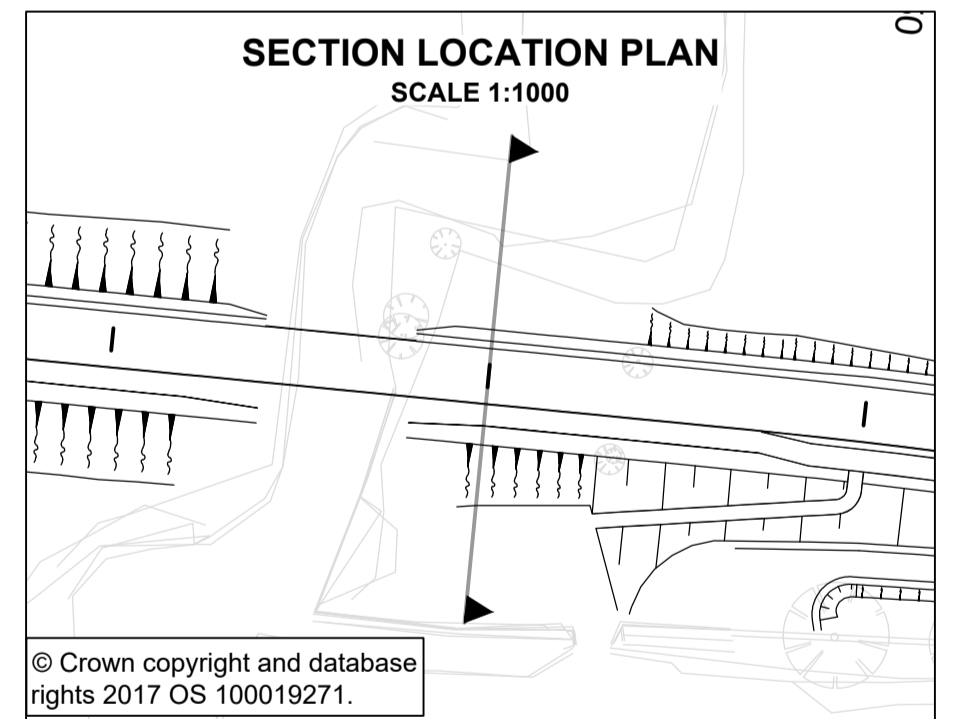
CROSS SECTION AT CH2000



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KEY

- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- TOP SOIL TO BE REMOVED
- FILL MATERIAL
- CONCRETE
- TOP SOIL



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS

DESIGNED: II | CHECKED: JS | APPROVED: AS

INTERNAL PROJECT NUMBER | **SCALE**

60542201 | 1:50

STATUS | **BS1192 SUITABILITY**

FOR COSTING | D1

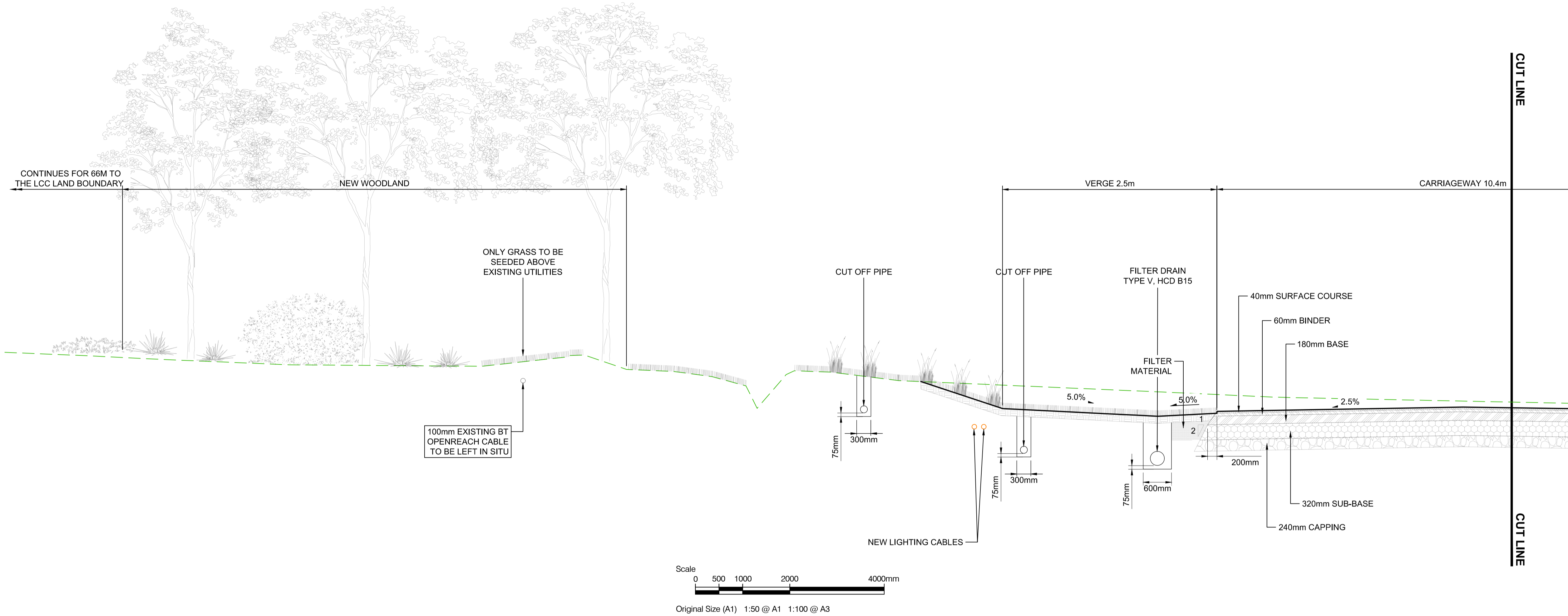
SHEET TITLE

TYPICAL CROSS SECTIONS
SECTION 2 MAINLINE
CH2000

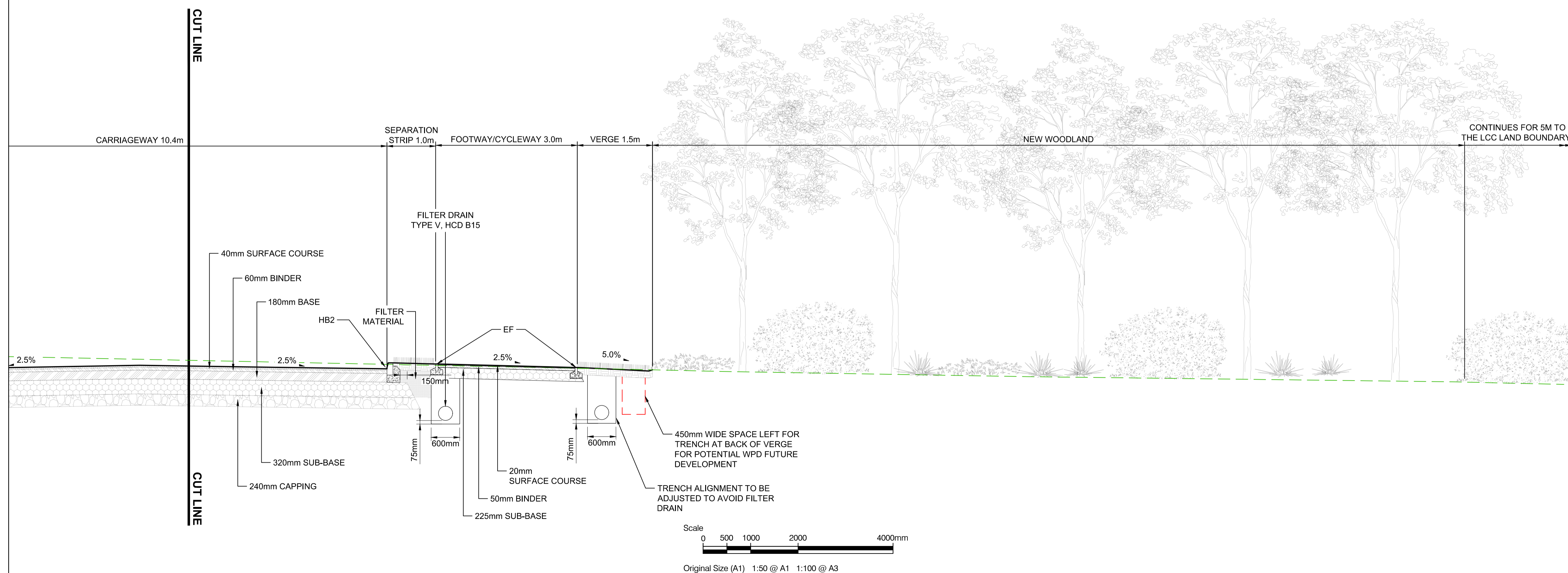
DRAWING NUMBER	REV
60542201-ACM-HML-S2_ML_M02_Z -DR-CH-0102	P01

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CROSS SECTION AT CH2740



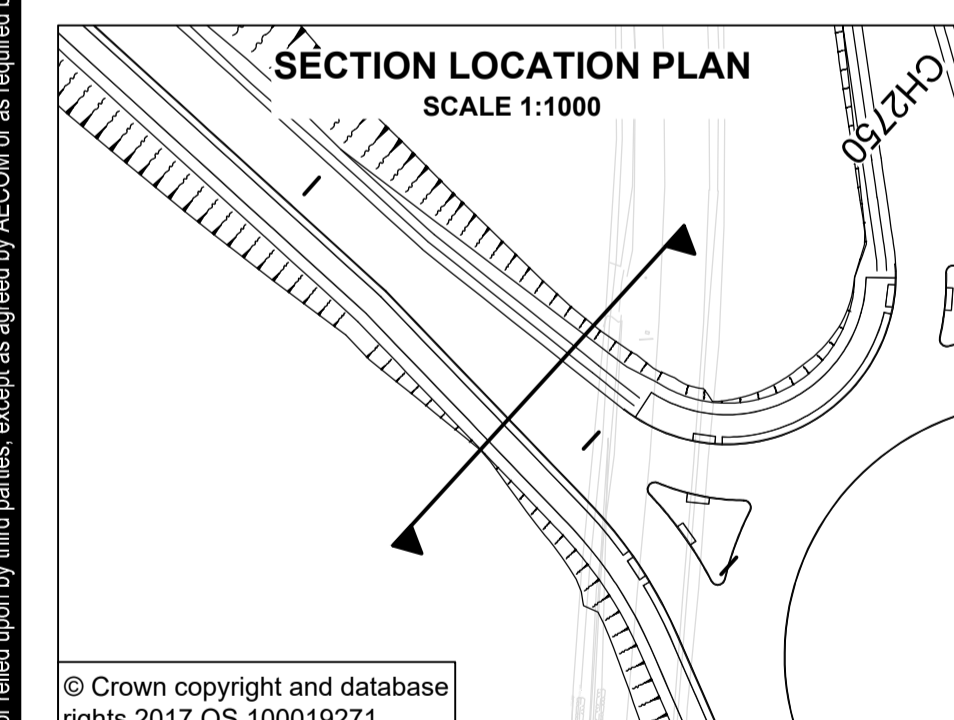
CROSS SECTION AT CH2740



- NOTES**
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 - HB2 AND EF DENOTE HALF BATTERED KERBS AND EDGING, RESPECTIVELY. SEE DRAWING 60542201-ACM-HKF-GEN_ZZ_ZZ-SD-CH-0001 TO 0003.

KEY

- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- TOP SOIL TO BE REMOVED
- FILL MATERIAL
- CONCRETE
- TOP SOIL



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS

DESIGNED: II CHECKED: JS APPROVED: AS

INTERNAL PROJECT NUMBER **SCALE**

60542201 1:50

STATUS **BS1192 SUITABILITY**

FOR COSTING D1

SHEET TITLE

TYPICAL CROSS SECTIONS
SECTION 2 MAINLINE
CH2740

DRAWING NUMBER **REV**

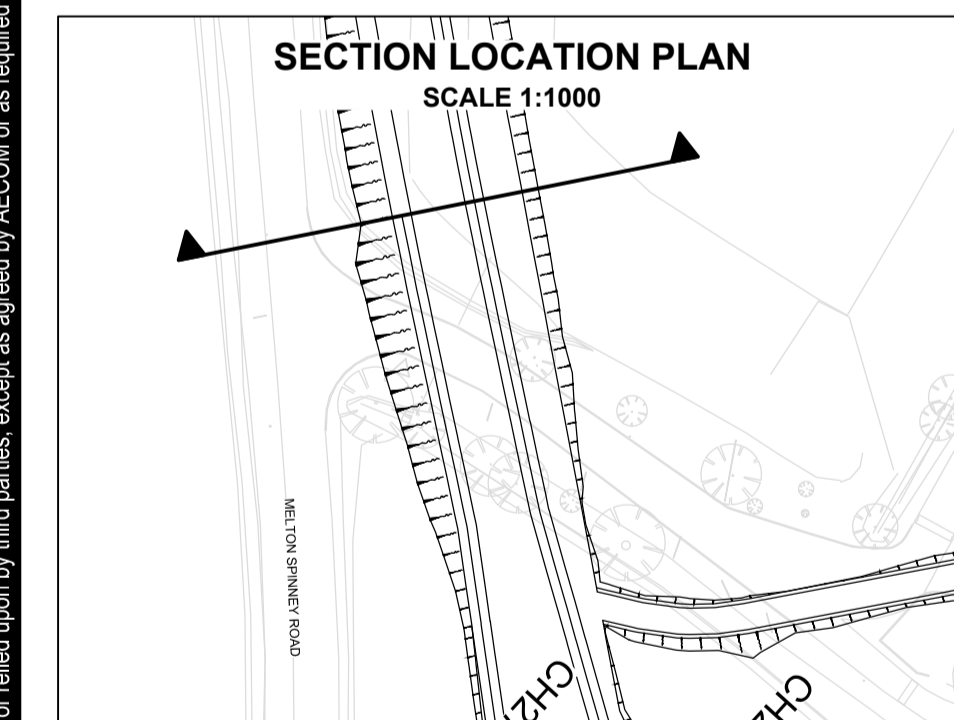
60542201-ACM-HML-S2_ML_M02_Z -DR-CH-0103 P01

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KEY

	EXISTING GROUND PROFILE
	PROPOSED GROUND PROFILE
	TOP SOIL TO BE REMOVED
	FILL MATERIAL
	CONCRETE
	TOP SOIL



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS

DESIGNED: II	CHECKED: JS	APPROVED: AS
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INTERNAL PROJECT NUMBER **SCALE**

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STATUS **BS1192 SUITABILITY**

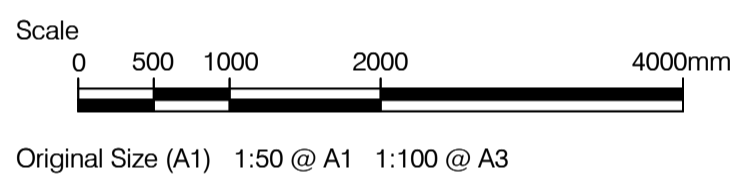
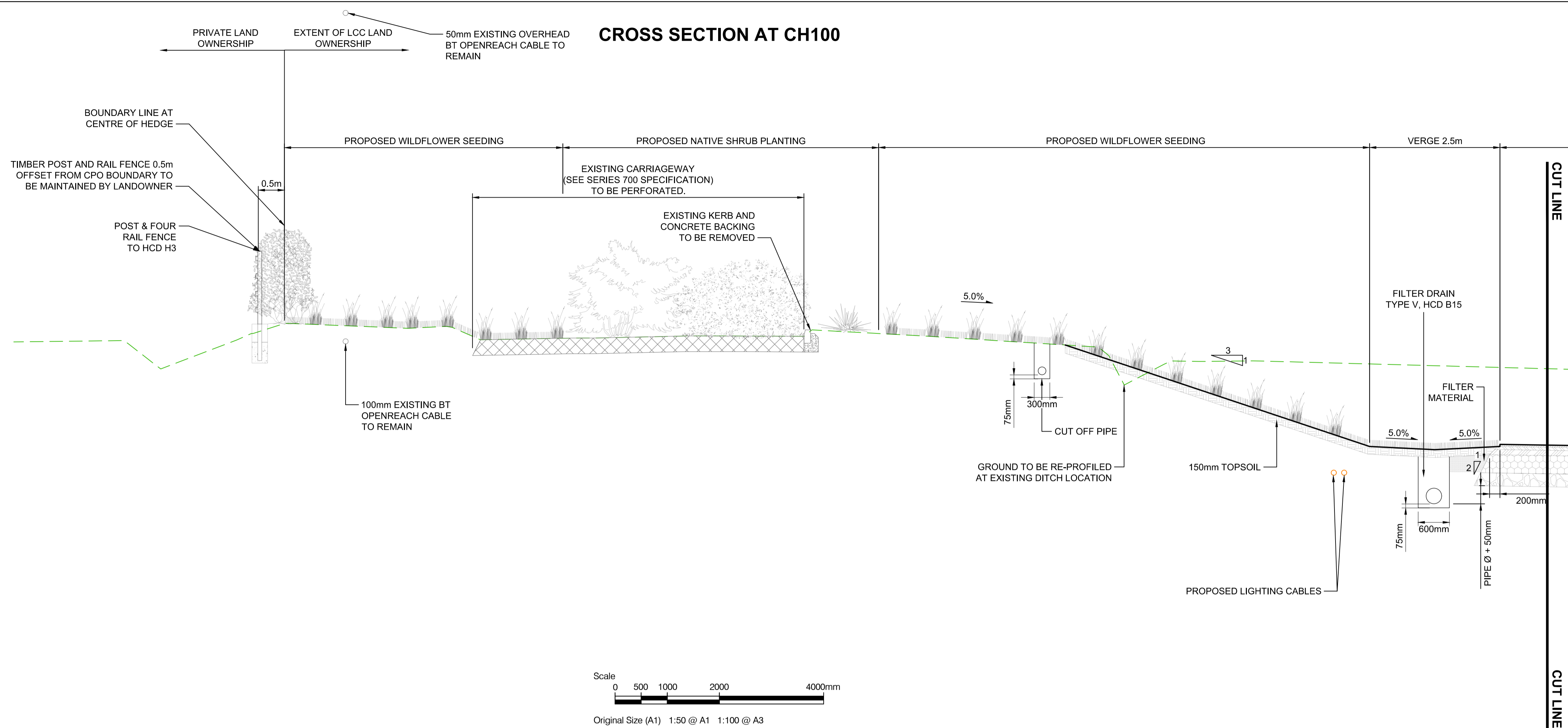
FOR COSTING	D1
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SHEET TITLE
TYPICAL CROSS SECTIONS
ROUNDBOUT 3
MELTON SPINNEY RD NORTH

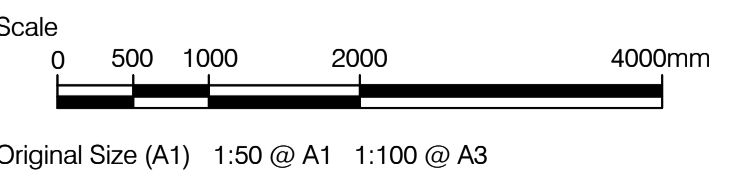
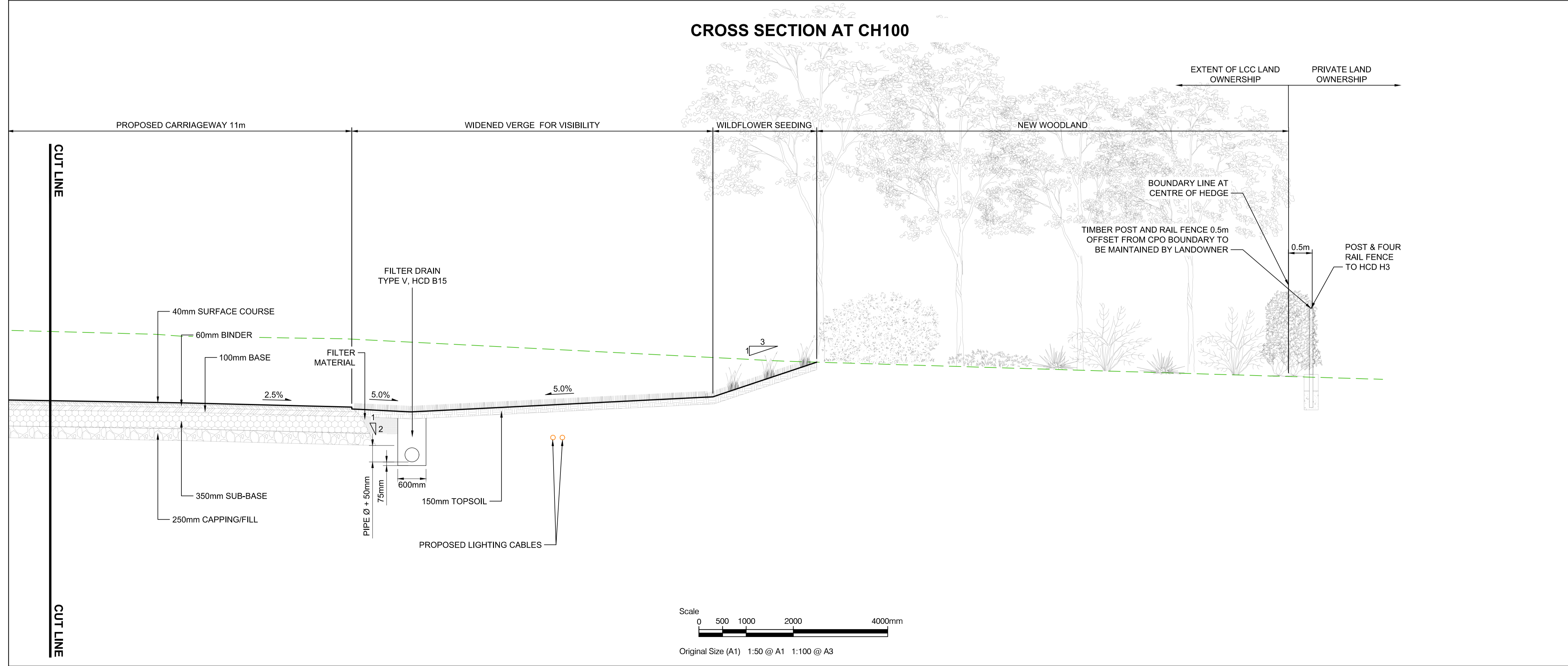
DRAWING NUMBER **REV**

60542201-ACM-HML -S2_JN_R03_Z	-DR-CH-0101	P01
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CROSS SECTION AT CH100

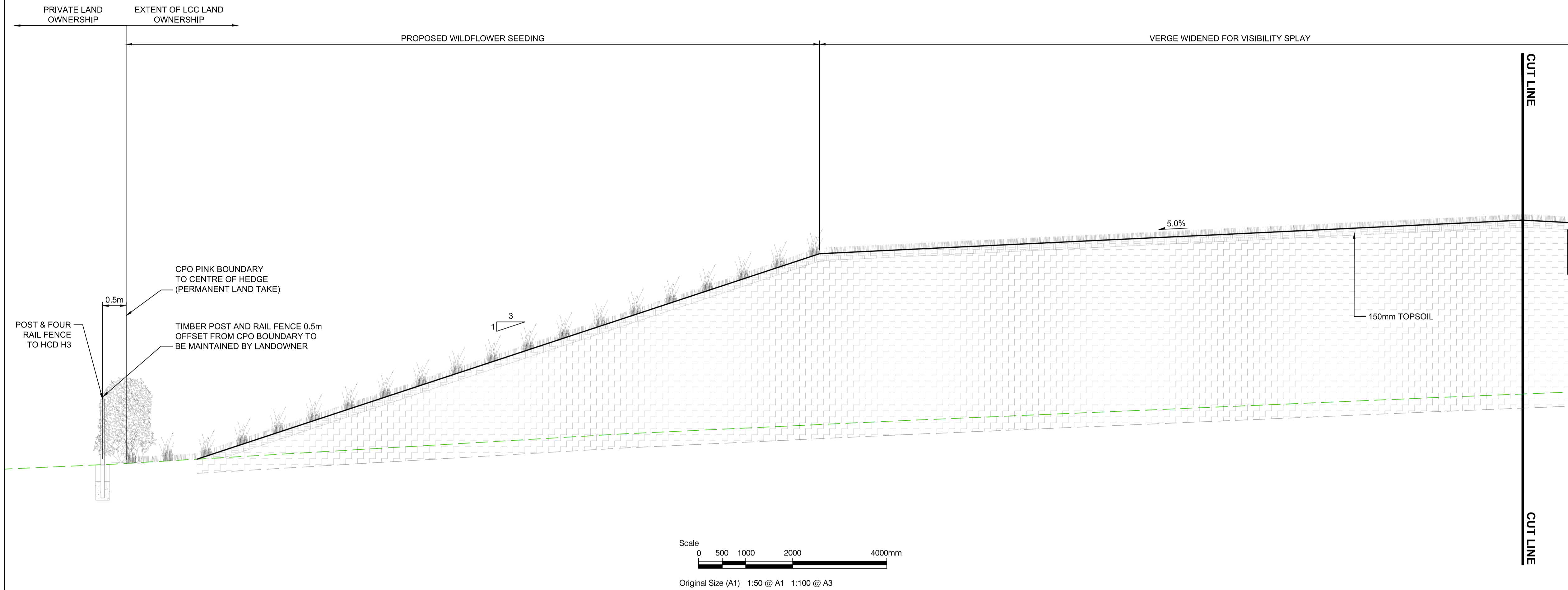


CROSS SECTION AT CH100

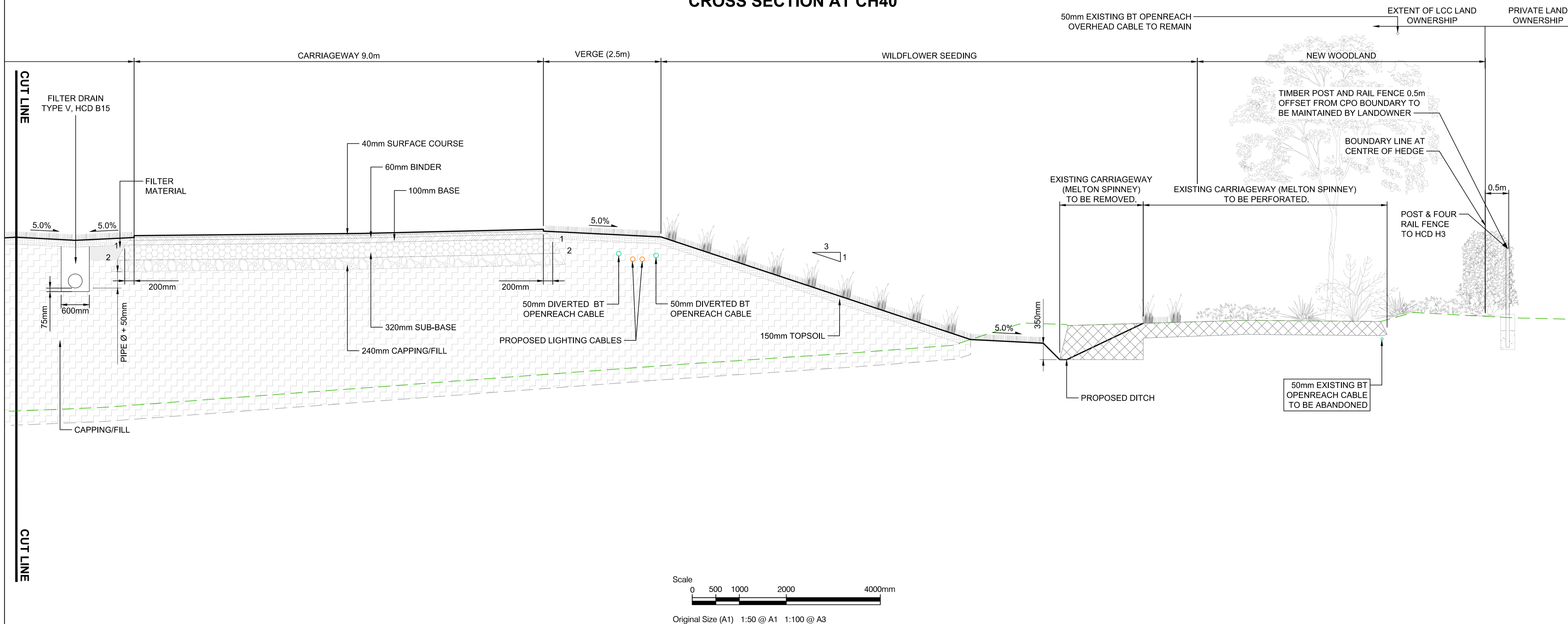


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CROSS SECTION AT CH40



CROSS SECTION AT CH40



PROJECT
NORTH & EAST MMDR



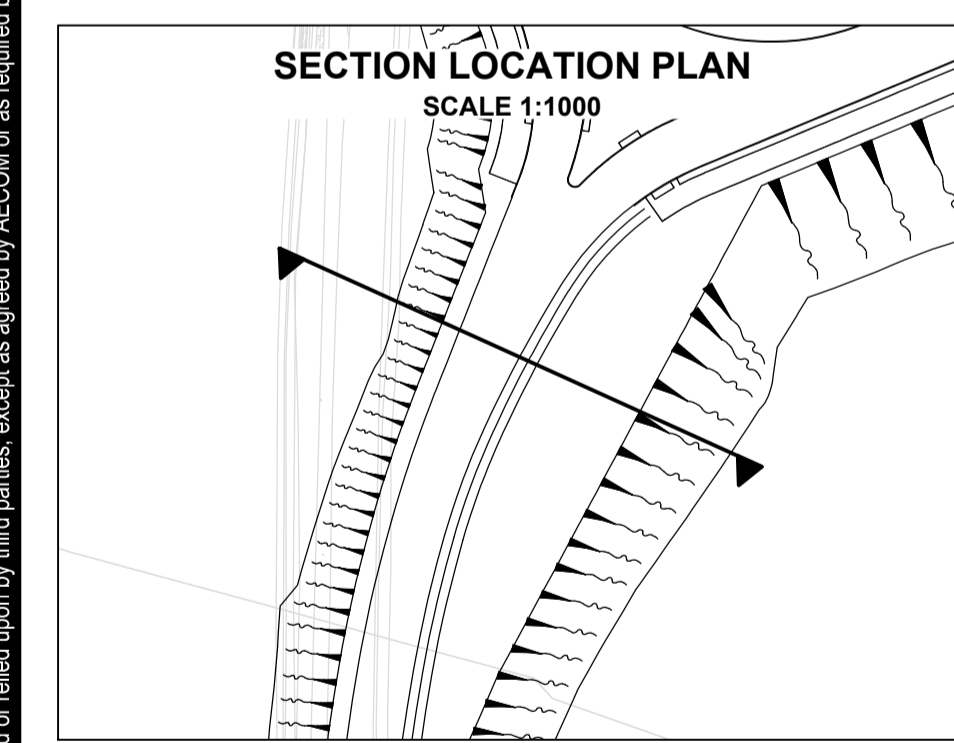
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KEY

	EXISTING GROUND PROFILE
	PROPOSED GROUND PROFILE
	TOP SOIL TO BE REMOVED
	FILL MATERIAL
	CONCRETE
	TOP SOIL



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS
DESIGNED: II CHECKED: JS APPROVED: AS

INTERNAL PROJECT NUMBER SCALE
60542201 1:50

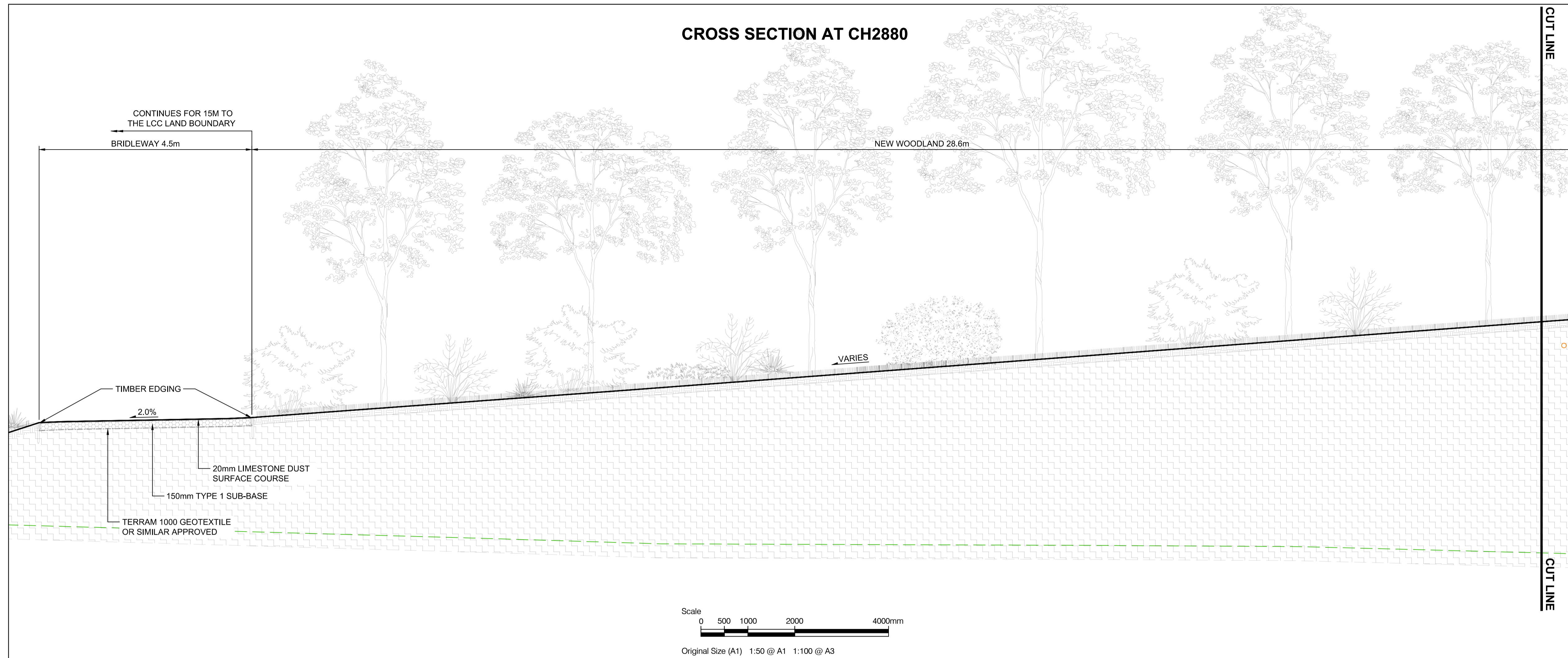
STATUS BS1192 SUITABILITY
FOR COSTING D1

SHEET TITLE
TYPICAL CROSS SECTIONS
ROUNDBOUT 3
MELTON SPINNEY RD SOUTH

DRAWING NUMBER REV
60542201-ACM-HML -S2_JN_R03_Z -DR-CH-0102 P01

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CROSS SECTION AT CH2880



PROJECT
NORTH & EAST MMDR



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www.leicestershire.gov.uk

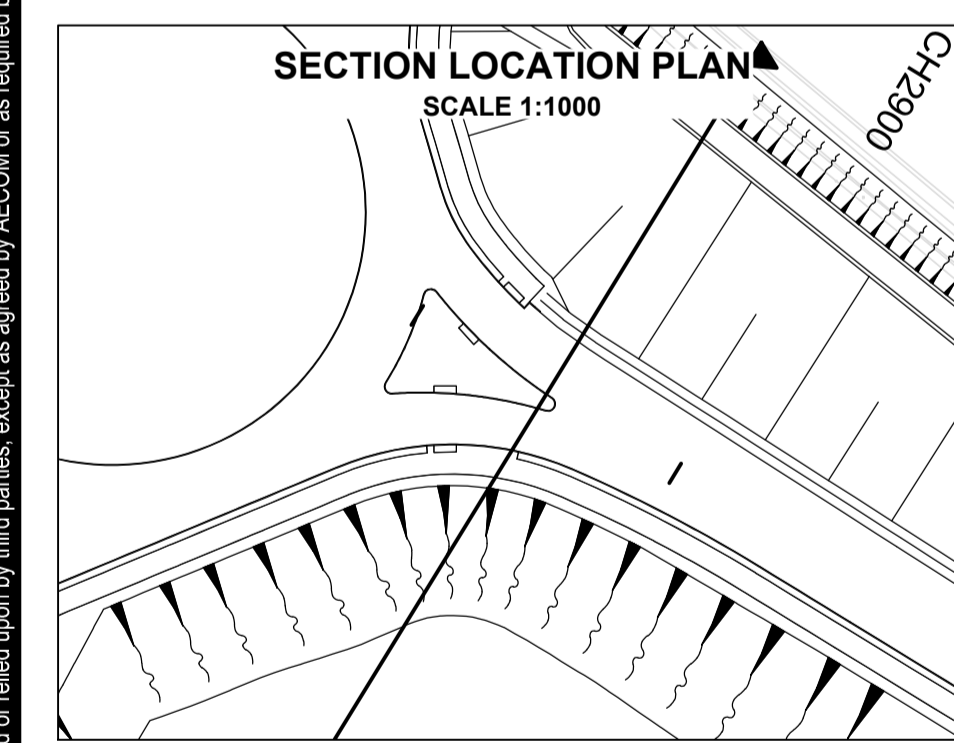
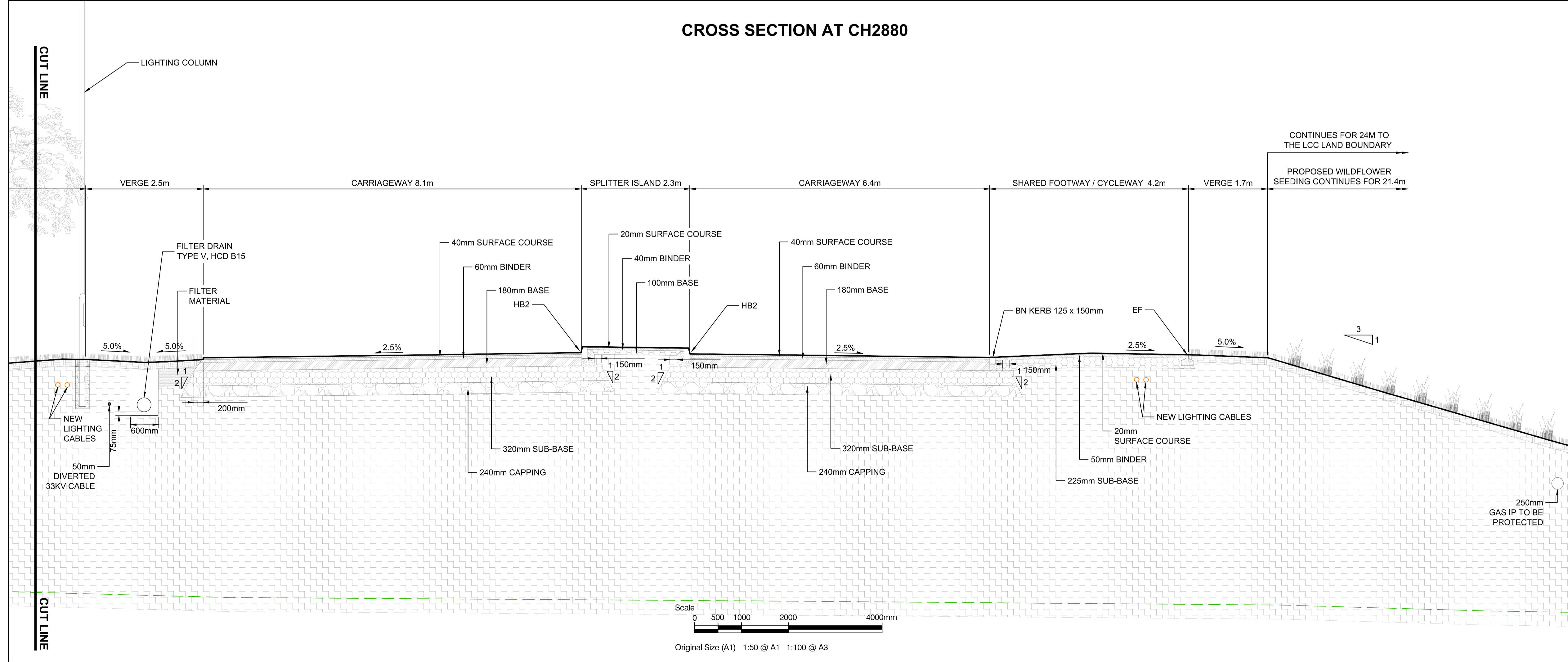
CONSULTANT
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www.aecom.com

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KEY

	EXISTING GROUND PROFILE
	PROPOSED GROUND PROFILE
	TOP SOIL TO BE REMOVED
	FILL MATERIAL
	CONCRETE
	TOP SOIL

CROSS SECTION AT CH2880



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS
DESIGNED: II CHECKED: JS APPROVED: AS

INTERNAL PROJECT NUMBER **SCALE**
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STATUS **BS1192 SUITABILITY**
FOR COSTING D1

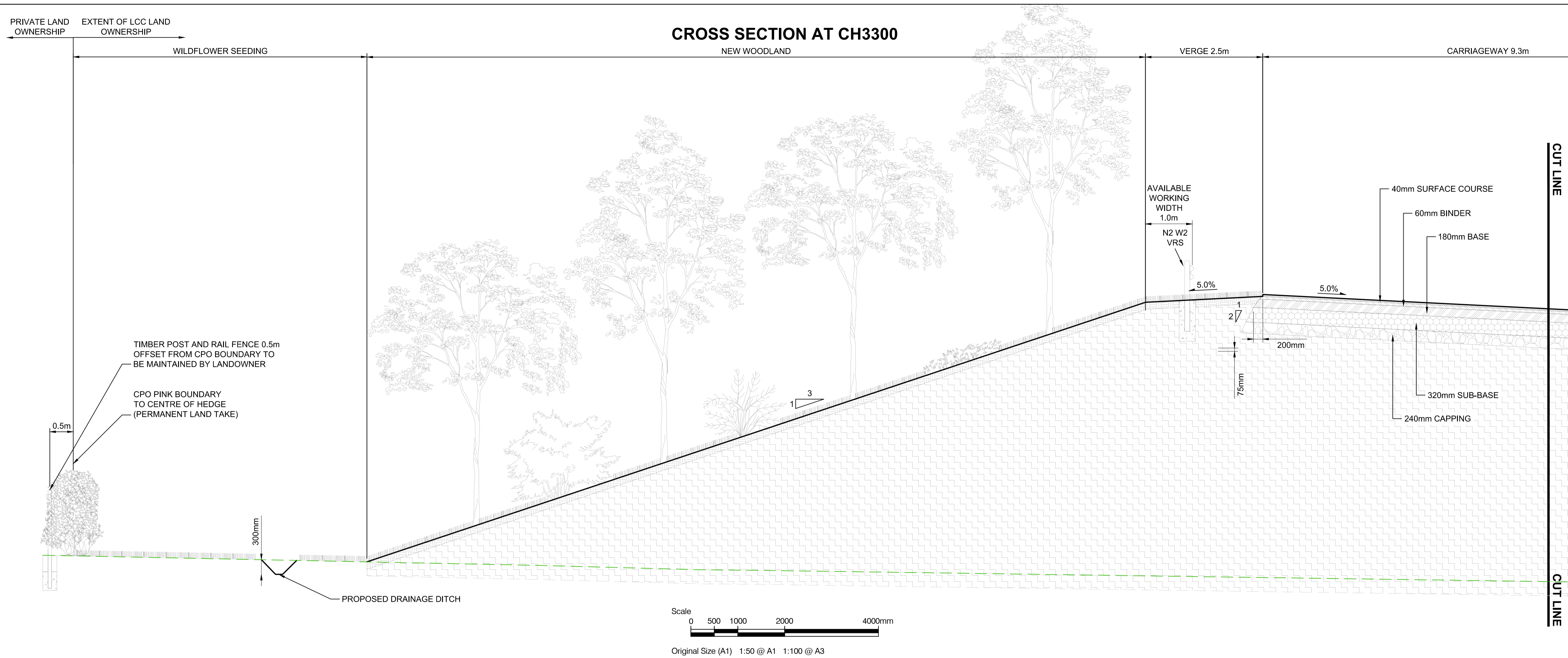
SHEET TITLE
TYPICAL CROSS SECTIONS
SECTION 3 MAINLINE
CH2880

DRAWING NUMBER **REV**
60542201-ACM-HML-S3_ML_M03_Z -DR-CH-0101 P01

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CROSS SECTION AT CH3300

NEW WOODLAND



Scale
0 500 1000 2000 4000mm
Original Size (A1) 1:50 @ A1 1:100 @ A3

PROJECT
NORTH & EAST MMDR



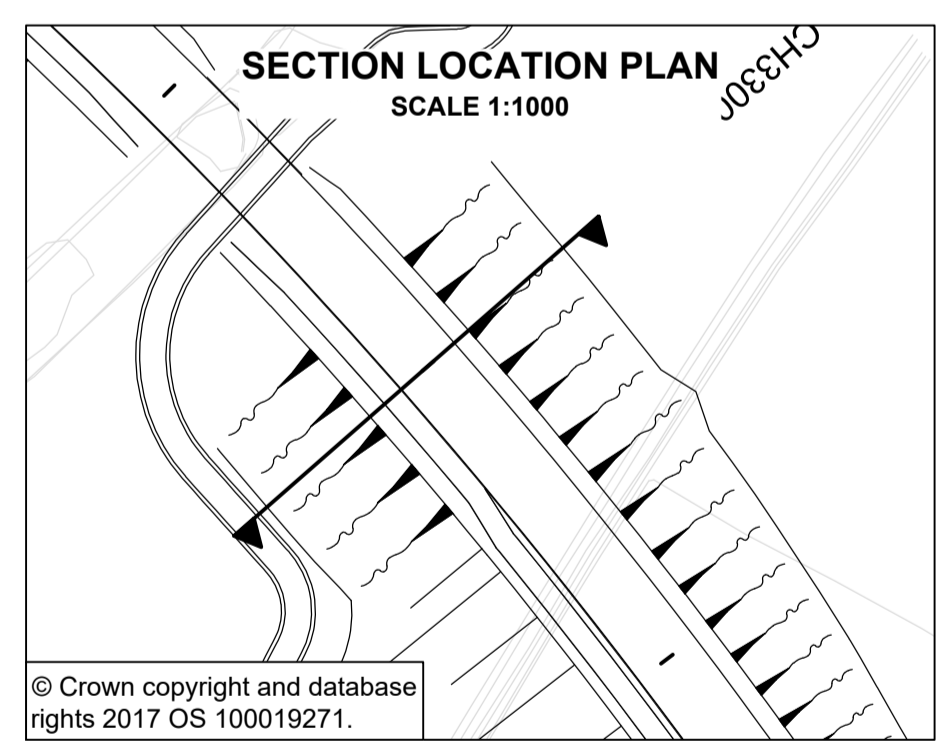
CLIENT
County Hall, Glenfield
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CONSULTANT
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KEY

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	PROPOSED GROUND PROFILE
	TOP SOIL TO BE REMOVED
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	CONCRETE
	TOP SOIL



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DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS
DESIGNED: II CHECKED: JS APPROVED: AS

INTERNAL PROJECT NUMBER **SCALE**
60542201 1:50

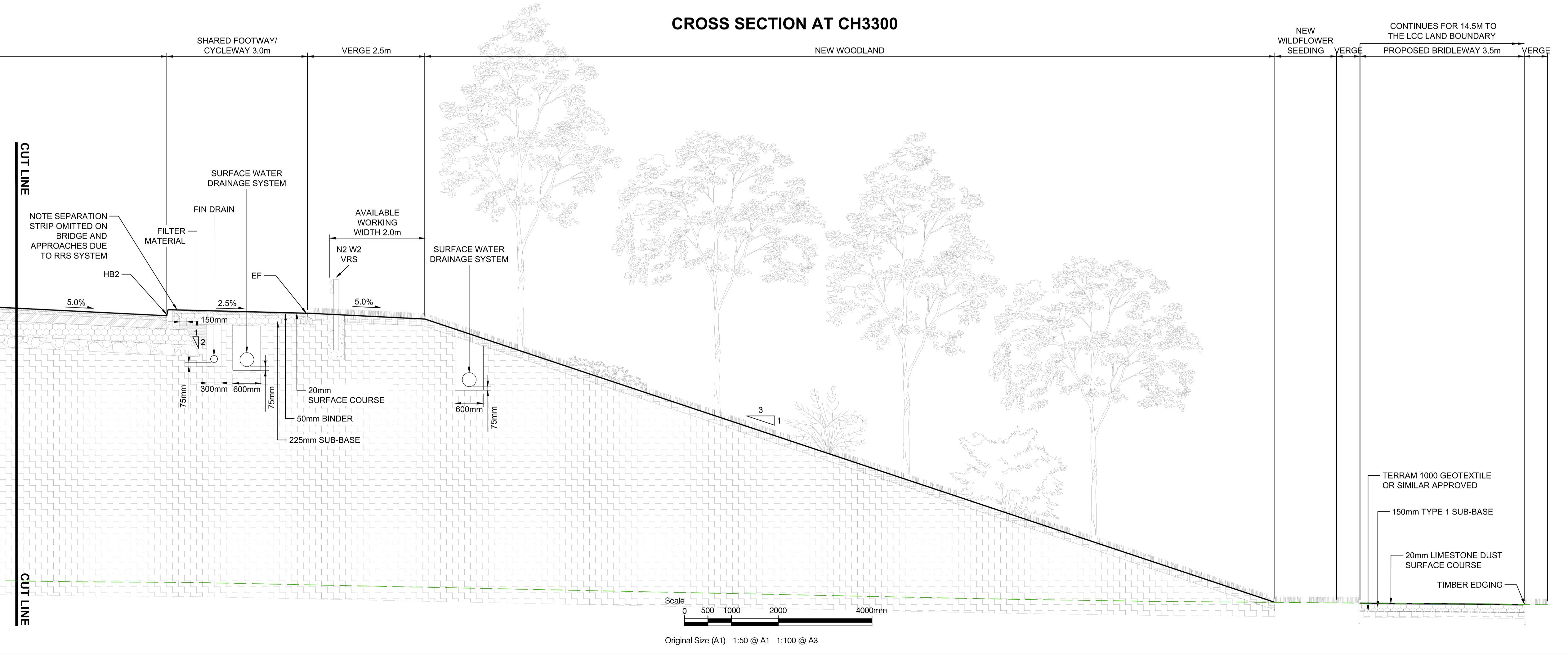
STATUS **BS1192 SUITABILITY**
FOR COSTING D1

SHEET TITLE
TYPICAL CROSS SECTIONS
SECTION 3 MAINLINE
CH3300

DRAWING NUMBER **REV**
60542201-ACM-HML-S3_ML_M03_Z -DR-CH-0102 P01

CROSS SECTION AT CH3300

NEW WOODLAND

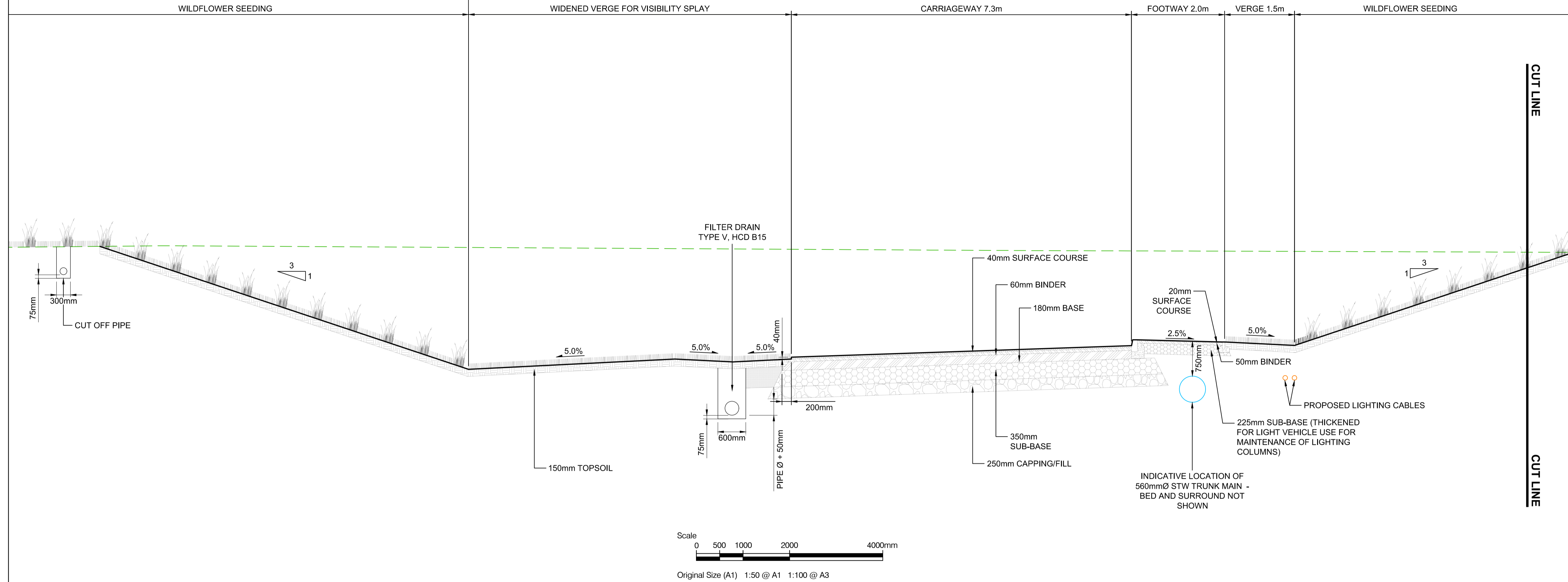


Scale
0 500 1000 2000 4000mm
Original Size (A1) 1:50 @ A1 1:100 @ A3

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CROSS SECTION AT CH60

CONTINUES FOR 13M TO THE LCC LAND BOUNDARY



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NORTH & EAST MMDR



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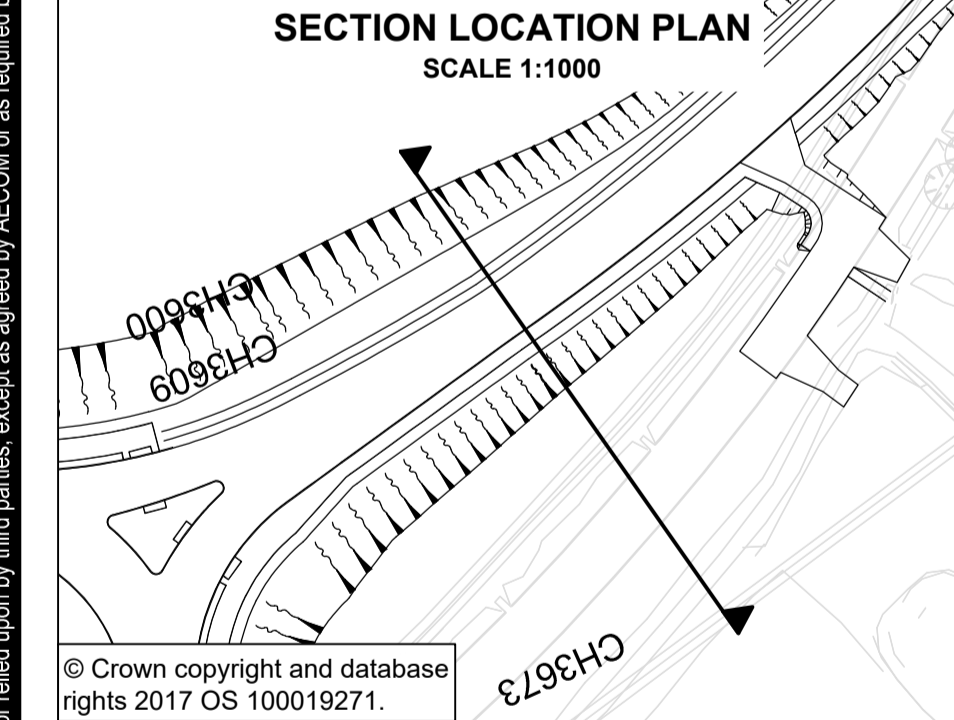
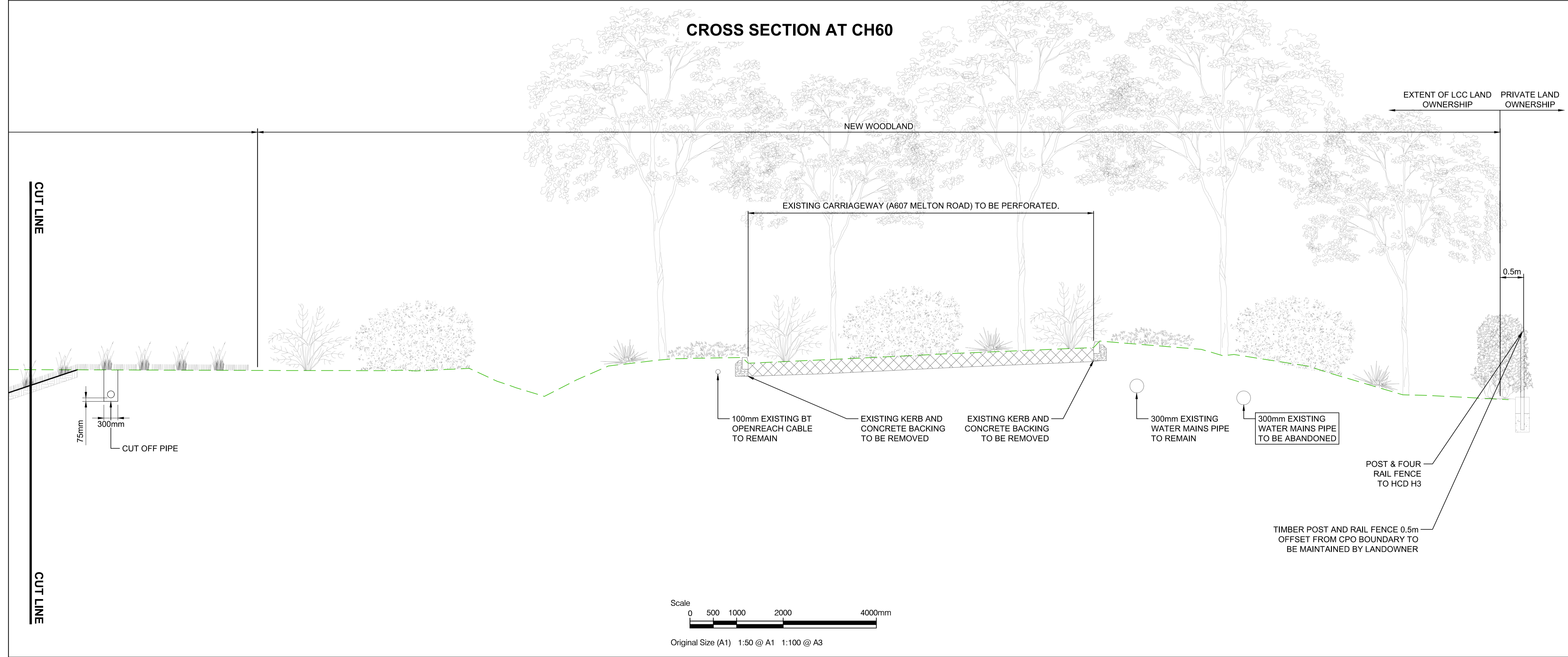
CONSULTANT
AECOM
12 Regan Way
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Chilwell, Nottingham, NG9 6RZ
tel: +44 [REDACTED]
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KEY

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	TOP SOIL TO BE REMOVED
	FILL MATERIAL
	CONCRETE
	TOP SOIL

CROSS SECTION AT CH60



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DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS

DESIGNED: II	CHECKED: JS	APPROVED: AS
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INTERNAL PROJECT NUMBER SCALE
60542201 1:50

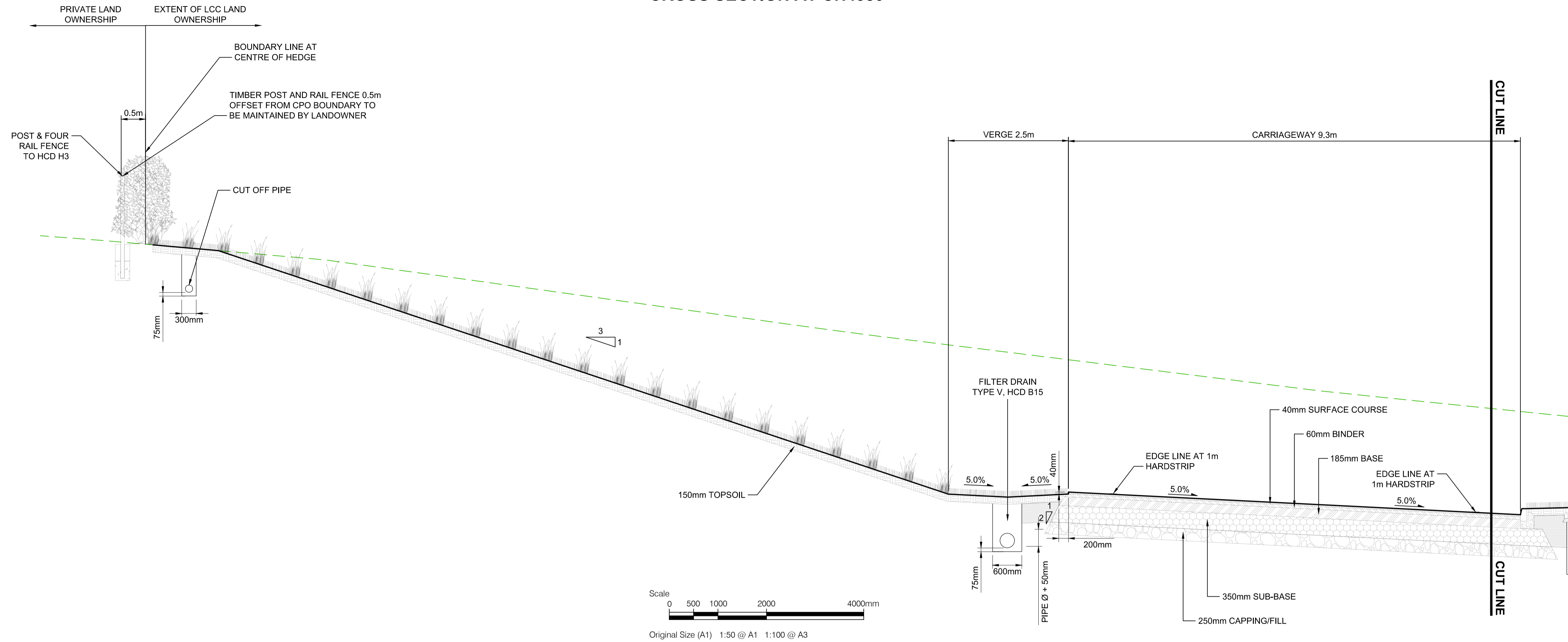
STATUS BS1192 SUITABILITY
FOR COSTING D1

SHEET TITLE
TYPICAL CROSS SECTIONS
ROUNDBOUT 4
A607 NORTHEAST

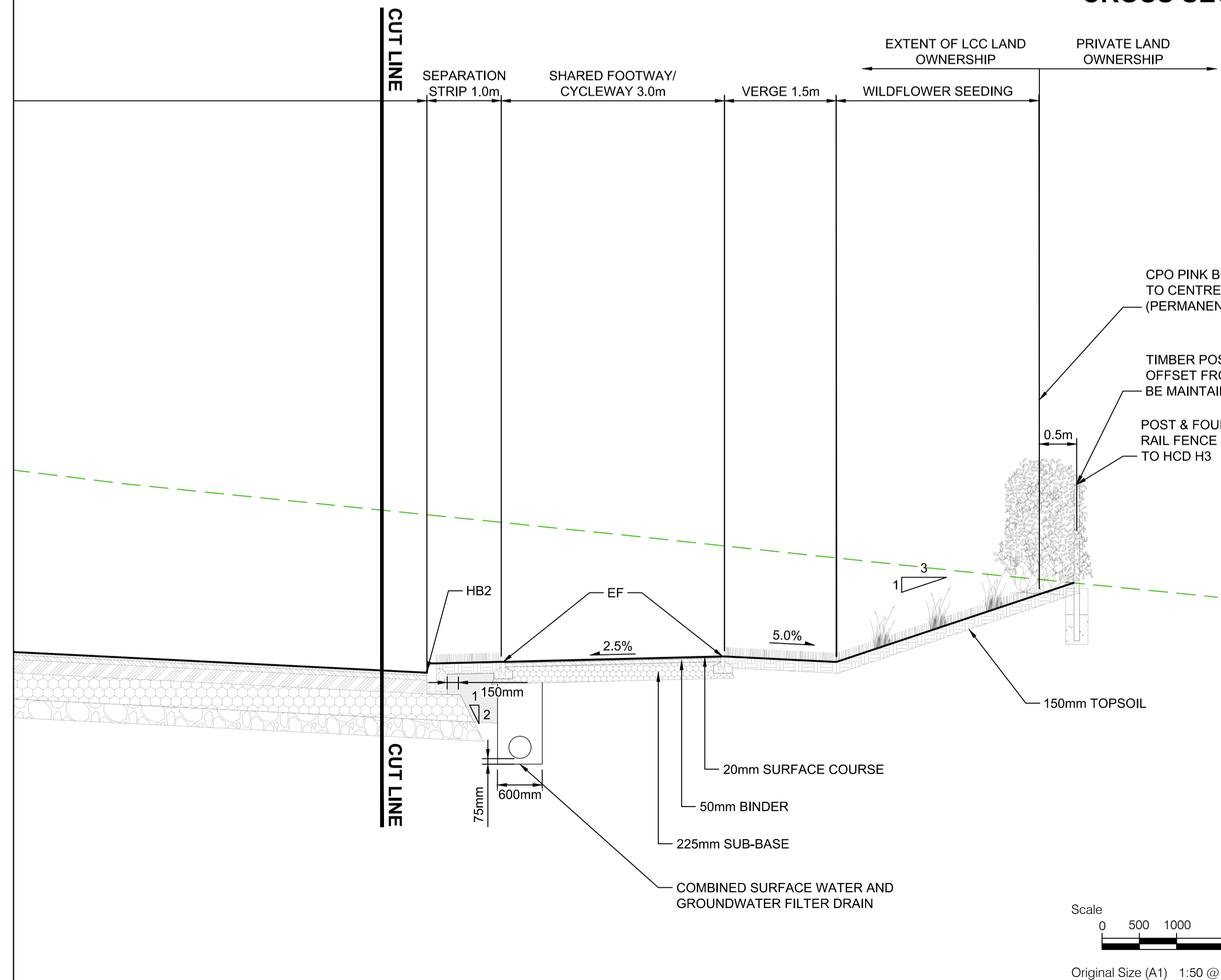
DRAWING NUMBER	REV
60542201-ACM-HML-S3_JN_R04_Z	-DR-CH-0101 P01

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CROSS SECTION AT CH4380



CROSS SECTION AT CH4380



PROJECT
NORTH & EAST MMDR

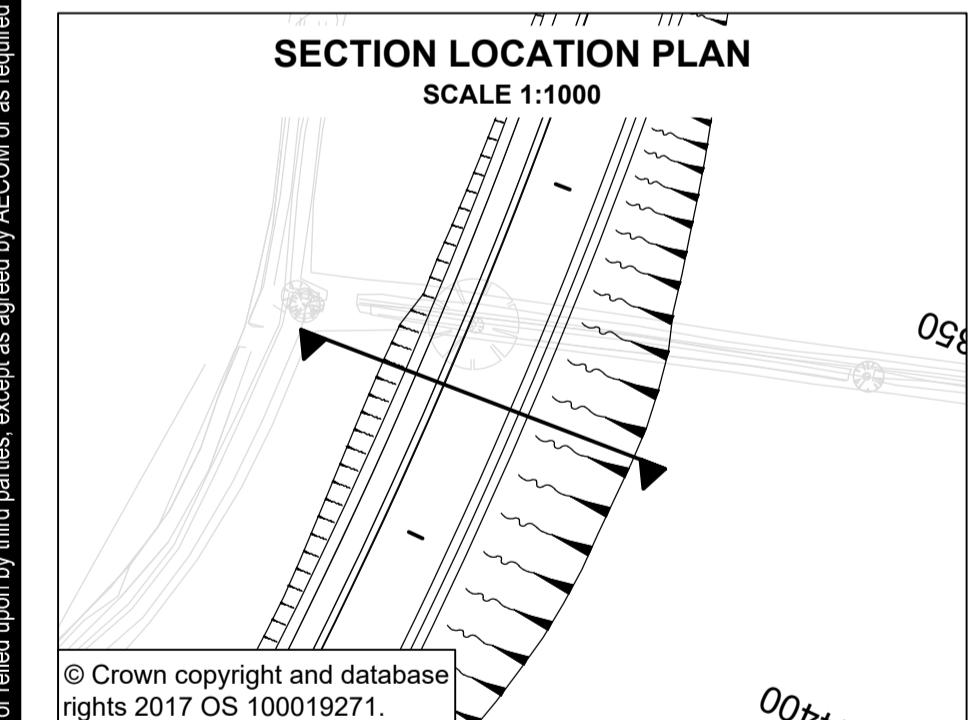


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 - ENGINEERING FILL MATERIAL, AS SPECIFIED IN SERIES 600 SPECIFICATION, MAY VARY BETWEEN LOCATIONS.
 - FOR DETAILS OF STARTER LAYER, REFER TO DRAWING 60542201-ACM-EG-GEN_GEN_ZZ_Z-DR-GE-0121 OR THE SPECIFIC GROUND IMPROVEMENT DRAWING AND THE SERIES 600 SPECIFICATION.
 - HB2 AND EF DENOTE HALF BATTERED KERBS AND EDGING, RESPECTIVELY SEE DRAWING 60542201-ACM-HKF-GEN_GEN_ZZ_Z-SD-CH-0001 TO 0003.

- KEY
- EXISTING GROUND PROFILE
 - PROPOSED GROUND PROFILE
 - TOP SOIL TO BE REMOVED
 - FILL MATERIAL
 - CONCRETE
 - TOP SOIL



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS
DESIGNED: II | CHECKED: JS | APPROVED: AS

INTERNAL PROJECT NUMBER SCALE
60542201 1:50

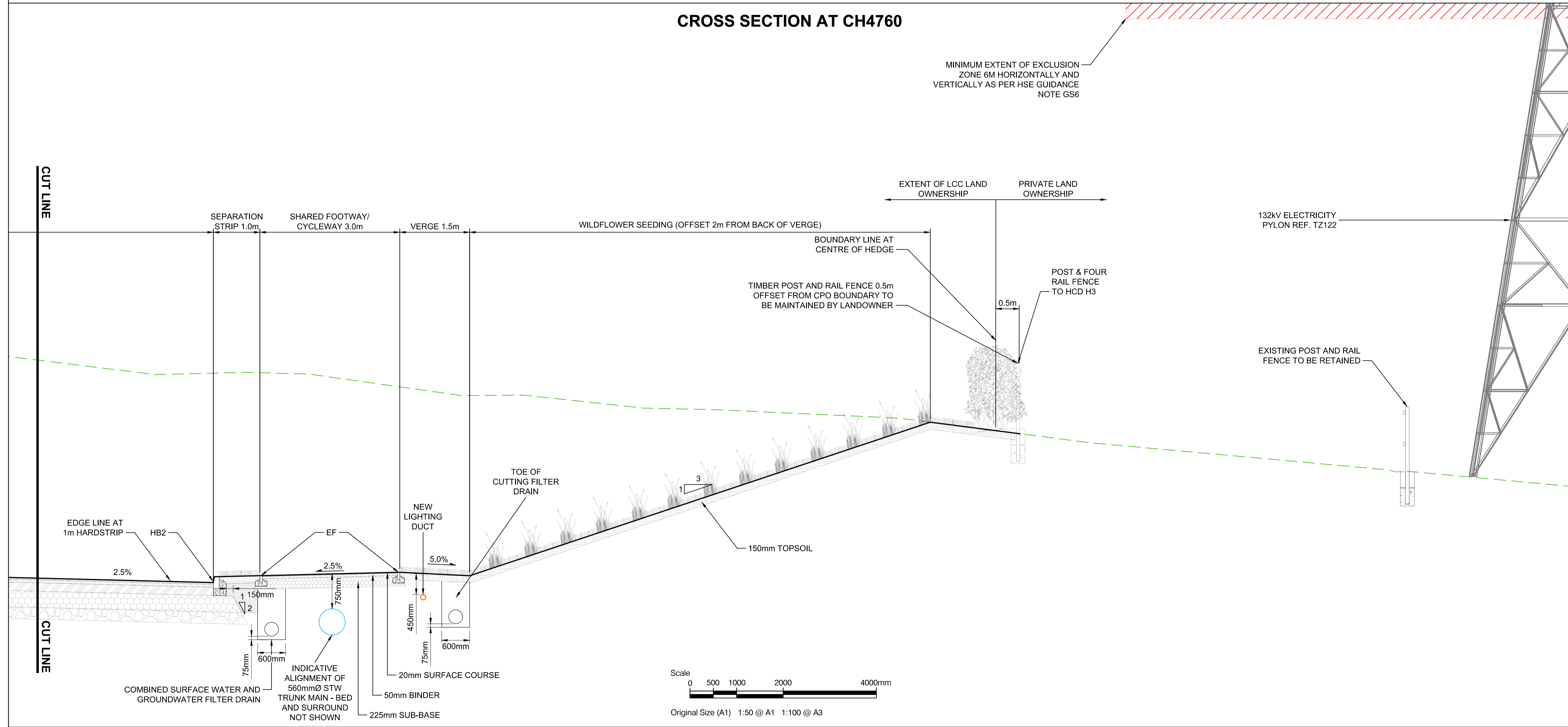
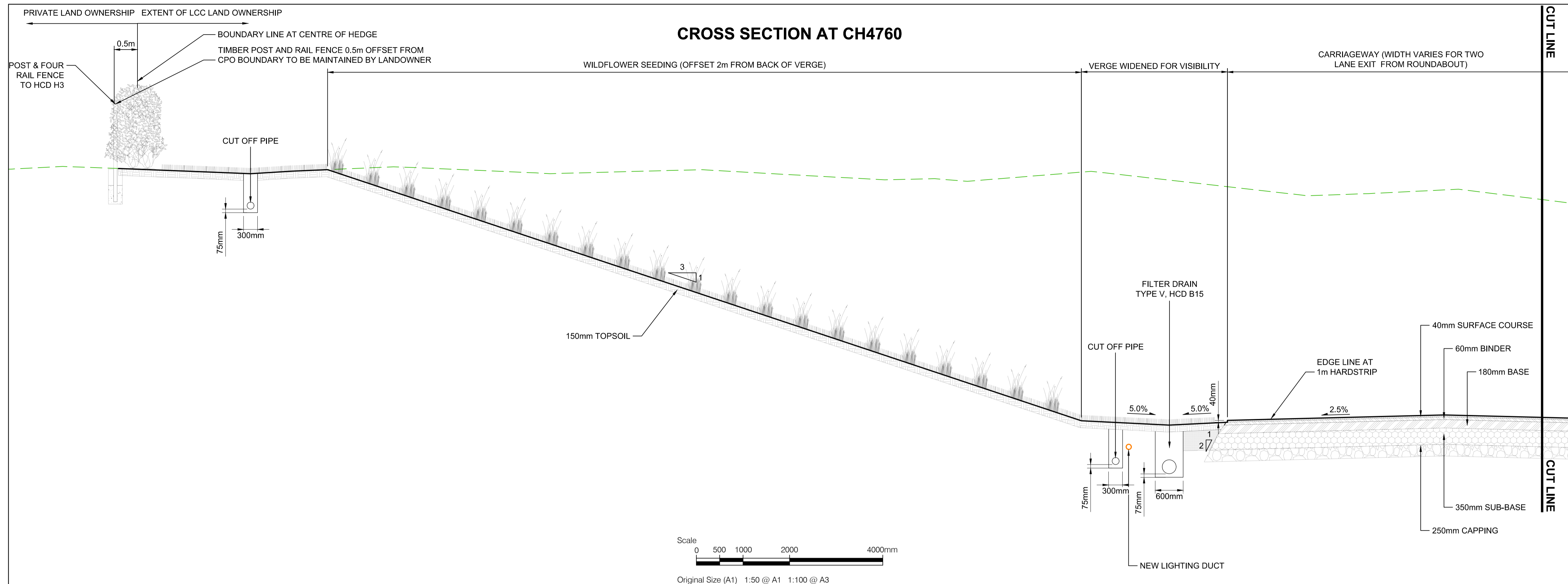
STATUS BS1192 SUITABILITY
FOR COSTING D1

SHEET TITLE
TYPICAL CROSS SECTIONS
SECTION 4 MAINLINE
CH4380

DRAWING NUMBER REV
60542201-ACM-HML-S4_ML_M04_Z -DR-CH-0101 P01

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ISO A1 594mm x 841mm



PROJECT
 NORTH & EAST MMDR



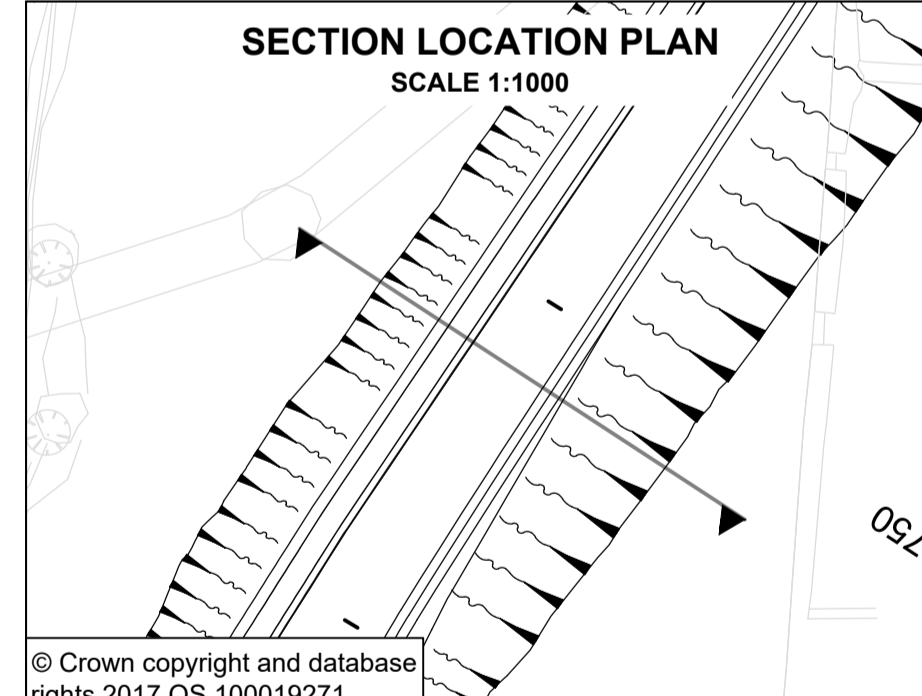
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CONSULTANT
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 Chilwell, Nottingham, NG9 6RZ
 tel: +44 [REDACTED]
 www.aecom.com

- NOTES**
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 - HB2 AND EF DENOTE HALF BATTERED KERBS AND EDGING, RESPECTIVELY SEE DRAWING 60542201-ACM-HKF-GEN_GEN_ZZ_Z-SD-CH-0001 TO 0003.

KEY

	EXISTING GROUND PROFILE
	PROPOSED GROUND PROFILE
	TOP SOIL TO BE REMOVED
	FILL MATERIAL
	CONCRETE
	TOP SOIL



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS

DESIGNED: II | CHECKED: JS | APPROVED: AS

INTERNAL PROJECT NUMBER | **SCALE**

60542201 | 1:50

STATUS | **BS1192 SUITABILITY**

FOR COSTING | D1

SHEET TITLE

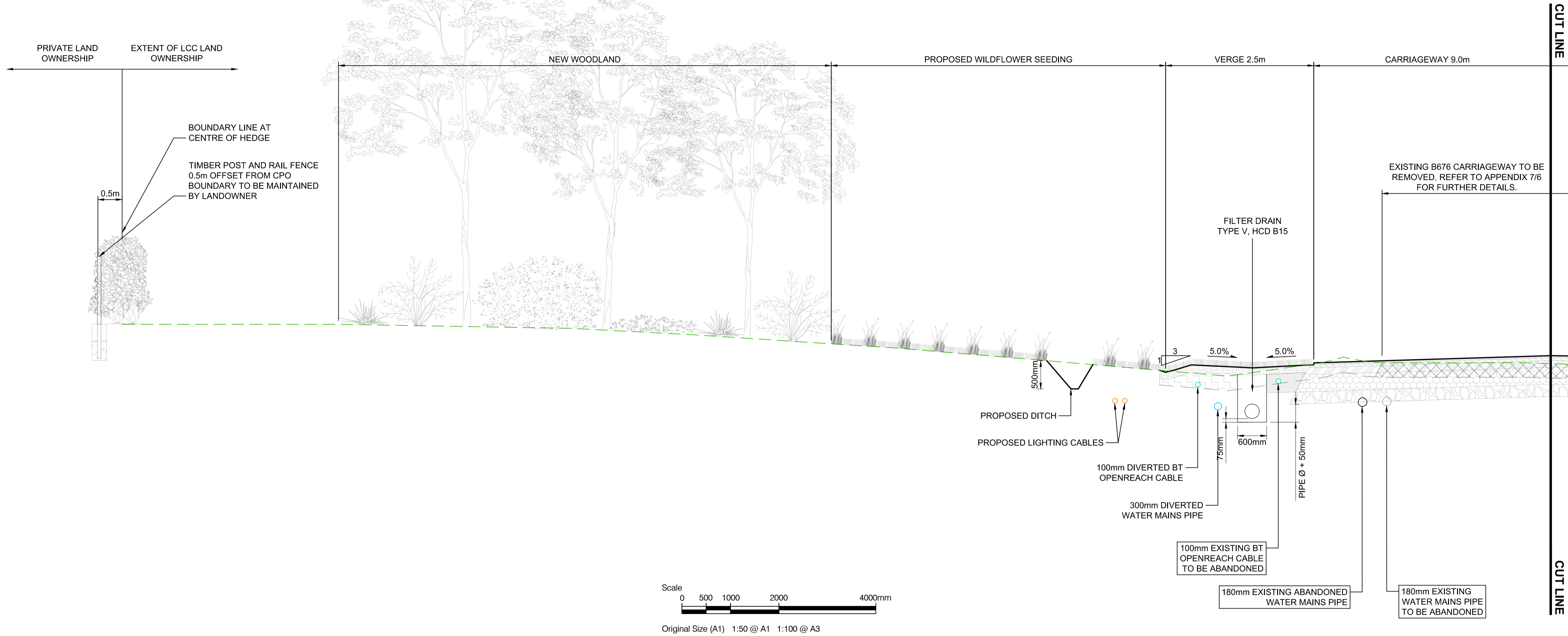
TYPICAL CROSS SECTIONS
 SECTION 4 MAINLINE
 CH4760

DRAWING NUMBER | **REV**

60542201-ACM-HML-S4_ML_M04_Z -DR-CH-0102 | P01

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CROSS SECTION AT CH40



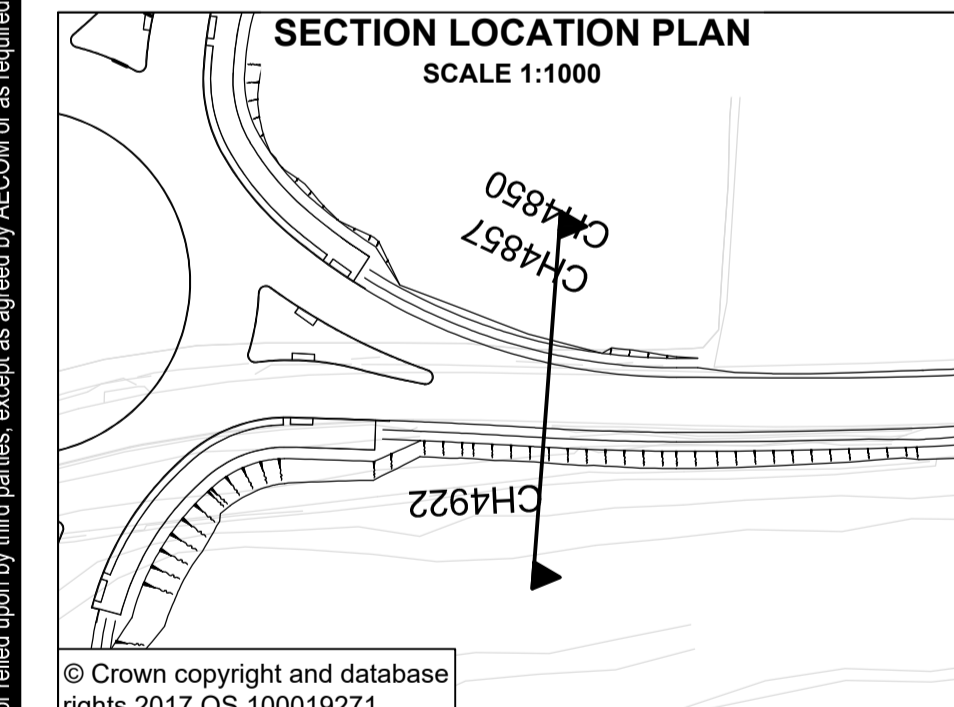
CROSS SECTION AT CH40



- NOTES**
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 - HB2 AND EF DENOTE HALF BATTERED KERBS AND EDGING, RESPECTIVELY SEE DRAWING 60542201-ACM-HKF-GEN_GEN_ZZ_Z-SD-CH-0001 TO 0003.

KEY

- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- TOP SOIL TO BE REMOVED
- FILL MATERIAL
- CONCRETE
- TOP SOIL



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS
 DESIGNED: II CHECKED: JS APPROVED: AS

INTERNAL PROJECT NUMBER **SCALE**
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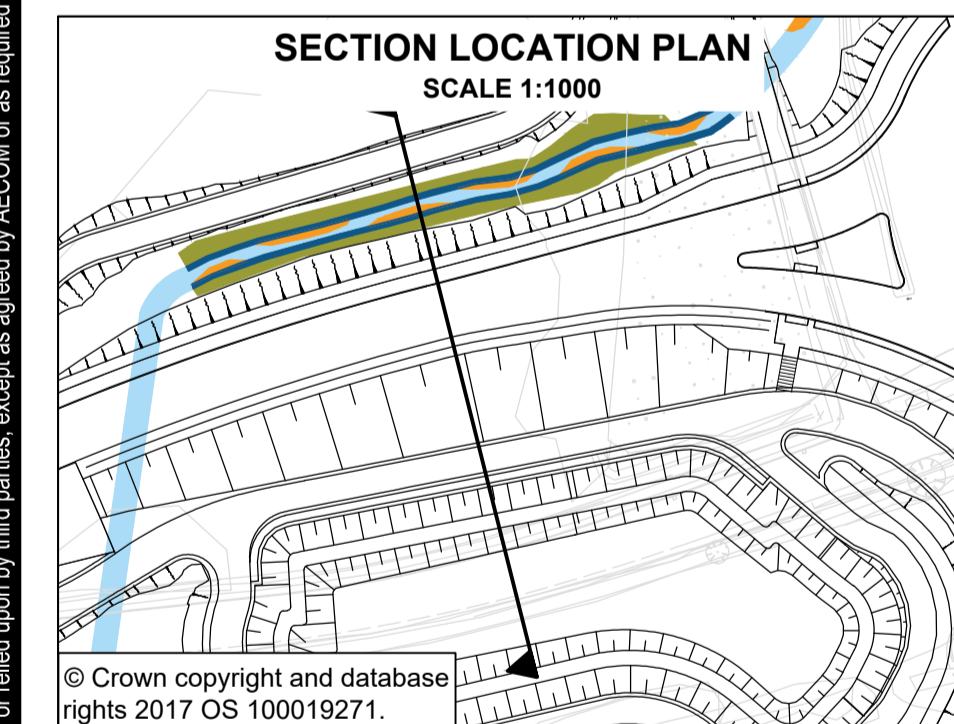
STATUS **BS1192 SUITABILITY**
 FOR COSTING D1

SHEET TITLE
 TYPICAL CROSS SECTIONS
 ROUNDABOUT 5
 B676 EAST

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 11. HB2 AND EF DENOTE HALF BATTERED KERBS AND EDGING, RESPECTIVELY SEE DRAWING 60542201-ACM-HKF-GEN_GEN_ZZ_Z-SD-CH-0001 TO 0003.

- KEY**
- EXISTING GROUND PROFILE
 - PROPOSED GROUND PROFILE
 - - - TOP SOIL TO BE REMOVED
 - ▨ FILL MATERIAL
 - ▩ CONCRETE
 - ▨ TOP SOIL



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS

DESIGNED: II CHECKED: JS APPROVED: AS

INTERNAL PROJECT NUMBER **SCALE**

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STATUS **BS1192 SUITABILITY**

FOR COSTING D1

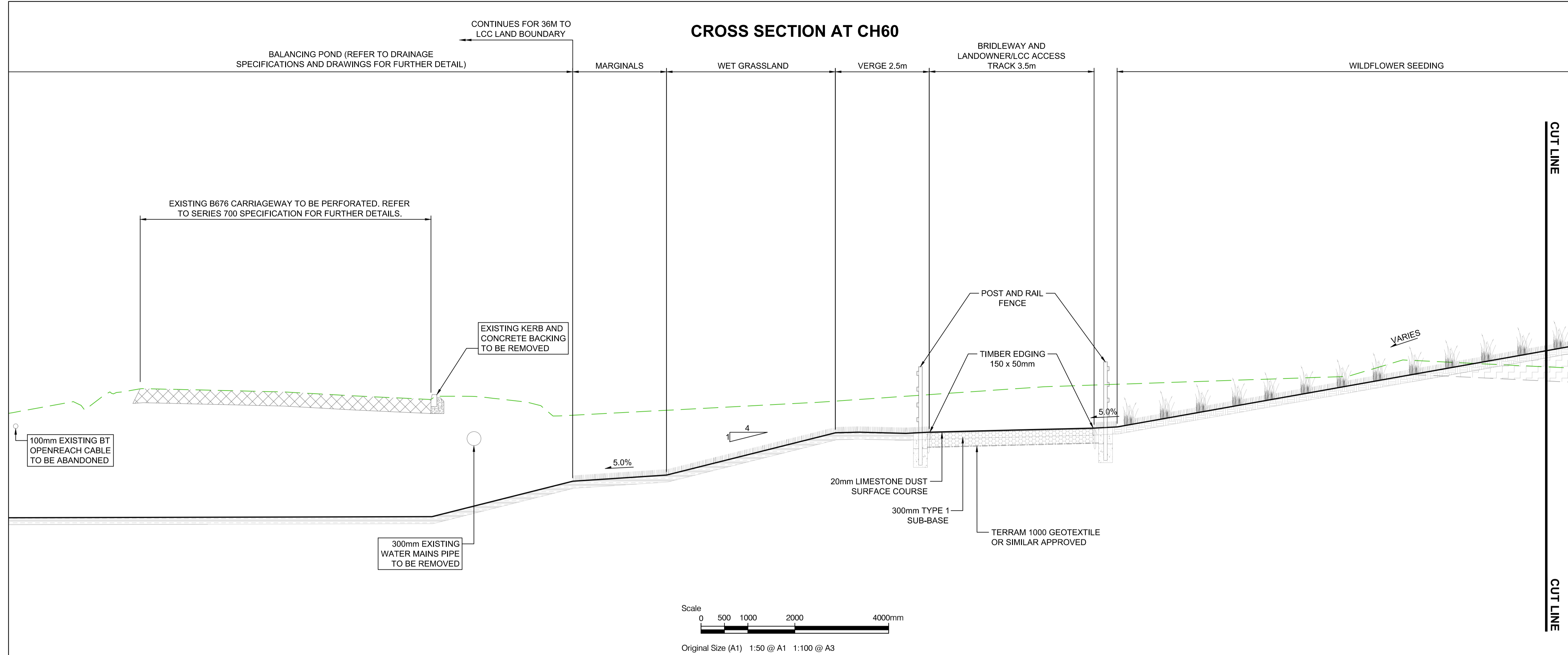
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TYPICAL CROSS SECTIONS
ROUNDBABOUT 5
B676 WEST

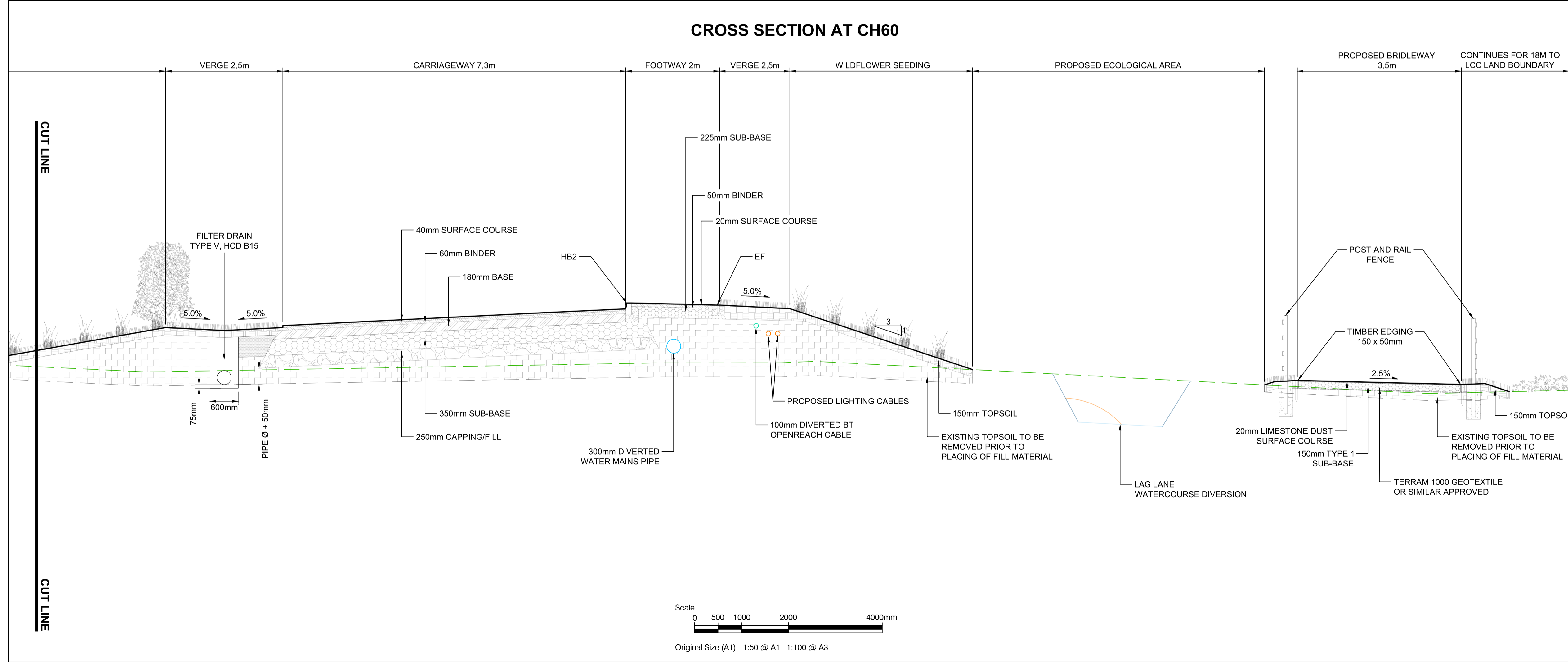
DRAWING NUMBER **REV**

60542201-ACM-HML-S4_JN_R05_Z -DR-CH-0102 P01

CROSS SECTION AT CH60

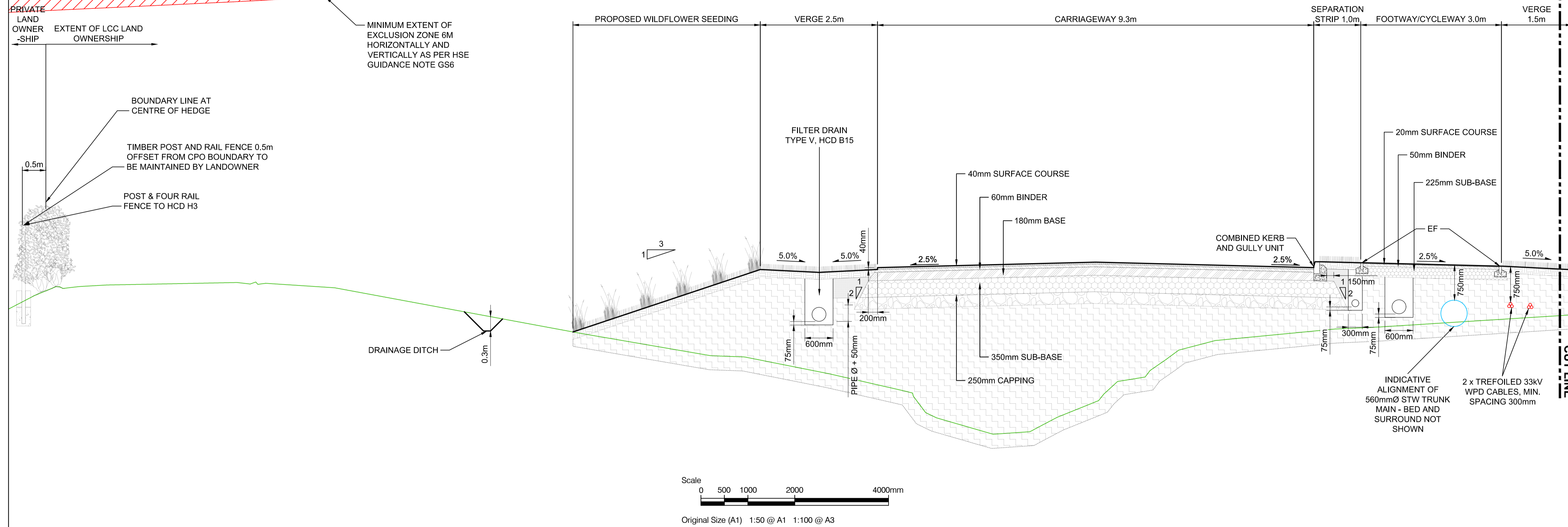


CROSS SECTION AT CH60



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CROSS SECTION AT CH4992



Scale
0 500 1000 2000 4000mm
Original Size (A1) 1:50 @ A1 1:100 @ A3

PROJECT
NORTH & EAST MMDR



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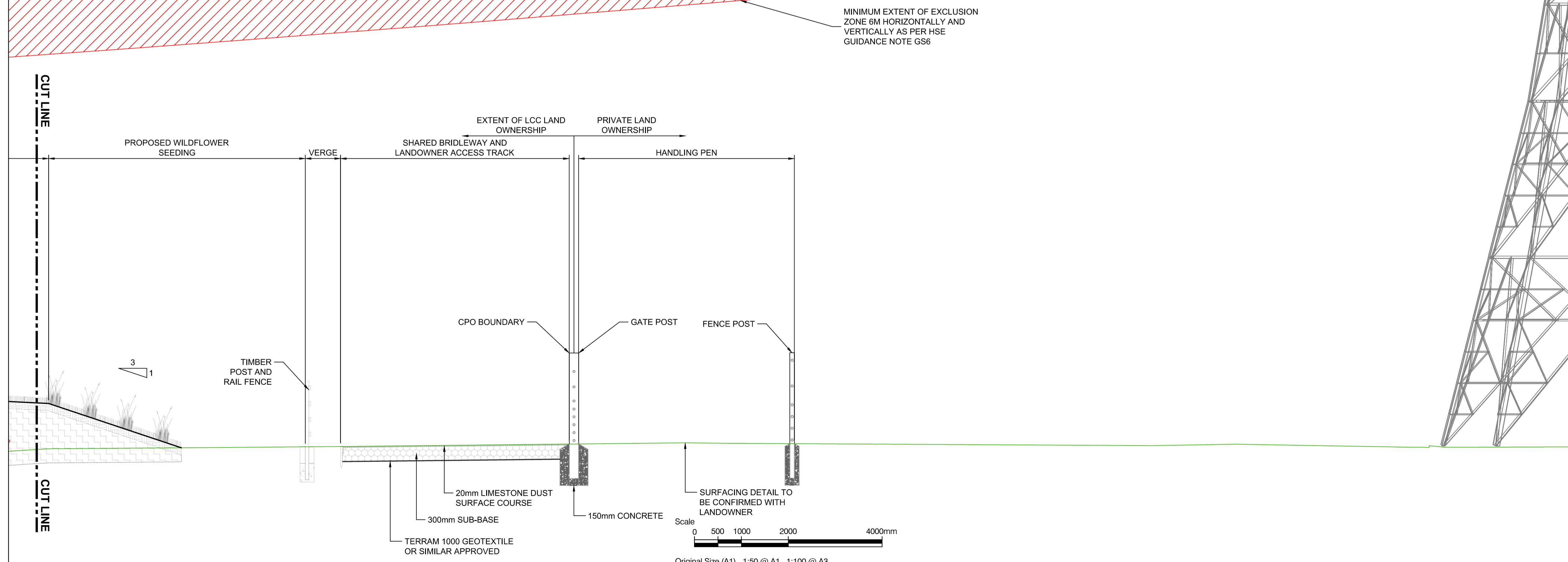
CONSULTANT
AECOM
12 Regan Way
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Chilwell, Nottingham, NG9 6RZ
tel: +44 [REDACTED]
www.aecom.com

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 - HB2 AND EF DENOTE HALF BATTERED KERBS AND EDGING, RESPECTIVELY. SEE DRAWING 60542201-ACM-HKF-GEN_GEN_ZZ_Z-SD-CH-0001 TO 0003.

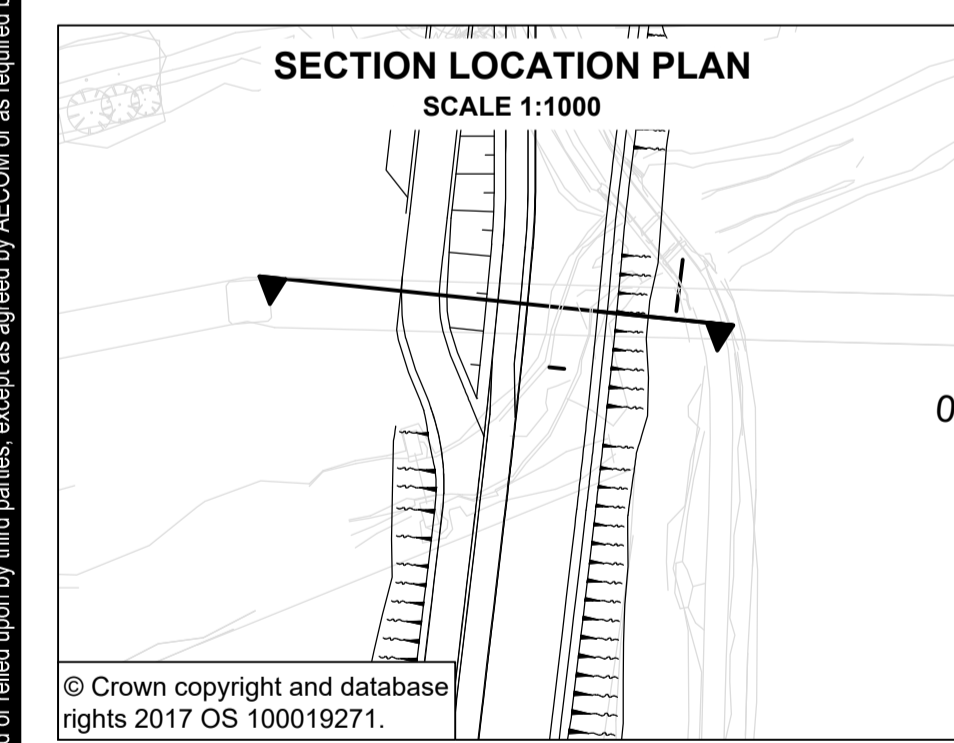
KEY

	EXISTING GROUND PROFILE
	PROPOSED GROUND PROFILE
	TOP SOIL TO BE REMOVED
	FILL MATERIAL
	CONCRETE
	TOP SOIL

CROSS SECTION AT CH4992



Scale
0 500 1000 2000 4000mm
Original Size (A1) 1:50 @ A1 1:100 @ A3



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS

DESIGNED: II	CHECKED: JS	APPROVED: AS
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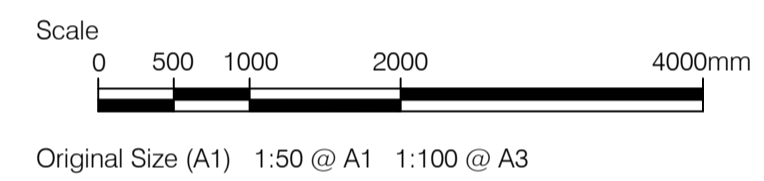
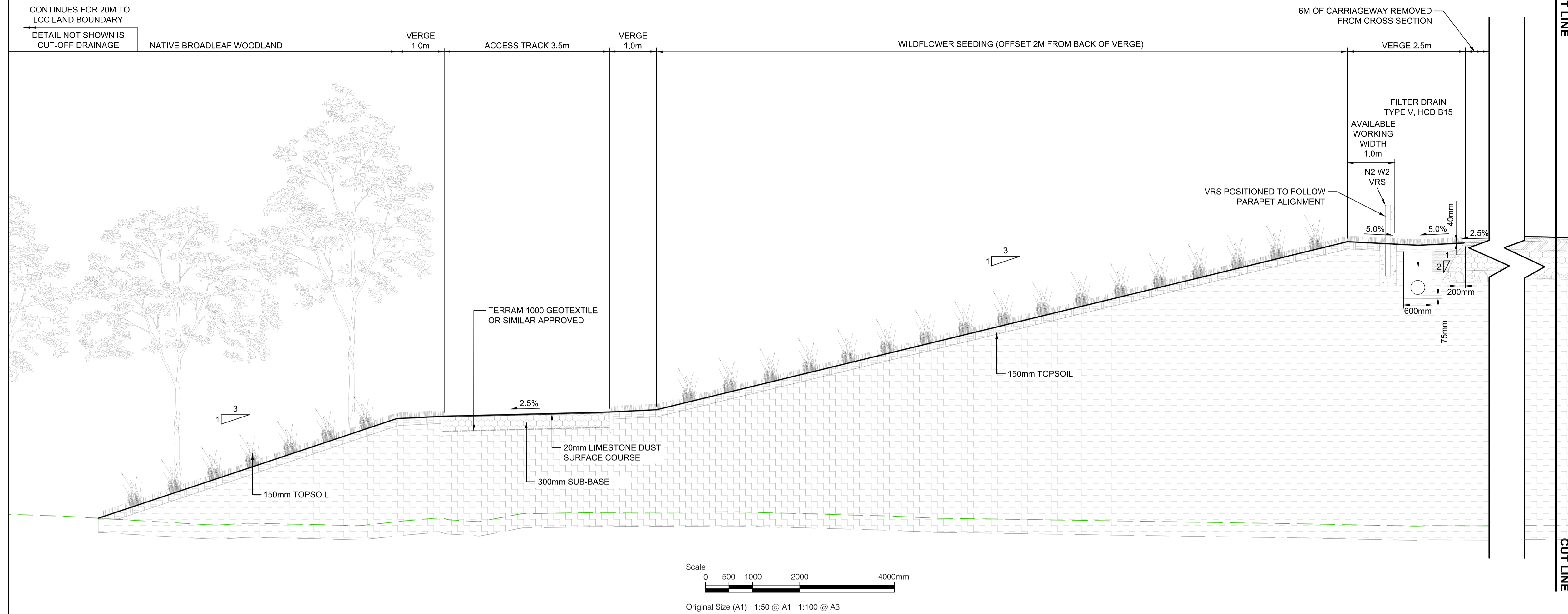
INTERNAL PROJECT NUMBER 60542201 **SCALE** 1:50

STATUS BS1192 SUITABILITY **D1**

SHEET TITLE TYPICAL CROSS SECTIONS SECTION 5 MAINLINE CH4992

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CROSS SECTION AT CH5140

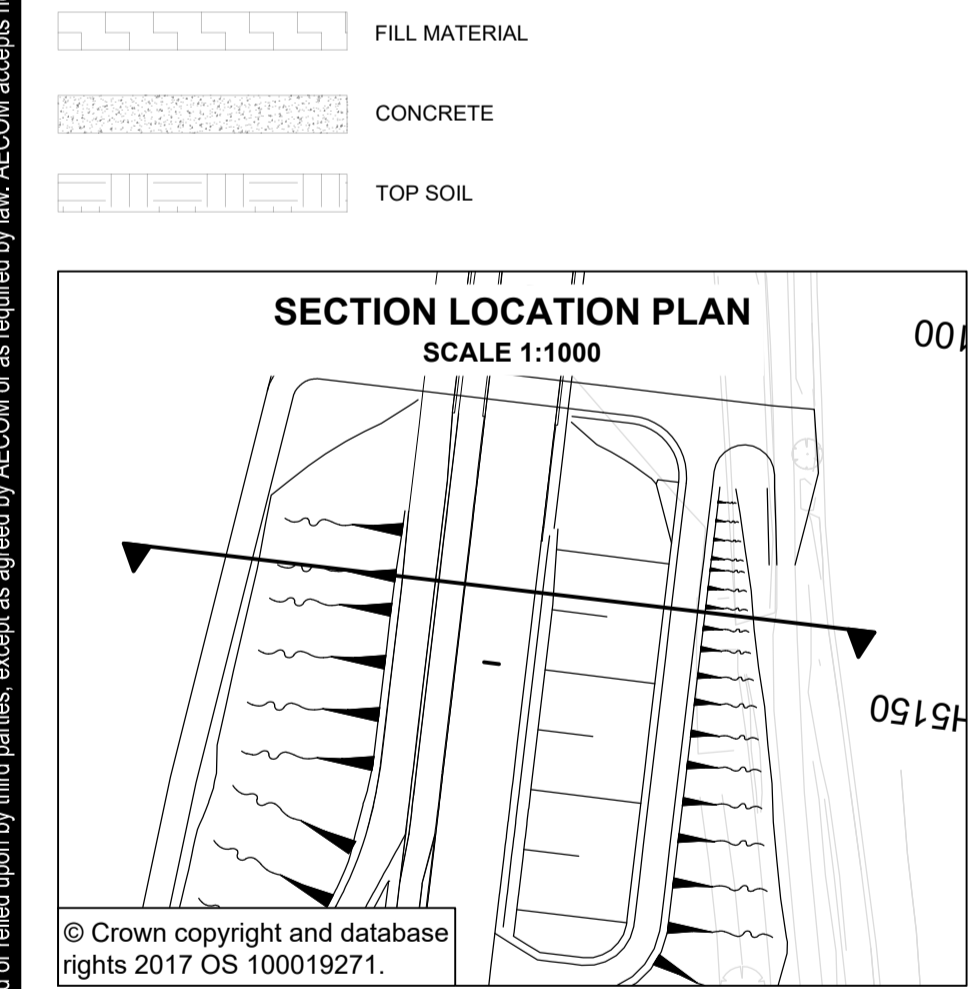
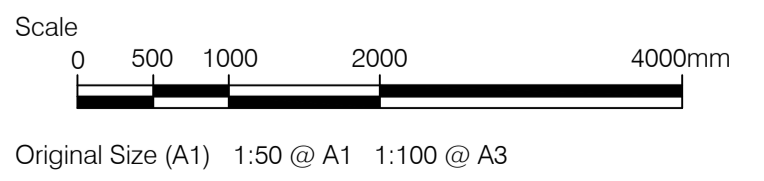
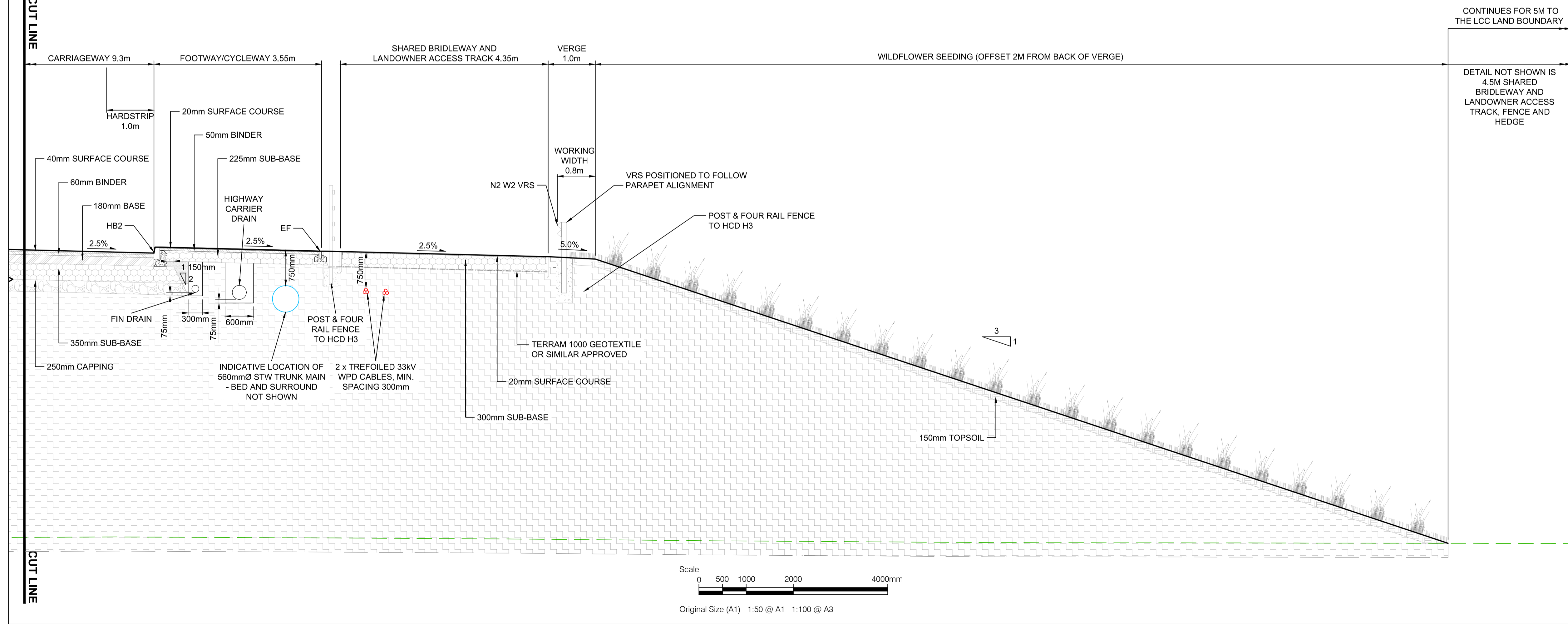


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KEY

	EXISTING GROUND PROFILE
	PROPOSED GROUND PROFILE
	TOP SOIL TO BE REMOVED
	FILL MATERIAL
	CONCRETE
	TOP SOIL

CROSS SECTION AT CH5140



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX
PROJECT MANAGEMENT INITIALS				
DESIGNED: II	CHECKED: JS	APPROVED: AS		
INTERNAL PROJECT NUMBER				SCALE
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STATUS				BS1192 SUITABILITY
FOR COSTING				D1
SHEET TITLE				
TYPICAL CROSS SECTIONS SECTION 5 MAINLINE CH5140				
DRAWING NUMBER				REV
60542201-ACM-HML-S5_ML_M05_Z -DR-CH-0102				P01

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CROSS SECTION AT CH5540 - RAILWAY BRIDGE APPROACH

CONTINUES FOR 32M TO THE LCC LAND BOUNDARY

NEW BROADLEAF WOODLAND

CUT LINE



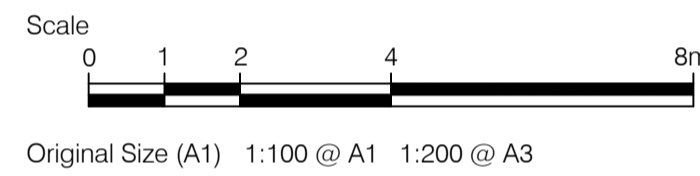
PROJECT
NORTH & EAST MMDR



CLIENT
County Hall, Glenfield
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tel: +44 (0)116 232 3232
www.leicestershire.gov.uk

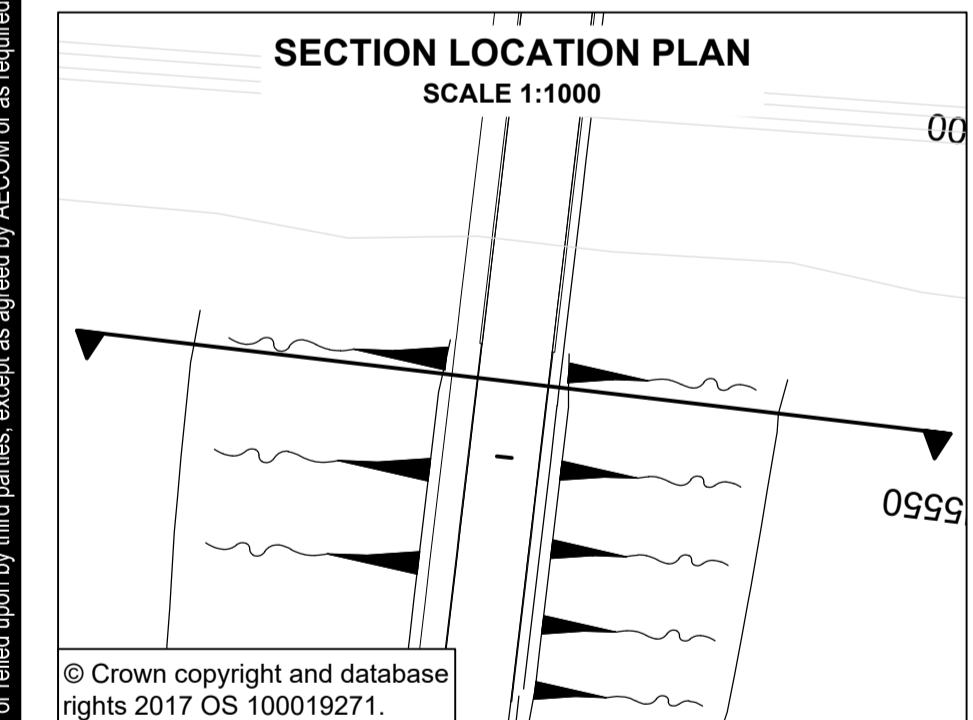
CONSULTANT
AECOM
12 Regan Way
Chetwynd Business Park
Chilwell, Nottingham, NG9 6RZ
tel: +44 [REDACTED]
www.aecom.com

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KEY

	EXISTING GROUND PROFILE
	PROPOSED GROUND PROFILE
	TOP SOIL TO BE REMOVED
	FILL MATERIAL
	CONCRETE
	TOP SOIL



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS
DESIGNED: II CHECKED: JS APPROVED: AS

INTERNAL PROJECT NUMBER **SCALE**
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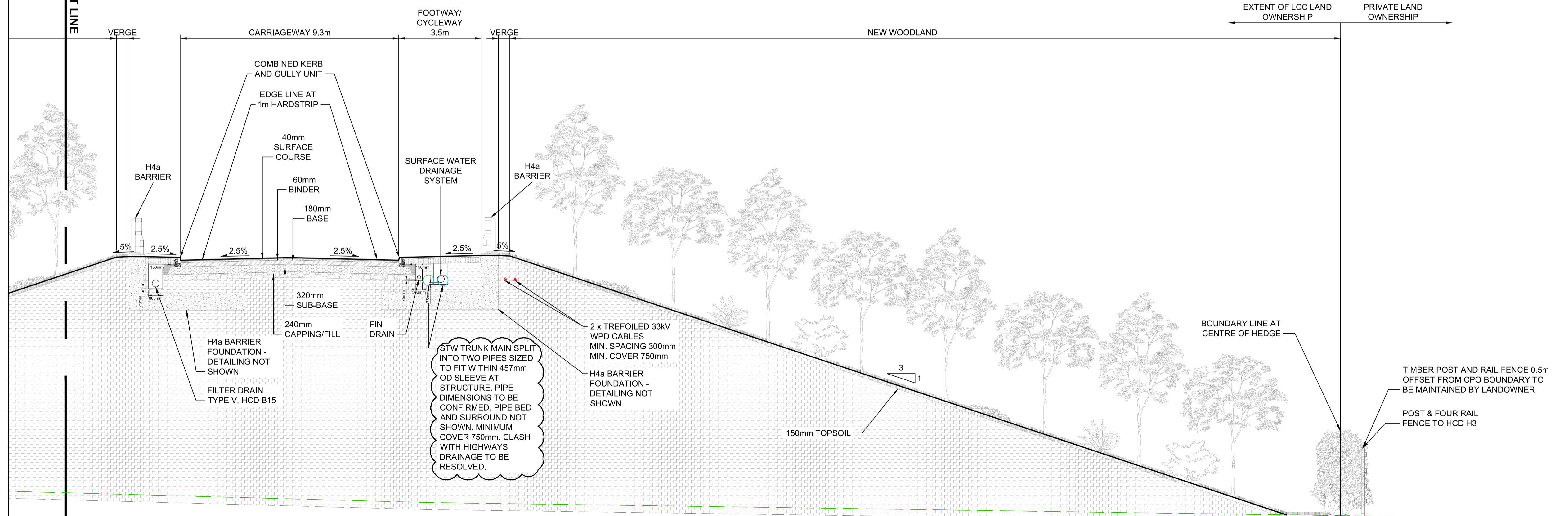
STATUS **BS1192 SUITABILITY**
FOR COSTING D1

SHEET TITLE
TYPICAL CROSS SECTIONS
SECTION 5 MAINLINE
CH5540

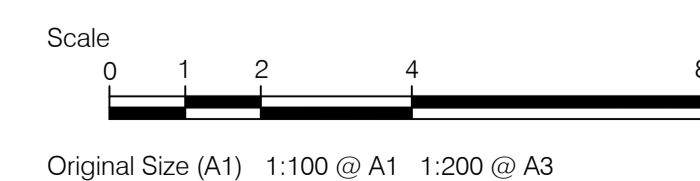
DRAWING NUMBER **REV**
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CROSS SECTION AT CH5540 - RAILWAY BRIDGE APPROACH

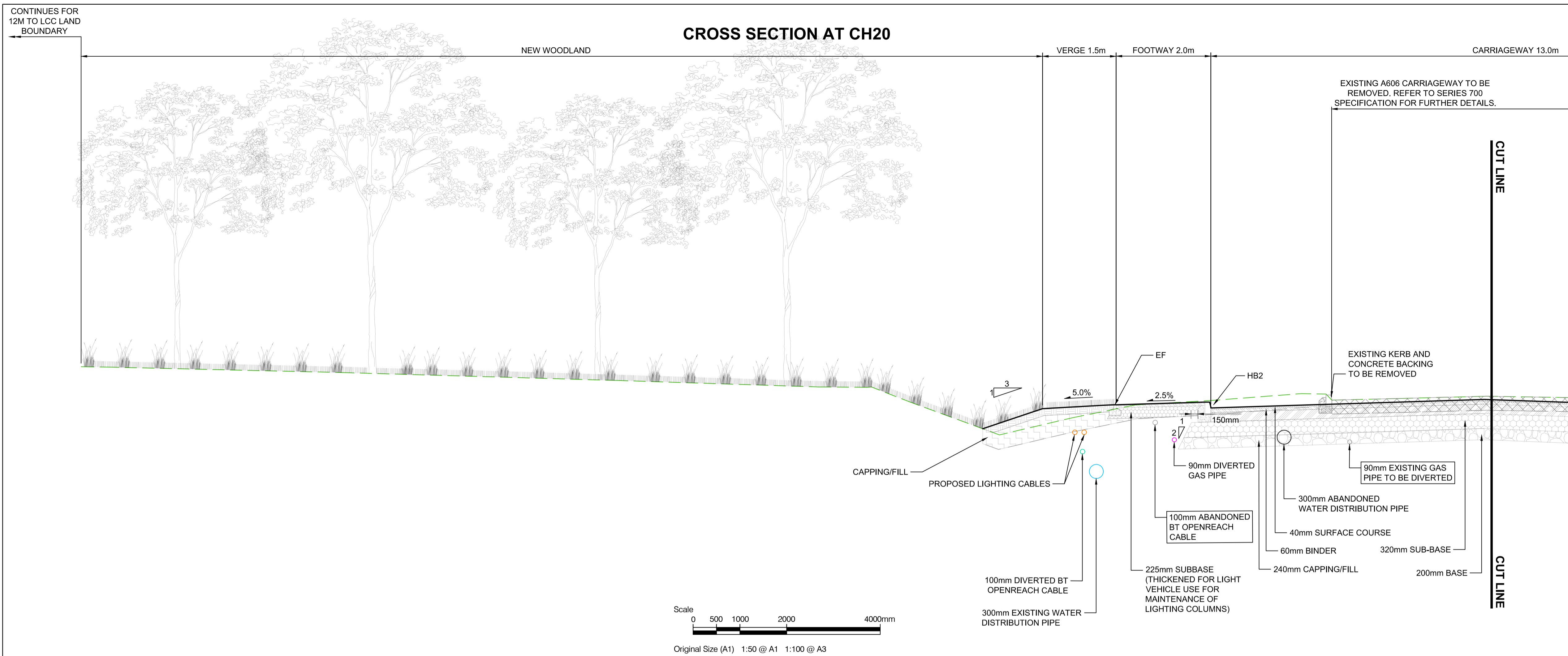
CUT LINE



STW TRUNK MAIN SPLIT INTO TWO PIPES SIZED TO FIT WITHIN 457mm OD SLEEVE AT STRUCTURE. PIPE DIMENSIONS TO BE CONFIRMED. PIPE BED AND SURROUND NOT SHOWN. MINIMUM COVER 750mm. CLASH WITH HIGHWAYS DRAINAGE TO BE RESOLVED.



CROSS SECTION AT CH20



PROJECT
NORTH & EAST MMDR



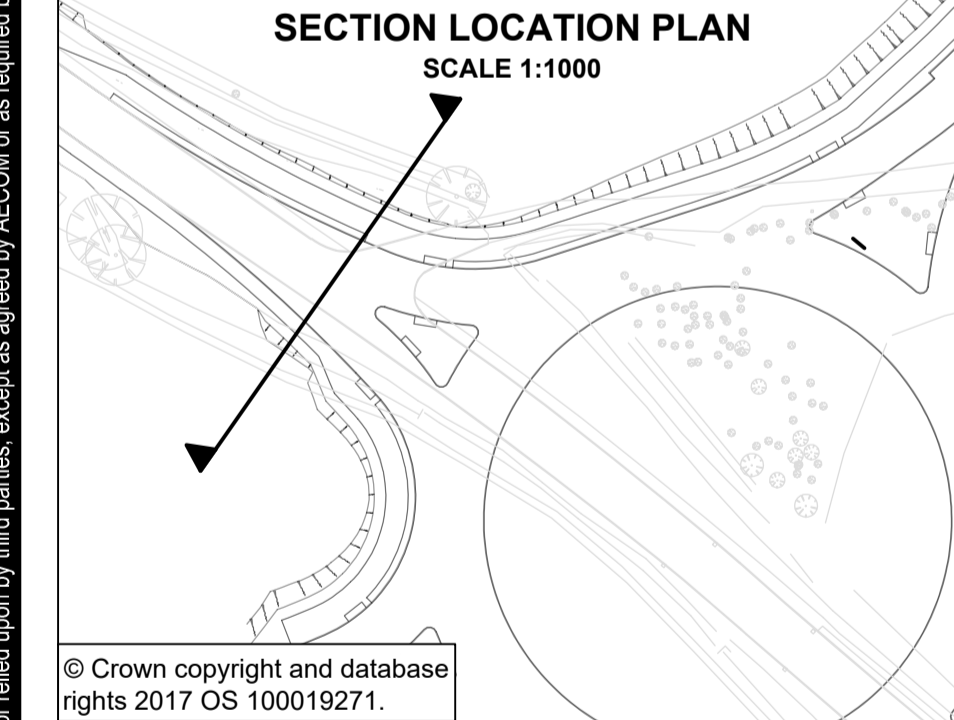
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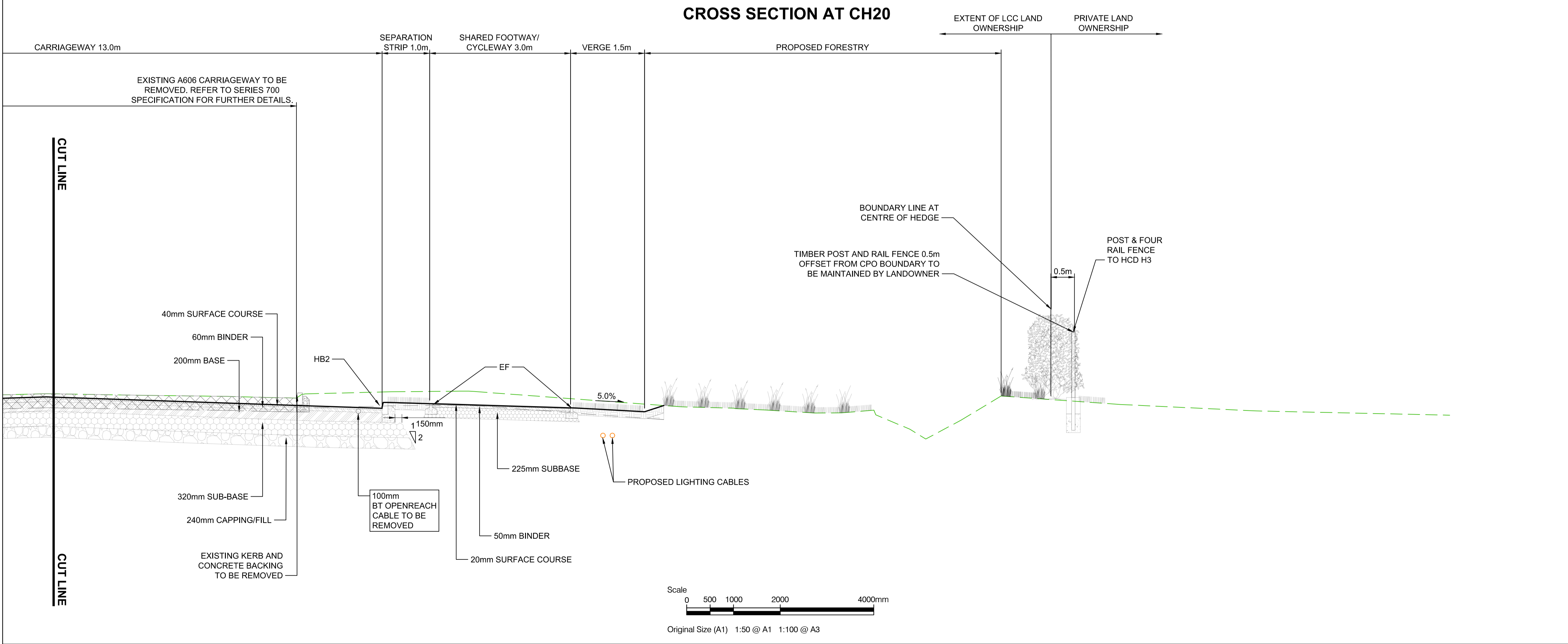
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 - FOR DETAILS OF SERVICES AND UTILITIES, SEE DRAWINGS 60542201-ACM-HUT-XX_XX_XXX_Z-DR-CU-0001 TO 0038.
 - PROPOSED UTILITY DIVERSIONS ARE SUBJECT TO DESIGN DEVELOPMENT FOLLOWING RESPONSES FROM STATUTORY UNDERTAKERS.
 - FOR DETAILS OF FILTER DRAINS, SEE DRAWING 60542201-ACM-HDG-GEN_GEN_ZZ_Z-SD-CD-0001.
 - SUB-BASE AND CAPPING TO BE CONTIGUOUS WITH FILTER DRAIN WHERE PRESENT. REFER TO CARRIAGEWAY EDGE DETAILS 60542201-ACM-HPV-GEN_GEN_ZZ_Z-SD-CH-0002.
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 - ENGINEERING FILL MATERIAL, AS SPECIFIED IN SERIES 600 SPECIFICATION, MAY VARY BETWEEN LOCATIONS.
 - FOR DETAILS OF STARTER LAYER, REFER TO DRAWING 60542201-ACM-EGN-GEN_GEN_ZZ_Z-DR-GE-0121 OR THE SPECIFIC GROUND IMPROVEMENT DRAWING AND THE SERIES 600 SPECIFICATION.
 - HB2 AND EF DENOTE HALF BATTERED KERBS AND EDGING, RESPECTIVELY SEE DRAWING 60542201-ACM-HKF-GEN_GEN_ZZ_Z-SD-CH-0001 TO 0003.

KEY

---	EXISTING GROUND PROFILE
---	PROPOSED GROUND PROFILE
---	TOP SOIL TO BE REMOVED
---	FILL MATERIAL
---	CONCRETE
---	TOP SOIL



CROSS SECTION AT CH20



DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS
DESIGNED: II CHECKED: JS APPROVED: AS

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60542201 1:50

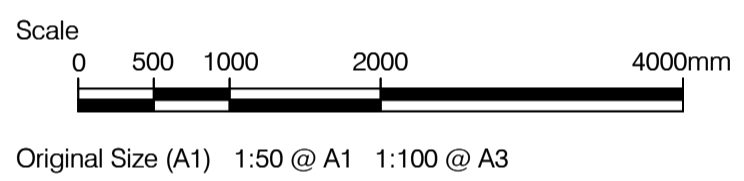
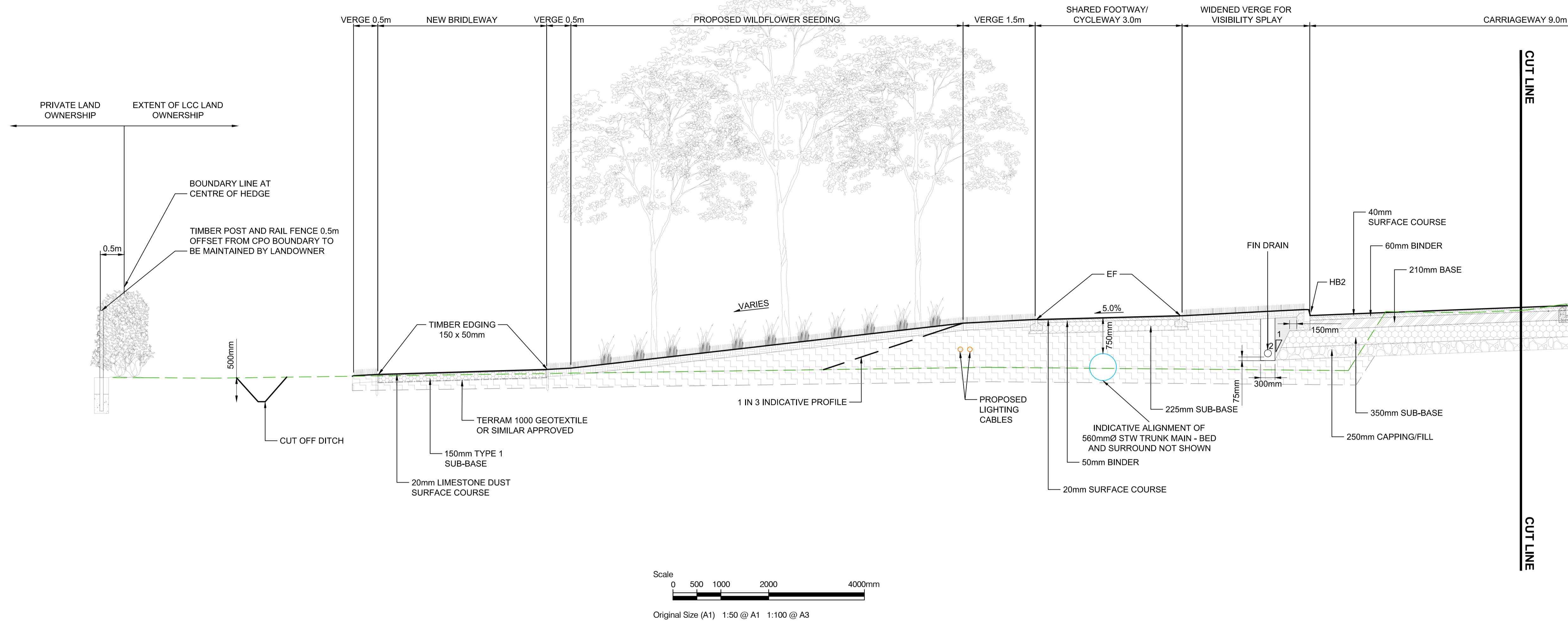
STATUS **BS1192 SUITABILITY**
FOR COSTING D1

SHEET TITLE
TYPICAL CROSS SECTIONS
ROUNDBOUT 6
A606 NORTHWEST

DRAWING NUMBER	REV
60542201-ACM-HML -S5_JN_R06_Z	-DR-CH-0101 P01

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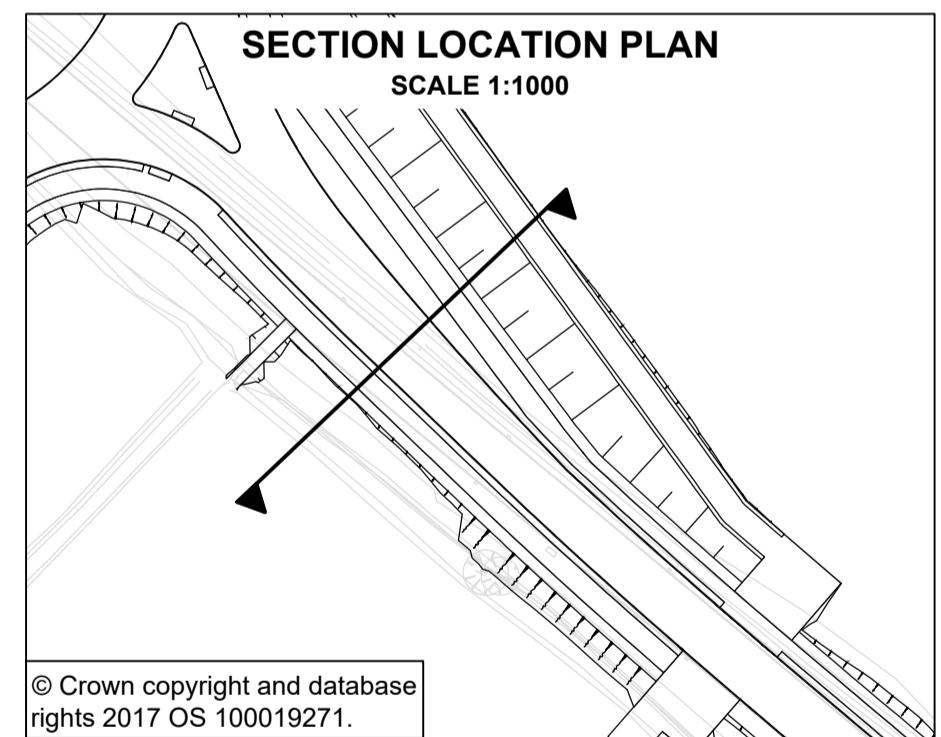
CROSS SECTION AT CH20



- NOTES**
- ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE.
 - EXISTING GROUND DATA IS BASED ON THE COMBINED AECOM AND LCC TOPOGRAPHICAL SURVEY.
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KEY

	EXISTING GROUND PROFILE
	PROPOSED GROUND PROFILE
	TOP SOIL TO BE REMOVED
	FILL MATERIAL
	CONCRETE
	TOP SOIL



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DETAILED DESIGN ISSUE	II	AS	16/10/20	P01
REVISION DETAILS	BY	CHECK	DATE	SUFFIX

PROJECT MANAGEMENT INITIALS

DESIGNED: II	CHECKED: JS	APPROVED: AS
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INTERNAL PROJECT NUMBER **SCALE**

60542201	1:50
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STATUS **BS1192 SUITABILITY**

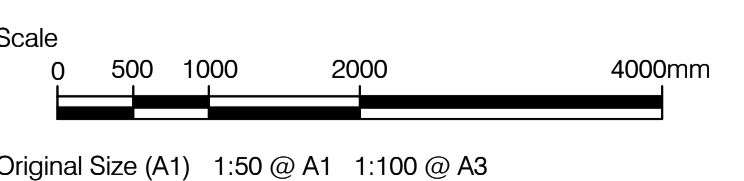
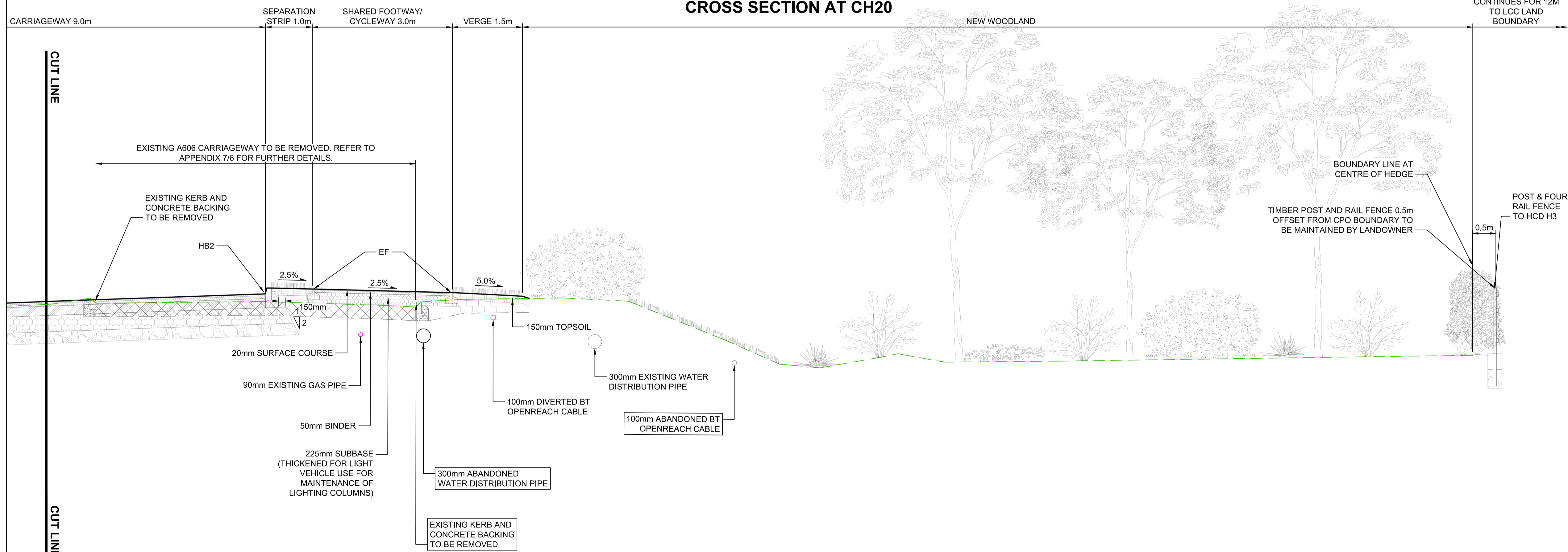
FOR COSTING	D1
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SHEET TITLE
TYPICAL CROSS SECTIONS
ROUNABOUT 6
A606 SOUTHEAST

DRAWING NUMBER **REV**

60542201-ACM-HML-S5_JN_R06_Z	-DR-CH-0102	P01
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CROSS SECTION AT CH20



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Annex A – Drainage Design

1. Introduction

1.1 Qualifications

- 1.1.1 My name is Garry Dawson (BEng CEng MICE) and I am the drainage design lead for the North and East Melton Mowbray Distributor Road (NEMMDR). I have 27 years' experience of highway and drainage design and have been a member of the Institution of Civil Engineers throughout this time. I have been a Chartered Civil Engineer for 17 year and a Supervising Civil Engineer for 7 years.
- 1.1.2 I am currently an Associate Director at AECOM and have held this post for 4 years.

1.2 Relevant Experience

- 1.2.1 I have considerable knowledge of drainage design on new build and highway improvement projects on both Highways England and Local Authority road networks. I also have experience in a number of highway related areas including alignment design, pavement design, non-motorised user design and auditing, culvert design, traffic sign and road marking design and Scheme costing. I am an AECOM certified project manager and regular manage both drainage design Schemes and multi-disciplinary highway Schemes.
- 1.2.2 **Mount Grace Priory Junction Improvement, 2018 to 2021.** I project managed this trunk road improvement Scheme on the A19 in North Yorkshire from preliminary design through to completion of construction. The works involved adding merge and diverge lanes to an at-grade junction, widening of the junction and side road and closure of the central reservation gap. I oversaw all design works which included alignment, drainage, pavement, VRS, traffic signs and road markings; as well as preparation of contract documents and site supervision.
- 1.2.3 **M1 Pinch Point Schemes, Leeds, 2016 to 2020.** I led the drainage design team on this package of Schemes which included preliminary and then detailed design of improvements to M1 Junction 45, M1 Junction 46 South, M1 Junction 46 North and M621 Junction 7. The Schemes involved widening of roundabouts, slip roads and adjacent side roads at grade separated junctions. The drainage design works included gully and combined kerb and gully unit design, design of surface water channels and surface water pipes and sizing of numerous at source storage pipes to attenuate proposed outflows back to existing levels and minimise changes required to the existing drainage system.
- 1.2.4 **A19 Pinch Point Schemes, 2013 to 2015.** I led the drainage design team on the preliminary and detailed design of the A174 Parkway and A689 Wynyard junction improvement Schemes on the A19 trunk road. Work included design of gullies, surface water channels, combined kerb and gully units, carrier and filter drains, attenuation and runoff treatment facilities.
- 1.2.5 **A75 Dunragit Bypass, 2013.** I led the team carrying out preliminary drainage design for this 5km long bypass Scheme. The work included design of filter and carrier pipes, retention ponds, infiltration ponds and swales carried out to a demanding timescale. I also prepared the preliminary design of seven culverts along the length of the Scheme.
- 1.2.6 **Spanish City Link Road, 2010 – 2012.** I project management the options analysis, consultation, planning submission, detailed design, contract document preparation and site supervision of this local road bypass Scheme in North Tyneside. I also carried out the preliminary design of the road alignment and led the detailed design of the drainage, pavement construction, signs and road markings.

2. Drainage Design Principles

- 2.1.1 The principles used in the design of the surface water drainage system for the North and East Melton Mowbray Distributor Road (NEMMDR) are summarised below .

2.2 Carriageway Drainage Methods

- 2.2.1 Due to the high groundwater levels in the area of the proposed road, combined surface water and groundwater filter drains are specified to drain the main carriageway and protect the road pavement from groundwater ingress. On its south/west side the main carriageway will be kerbed due to the presence of a cycleway/footway. This side of the carriageway will therefore be drained with gullies outfalling to combined ground and surface water filter drains under the footway/cycleway. In areas where the gradient of the adjacent road is less than 1 in 100, gullies are replaced with combined kerb and gully units draining to the combined ground and surface water filter drains to ensure the carriageway still drains efficiently in flatter areas.
- 2.2.2 When in cutting the footway / cycleway will fall towards the carriageway and drain into the carriageway gullies. When on embankment the footway / cycleway will fall away from the carriageway and be allowed to drain down the embankment slope (i.e. over the edge) to provide a more sustainable drainage system which more closely replicates the existing drainage regime.
- 2.2.3 On the north / east side of the road there is no kerb so the carriageway will drain straight into the combined ground and surface water filter drains.
- 2.2.4 Where wide cutting slopes are proposed on the south / west side of the road an additional filter drain is provided at the bottom of the slopes to capture the cutting runoff and prevent high flows running across the footway / cycleway. For relatively narrow cutting slopes the runoff is allowed to flow across the footway / cycleway and into the carriageway gullies.
- 2.2.5 On embankments, where groundwater flows are lower, the combined surface water and groundwater filter drains on the kerbed side of the road are replaced with a carrier pipe and separate fin/narrow filter drain system. They are retained on the kerbed side however to avoid having to provide a carrier pipe, fin drain and separate carriageway runoff collector such as a concrete surface water channel. Where combined surface water and groundwater filter drains are used on embankments they have an impermeable geotextile backing and base to prevent washout of water from the drains through the sides of the embankment.
- 2.2.6 At the roundabout junctions the carriageway will be kerbed and hence will be drained by gullies or combined kerb and gully units in flatter areas, draining to carrier pipes.

2.3 Highway Drainage Pipe Design

- 2.3.1 The highway drainage pipes have been designed for the Design Manual for Roads & Bridges (DMRB) criteria of no surcharging for 1 in 1 year storms and no surcharging above base of pavement levels in filter drains or above cover levels for carrier drains for a 1 in 5 year storm. Furthermore the drainage system has been designed to meet the Sewers for Adoption criteria of no flooding for a 1 in 30 year storm. To ensure compliance with the Non-Statutory Technical Standards for SuDS criteria S7, S8 and S9 the system has also been designed to ensure no flooding of sensitive areas such as buildings or utility plant susceptible to flooding for a 1 in 100 year storm.

2.4 Pond Design

- 2.4.1 Highway drainage attenuation is provided with the use of balancing ponds. To provide maximum environmental benefit these have been designed as wet ponds with permanently wet sections varying in depth from 0.5m to 1.0 m.
- 2.4.2 The ponds have been designed to accommodate a 1 in 100 year storm with 40% allowance for climate change as per the requirements of Leicestershire County Council's Flood Risk Management team. Inflow to the ponds has been based on 100% runoff from impermeable areas and 20% runoff from permeable areas. Wherever possible the cut off drainage system has been kept completely separate from the carriageway drainage system with separate outfalls to nearby watercourses, or where

possible to pond outfall runs to reduce the number of new outfalls to existing watercourses. This keeps the highway runoff which needs to pass through the ponds as part of the pollutant removal process and to attenuate the higher flows from impermeable areas, separate to the overland flows which do not contain highway contaminants and are from permeable areas so do not need attenuating. There is only one location where cut off drainage outfalls to the highway drainage system. This is between Roundabouts 5 and 6 where cut off drainage run CW10 to CW60 outfalls to Highway Drainage Network X as there is no suitable watercourse or pond outfall run close to CW10 to CW60 to outfall too.

- 2.4.3 Discharge from the ponds will be at greenfield runoff rates to nearby watercourses as shown on the drawings. Greenfield runoff rates have been calculated using both the Institute of Hydrology 50Ha Method and the Flood Studies Report Method and the lowest rate of the two used, which was the loH50 result in all cases.

2.5 Cut Off Drainage

- 2.5.1 Where adjacent land falls towards the proposed road cut off drainage has been provided at the top of cutting slopes and bottom of embankments either in the form of filter drains or ditches to collect and convey overland flow to nearby watercourses. Generally filter drains are provided at the top of cutting slopes, to draw down ground water levels and assist slope stability and long term durability, and ditches are provided at the bottom of embankment slopes as a cost effective alternative where ground water draw down is not required.
- 2.5.2 Wherever possible, and in most cases, the earthworks drainage system has been kept completely separate from the carriageway drainage system with separate outfalls to nearby watercourses, or where possible to pond outfall runs to reduce the number of new outfalls to existing watercourses. This keeps the highway runoff which needs to pass through the ponds as part of the pollutant removal process and to attenuate the higher flows from impermeable areas, separate to the overland flows which do not contain highway contaminants and are from permeable areas so do not need attenuating.

3. Carriageway Drainage Design

3.1 Gully Design

- 3.1.1 Gully spacings have been designed to the requirements of the 6Cs Design Guide, namely the gully spacings in Table MC1, reproduced below.

Carriageway Gradient	1/100	1/80	1/60	1/40 or Steeper
<i>Area drained (including footways etc.) in m2</i>	170	180	200	240

- 3.1.2 In calculating areas drained allowance has been made for all footways, paved areas, verges and earthworks slopes draining towards the carriageway. Footways and paved areas have been allowed for at 100% of area and verges and earthworks slopes at 20% of area.
- 3.1.3 Where the carriageway gradient falls below 1 in 100, gullies have been replaced with combined kerb and gully units.
- 3.1.4 A maximum gully spacing of 40m has been used except at summits where the first gully is not more than 40m from the high point. Double gullies are provided at all sag points and low points and each has an individual connection to the main highway drains. A maximum gully connection length of 15m has been used.

3.2 Combined Kerb and Gully Units Design

- 3.2.1 Combined kerb and gully units have been specified in all areas where the carriageway gradient falls below 1 in 100. The make and size of units and locations of any intermediate outfalls have not been specified to allow the Contractor to seek the most economically advantageous units.
- 3.2.2 The specified design rainfall intensity that the combined kerb and gully units must meet was calculated using the formula which is taken from HA37/97 'Hydraulic Design of Road Edge Surface Water Channels':

$$I = 32.7 \times (N-0.4)^{0.223} \times (T-0.4)^{0.565} \times 2\text{min}5/T$$

4. Highway Drainage Pipe Design

- 4.1.1 The highway drainage networks have been designed in Microdrainage. In accordance with Leicestershire County Council requirements a minimum pipe size of 225mm has been used.
- 4.1.2 The highway drainage pipes have been designed for the Design Manual for Roads & Bridges (DMRB) criteria of no surcharging for 1 in 1 year storms and no surcharging above base of pavement levels in filter drains or above cover levels for carrier drains for a 1 in 5 year storm. Furthermore, the drainage system has been designed to meet the Sewers for Adoption criteria of no flooding for a 1 in 30 year storm. To ensure compliance with the Non-Statutory Technical Standards for SuDS criteria S7, S8 and S9 the system has also been designed to ensure no flooding of sensitive areas such as buildings or utility plant susceptible to flooding for a 1 in 100 year storm. Checks have been carried out using a 20% allowance for climate change. Sensitivity tests have also been carried out to show the impact of using a 40% allowance for climate change.
- 4.1.3 Networks R and U outfall to Pond 8 below the level of the top of the attenuation storage. Also the level of the outfall from Pond 8 is below the level of flood water during River Eye flood events so if drainage network flood events should coincide with River Eye flood events, the outfall from the pond will be closed by the flap valve provided there to prevent River flood water flowing back into the pond. In order to fully assess the impact of the potentially submerged outfalls from networks R and U and the impact of the Pond 8 outfall being closed a combined Network R and U was developed incorporating Pond 8.
- 4.1.4 Two models were developed, one with an orifice plate on the pond outfall limiting the outflow from the pond to the maximum permitted for the various storm scenarios and one with an orifice plate on the outfall pipe with a 1mm opening size to simulate the outfall being closed. The full range of storm simulations were carried out for each of these two models.
- 4.1.5 With the pond outfall open there is limited impact on the surcharging and flooding in the pipe networks from the outfalls into the pond being submerged/partially submerged and all design requirements are still met. With the pond outfall closed some surcharging is introduced on the pipes close to the pond for the 1 in 1yr storm scenarios however this is very minor and the surcharge levels still remain below pavement levels for the 1 in 5yr scenario and there is no flooding /no increase in flooding for the 1 in 30yr and 1 in 100yr scenarios.

5. Cut Off Drainage Design

- 5.1.1 Where adjacent land falls towards the proposed road cut off drainage has been provided at the top of cutting slopes and bottom of embankments either in the form of filter drains or ditches to collect and convey overland flow to nearby watercourses. Generally filter drains are provided at the top of cutting slopes, to draw down ground water levels and assist slope stability and long term durability, and ditches are provided at the bottom of embankment slopes as a cost effective alternative where ground water draw down is not required.
- 5.1.2 The required capacity of the cut off drainage has been calculated in accordance with the Design Manual for Roads and Bridges, Volume 4, Section 2, Part 1, HA 106/04 'Drainage of Runoff from Natural Catchments'. The catchment areas for all the cut off drainage are less than 0.3km² and therefore in line with the recommendation in HA106/04 the ADAS method has been used to estimated runoff volumes. Also as recommended, flow rates have been estimated for design storms with a return period of 1 in 75 years. Furthermore, an additional 20% has been added to these flow rates to account for climate change.
- 5.1.3 The areas of land falling towards the road were determined using a combination of LIDAR contours where available, and 1:25,000 OS mapping contours. These areas were then divided into sub-areas and a separate flow rate calculation carried out for each of these sub-areas. A separate sub area was designated wherever there was a significant change in the contributing catchment depth or gradient and at maximum intervals of around 200m to ensure drainage was not oversized by having long lengths to accommodate a calculated flow rate where this flow rate will actually only occur towards the downstream end of the catchment.

5.2 Cut Off Drainage Pipe Design

- 5.2.1 The cut off drainage networks take runoff from three sources namely:
- Type 1) Overland flow where required capacity has been calculated as described above,
 - Type 2) Pond outflows where required capacity has been calculated as described below,
 - Type 3) Cutting slope drainage where required capacity has been calculated by entering the relevant impermeable areas into Microdrainage.
- 5.2.2 Where a cut off drainage network takes flows of only type 1 and 2, these have been entered as base flows in Microdrainage and the pipes sized to accommodate these flows. As the pond outflows are based on a maximum that would never be exceeded and the overland flows are based on the 1 in 75 return period required by DMRB with an additional 20% added for climate change, no simulations for other return periods or climate change percentages have been carried out for these networks.
- 5.2.3 Where a cut off drainage network also takes cutting slope runoff, where flows are based on impermeable areas, simulations have been run to test the network for various return periods and climate change percentages. Overland flows and pond outflows were again entered as base flows and pipes taking only these types of flow were initially sized to accommodate these flows. Initially simulations were done for 1 in 1yr, 1 in 5yr, 1 in 30yr and 1 in 100yr return periods with 40% climate change on the basis that if these gave acceptable results it would be unnecessary to run simulations for 20% climate change. It was found that the 40% climate change simulations gave acceptable results for all networks and simulations for 20% climate change were therefore not run.
- 5.2.4 For each of the return periods simulated the base flow from any pond outflow was adjusted to the maximum permissible discharge for that return period. To provide a robust assessment overland flows were increased from the 1 in 75 yr + 20% CC values for the 1 in 30yr + 40% and 1 in 100yr + 40% simulations. It was established from carrying out calculations of flows for various return periods and catchment sizes using the ADAS method that the following approximate relationships exist:
- 1 in 75yr +20%CC to 1 in 1yr + 40%CC = Approx 40% reduction in flows
 - 1 in 75yr +20%CC to 1 in 5yr + 40%CC = Slight reduction in flows
 - 1 in 75yr +20%CC to 1 in 30yr + 40%CC = Approx 12% increase in flows

- 1 in 75yr +20%CC to 1 in 100yr + 40%CC = Approx 24% increase in flows

5.2.5 The overland flows were therefore adjusted for the various scenarios as follows:

- 1 in 1yr + 40%CC = Generally left as 1 in 75yr + 20%CC flows except when this showed surcharging to occur, when flows were then reduced by 40%
- 1 in 5yr + 40%CC = Flows left as 1 in 75yr + 20%CC flows
- 1 in 30yr + 40%CC = Flows increased by 12%
- 1 in 100yr + 40%CC = Flow increased by 24%

5.3 Cut Off Drainage Ditch Design

The cut off drainage ditches have been designed to accommodate the calculated 1 in 75 yr + 20%CC flows. The ditches have been sized in accordance with HA 106/04 using Manning's resistance equation.

5.4 Cut Off Drainage Piped Ditch Design

- 5.4.1 The cut off drainage piped ditches have been designed in Microdrainage to accommodate the calculated 1 in 75 yr + 20%CC flows within bore. To aid future maintenance a minimum pipe size of 300 dia has been used and a minimum of 450 dia has been used where this is achievable without having to reduce the cover to the pipe below the acceptable minimum or having to overdeepen the adjacent ditches over significant lengths or where this would make tie-in's to existing ditches unachievable.
- 5.4.2 It should be noted that pipes RA10-RA20 and RB10-RB20 are not piped ditches, they have been provided purely as a precaution to help ensure there is never a build-up of water in the small area of land between the new road embankment, Lag Lane, the drainage run from the new road to Pond 10 and the railway cutting slope; that the current natural water pathways are maintained as closely as possible and that any overland flow is not concentrated to a single point on the railway cutting slope.
- 5.4.3 Due to the size of the area, the fact that it is to be significantly planted and the fact that the land is not particularly steeply sloping, it is unlikely that significant overland flow will occur but the fall of the land and the position of the new embankment means that any overland flow from much of the area would tend to flow towards the bottom of the embankment and then towards the railway cutting slope. As a precaution against this happening the new pipes have been specified to provide an alternative pathway for any overland flow through the base of the embankment thus helping to prevent any concentration of overland flow where the embankment meets the railway cutting slope and maintaining the natural overland flow pathway from southeast to northwest. It is likely that these pipes will however rarely take any flow and that any flow rate will not be significant.

6. Pond Design

6.1 Pond Locations

- 6.1.1 The ponds have been located such that they are out of the flood zones 2/3 of the adjacent watercourses where these exist, except for Ponds 8 and 9 at the River Eye where the width of the Flood Zone 3 makes this impractical and the ponds have been moved as far as possible to the edges of the flood zone.
- 6.1.2 For Pond 9, although it is located within the extent of Flood Zone 3, the level of the outside edge of the maintenance track around the pond is set so that it is above the 1 in 100yr +40% flooding level predicted by the flood modelling team for the River Eye in the area. Furthermore, the level of the outfall from the pond is set to be above this level so outflow from the pond will not be impeded by flooding from the River Eye, even in the 1 in 100yr +40%CC scenario.
- 6.1.3 For Pond 8, bunding has been provided around the pond, the top of which is above the 1 in 100yr +40%CC flooding level predicted by the flood modelling team for the River Eye in the area, so the pond will not be inundated during River Eye flooding events. A flap valve is also to be provided on the outfall from the pond so flood water cannot back-up the outfall drain run during flood events. This will however mean the pond cannot outfall during River Eye flooding events and so Pond 8 has been sized such that if a 1 in 100yr +40% storm event occurs at the same time as the River flood level is above the level of the pond outfall the storm water can still be retained within the area of the pond and the surrounding access track without overtopping the bunding around the pond.
- 6.1.4 With the exception of Pond 8, all pond levels are such that overtopping from flooding of adjacent watercourses will not occur and watercourse flooding will not prevent outfall of flows from the ponds. Pond 8 has been designed with bunding that prevents overtopping from River Eye flooding events and retains the 1 in 100yr + 40%CC storm within the area of the pond and the surrounding access track.

6.2 Greenfield Runoff Calculations

- 6.2.1 Allowable outflows from each pond have been calculated based on greenfield runoff from the total area contributing to the pipe network outfalling to that pond. However where an area falls within the catchment of one watercourse but contributes runoff to a network and pond outfalling to a second, neighbouring watercourse, this area is deducted when calculating the greenfield runoff allowance from the pond outfalling to the second watercourse and added back when calculating the greenfield runoff allowance from the next pond along in the neighbouring catchment outfalling to the first watercourse. This was done at the request of the Leicestershire County Council Flood Team to maintain current greenfield runoff levels to each individual watercourse as well as across the Scheme as a whole. There is one exception to this where greenfield runoff allowance from the Burton Brook catchment is included in the outflow from Pond 10 to the River Eye within the Eye/Wreake from Langham Brook to Soar Catchment. This exception was discussed and agreed with the Leicestershire County Council Flood Risk Management Team.
- 6.2.2 It has been conservatively assumed that all contributing areas are currently permeable and therefore will only be contributing greenfield runoff to watercourses at present. i.e. no additional runoff allowance has been made for existing roads and other impermeable areas that may currently be contributing runoff to watercourses at levels greater than greenfield runoff.

6.3 Pond Sizing Calculations

- 6.3.1 The ponds have been designed to accommodate a 1 in 100 year storm with 40% allowance for climate change as per the requirements of Leicestershire County Council's Flood Risk Management team. Inflow to the ponds has been based on 100% runoff from impermeable areas and 20% runoff from permeable areas. Outflow from the ponds has been restricted to a maximum of greenfield runoff equivalent for storm return periods of 1 in 1yr, 1 in 5yr, 1 in 30yr and 1 in 100yr with the use of orifice plates.
- 6.3.2 The ponds were sized in Microdrainage using the Source Control module.

- 6.3.3 The ponds have been designed to provide the required depth and a minimum of the required areas at top and bottom of the attenuation storage portion of the pond as specified in the Microdrainage input data with additional area allowed for the space occupied by the gabion baskets which separate the forebay area of the ponds.
- 6.3.4 Additional simulations were carried out for Pond 8 with the outfall orifice plate set with a 1mm orifice size to assess the impact of the pond not being able to outfall during River Eye flooding events. The revised pond model for these simulations included the freeboard area of the pond, the surrounding maintenance track and adjacent bunding. The simulations showed that if the outfall from the pond is closed for a 1 in 1yr storm the water level will reach a maximum of 17mm into the 300mm freeboard, for a 1 in 5yr storm the water level will reach a maximum of 205mm into the 300mm freeboard, for a 1 in 30yr storm the water level will reach a maximum of 16mm up the bunding around the pond and for a 1 in 100yr storm the water level will reach a maximum of 162mm up the bunding around the pond. These figures are very much a worse case scenario however as if the River Eye flood water levels outside the pond area are lower than the water level in the pond, the head of water within the pond would open the outfall flap valve to allow some outflow and balance the water levels inside and outside the pond area.

6.4 Pond Details

- 6.4.1 The ponds have been designed taking into account best practice guidance to optimise their treatment potential. Measures include:
- Sediment forebays have been provided sized at 10% of the total pond size and separated by gabion baskets to prevent pollution loadings to the main ponds. A sediment forebay has not been provided at Pond 1 following discussion with the Water Resources team, as the shape of the pond is not conducive to provision of one. The shape of the pond is dictated by the need to fit as close to the highway earthworks as possible to minimise land take from the adjacent proposed housing development.
 - A concrete invert to the ponds is provided in the forebay areas to aid future maintenance by giving an indication of pond base level and providing protection to the pond liner material during sediment clearing operations.
 - Ponds are designed to include wet pond areas with depths that range at each pond from 0.5m at the upstream end to 1m at the downstream end with 1 in 4 side slopes.
 - A 2 m wide vegetation shelf has been allowed for at the edge of the wet ponds.
 - The depths of the attenuation provision above the wet ponds ranges from 0.5 m to 1.2 m for the different ponds with 1 in 4 side slopes and a 300 mm freeboard allowance.
 - A 3.5 m maintenance track has been provided around the edge of each pond.
 - Sediment meters and lifebuoys have been specified at each pond.
 - Penstocks are to be provided at the Pond outfalls for Ponds 8, 9 and 10 which discharge to the River Eye.
 - A filter drain is specified around the perimeter of each pond to draw down ground water levels and help prevent lifting/failure of the pond liner due to build up of ground water pressure behind it. These pond perimeter drains will also act as an emergency overflow facility should the pond outfall become blocked as they outfall downstream of the pond outfalls and chambers containing the orifice plates.
 - A lowered section of maintenance track is specified close to the outfall of each pond to act as a secondary emergency overflow facility should both the pond outfall and the pond perimeter drainage become blocked. These lowered sections have been located to ensure any overflow is directed towards adjacent cut-off drainage, adjacent outfall ditches and/or adjacent watercourses.

