

Design Report

Woodhouse Meadows Route 1

Current stage: Preliminary Design

Current step: Final Stage Check

Rev	Check step	Description	Panel date	Check passed
DS	Design record set-up			
PF	Prelim final check	Prepared RH	Oct 2025	
DF	Detailed final check			



Hampshire
County Council

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0. HES Gateway progression

0.1. Feasibility Design Check / Gateway 1

When the certificate for the Feasibility Design Check has been completed a link is to be provided below:

0.2. Preliminary Design Check / Gateway 2

When the certificate for the Preliminary Design Check has been completed a link is to be provided below:

0.3. Detailed Design Check / Gateway 3

When the certificate for the Detailed Design Check has been completed a link is to be provided below:

1. Introduction

1.1. Introduction to scheme

The Woodhouse Meadows development site sits within the Hedge End Town Council district and the Borough of Eastleigh. A hybrid planning permission was secured for the site in 2019 which provided consent for a new secondary school and supporting highway infrastructure to provide access to the school and surrounding future residential housing land parcels to be situated off Woodhouse Lane.

Route 1 is situated at the southern edge of the Woodhouse Meadows development site, providing access from Woodhouse Lane to the Berrywood Fields playing fields recently delivered by Eastleigh Borough Council. Route 1 crosses and then runs adjacent to Bottom Copse, a Site of Importance for Nature Conservation (SINC) which includes designated ancient woodland and a main watercourse. The Deer Park School sports pitch is located immediately to the north of the track. The existing Route 1 gravel track was used for construction traffic during the UDI and Berrywood Fields construction schemes, during which a temporary steel Mabey bridge was installed over the existing dilapidated culvert at the SINC crossing. The temporary bridge is currently still in-situ.

Background documents
Preliminary Design Task Order and Project Plan RJ510518-HEH-ProjMan-ES Task Order Commission - Woodhouse Meadows Route 1.pdf
Preliminary Design Project Dashboard RJ510518-HEH-ProjMan-Project Dashboard-LIVE version.xlsx

1.2. Outline purpose / objectives

Engineering Services (ES) has been commissioned to complete preliminary design of Route 1, which will provide emergency and maintenance vehicle access from Woodhouse Lane to the Berrywood Fields sports pitches. The completed preliminary design will be passed to the appointed developer of the Woodhouse Meadows scheme, who will complete the detailed design and delivery of Route 1 under a licence.

Key objectives as per the agreed Task Order:

- Complete preliminary design of a new SINC crossing (culvert) to replace the existing dilapidated culvert, including pre-application engagement with and outline approval from the Environment Agency
- Review if a positive drainage solution is required along the length of the Route 1 track and undertake preliminary design if required.
- To agree top surfacing specification of the track with HCC Countryside Services to allow it to be dedicated and adopted by them.
- To manage and oversee the landscaping design for the SINC buffer, to be prepared by the Landscaping Team within Property Services

- To support the Hampshire 2050 Planning Team in discharging the existing planning condition relating to Route 1.

During the scheme and after consultation with the landscaping and planning teams, the Client instructed ES to adopt a ‘do minimum’ approach and leave the existing track and landscaping outside of the immediate vicinity of the SINC in its current state. A reactive maintenance approach will be taken for the existing track, and the existing landscaping is considered acceptable for the purposes of the outstanding planning condition.

1.3. Known constraints

- Planning permission O/18/83634 includes planning obligations on Hampshire County Council to deliver Route 1 prior to any development of housing. Route 1 was included in the detailed planning boundary but no detailed drawings were provided. The outstanding condition will be discharged by submitting completed Route 1 preliminary design drawings to the Local Planning Authority (LPA).
- The area is located within Bushy Copse, which is a designated SINC and area of Ancient Woodland. An ordinary water course is located within the SINC and any works to the existing culvert or within 8m of the watercourse will require full agreement with the Environment Agency via a Flood Risk Activity permit (FRAP).
- All of Route 1 currently sits within the Hampshire County Council’s freehold ownership and it is intended to grant Hedge End Town Council a long leasehold of the route from the highway balancing pond off Woodhouse Lane to the edge of the Berrywood Fields sports pitches.

1.4. Contract procurement method

The Hampshire 2050 Client is planning to include these works within the wider Woodhouse Meadows development package, with the chosen developer appointing a Design & Build contractor for Route 1.

Contract document preparation is not part of this commission.

1.5. Project team contacts

Role	Name	Email (if external)	Tel (if external)
Client Manager:	Dominic Grist		
Commission Manager:	Andrew Walker		
Project Manager:	Ross Hemsley		
Principal Designer (CDM):	N/A, to be notified at later stage		
Lead Designer:	Ross Hemsley		
Lead Design Checker:	TBC		
Drainage:	Joseph Ozkan		
Highways:			
Designer	Solomon Castillo		
Checker	Chris Campos		
Structures:			
Designer	Ross Hemsley		
Checker	Leonard Asiimwe		
Geotechnics:	Lee Hammond (Feasibility Stage input)		
Arboriculture:	Sarah Kiss		
Ecology:	Emma Taylor		
RSA:	Ross Rawlings		
Buildability Review:	Mark Fairley		

1.6. Scheme drawings

5 No. drawings have been completed and are currently saved on the scheme SharePoint site:

Highways Drawings

- [RJ510518-HEH-HGN-17133040-DR-CH-0001 GA, WHMB - ROUTE 1.pdf](#)
- [RJ510518-HEH-HSE-17133040-DR-CH-0002 LONG SECTION, WHMB - ROUTE 1.pdf](#)
- [RJ510518-HEH-HSE-17133040-DR-CH-0003 CROSS SECTIONS, WHMB - ROUTE 1.pdf](#)

Structures Drawings

- [RJ510518-HES-SBR-B2372-DR-CB-1700 P02.pdf](#)
- [RJ510518-HES-SBR-B2372-DR-CB-1701 P02.pdf](#)

2. Safety, CDM and Health & Safety File

F10 HSE notification is not required at this stage.

Associated documents:
Designers Risk Assessment CDM 2015 – Hazard Identification and Risk Assessment
Scheme Specific Health & Safety Checklist and Risk Assessment RJ510518-HEH-HSCDM-Scheme Specific Checklist and Risk Assessment.docx

3. Statutory undertakers

From the recently completed Uplands Development Infrastructure scheme it is known that there is no Statutory Undertakers plant located within Route 1. It was agreed that new SU searches were not required at this stage, but it is expected that the appointed Developer will reconfirm searches closer to construction.

4. Alignment design, geometry and cross sections

4.1. Design set-up & approach - Complete

Agreed design checker: Chris Campos

The Route 1 design includes replacement of the existing track over a new proposed culvert. The design standards used are those relevant from HCCs Technical Guidance Notes (TG's), the Design Manual for Roads and Bridges (DMRB) suite, and the Manual for Streets (MfS).

HCC Technical Guidance does not include a specific design classification for access tracks. As a result, the proposed highway design has been developed using the standards for a Tertiary Street. According to HCC Guidance TG1, Tertiary Streets are “residential streets primarily used to access properties within the street or private mews courts, edge lanes, or private drives,” and are designed to maintain self-enforcing speeds of 20mph or less. Although the access track in question does not serve any properties directly, the anticipated vehicle speeds are consistent with those expected on a Tertiary Street at 20mph or below.

The access track has low vehicular use and is to be used for general maintenance of the sports pitches and emergency access only. Lockable gates are present at either end of the track to restrict unpermitted access.

4.2. Associated documents & risks

Associated documents: Provide links to associated relevant studies, investigation reports, calculations/working, key meeting notes etc
N/A

Table of departures associated with this element of design

Departure No (include link to form)	Departure description	Approved / Rejected	Date
N/A			

4.3. Preliminary design - Complete

To ensure the design complies with the above listed requirements, the design of the UDI track over the culvert has been completed in 3D. The outputs of the preliminary design are a general arrangement, long section, and cross section drawings.

The area of new design is between chainage 38.00 and 62.00 and ties into the existing track at these chainages. Although not specifically identified in this design

stage it should be noted that other small areas on the track will require localised repair, i.e. where rutting of the existing surface has occurred and where some localised 'pot holes' have formed. These additional small repairs should be considered at the next design stage, as agreed with the Client.

The vertical alignment over the proposed culvert (between chainage 38.00 to 62.00) has been designed in accordance with HCC TG1.

To ensure that the culvert does not adversely increase flood risk in the area the maximum spill level over the culvert has been set to 12.980m. This figure is in accordance with recommendations in the Atkins Flood Model Report (2023).

The vertical alignment over the culvert ties into this level (12.980m) on the eastern side of the culvert. However, to ensure water can drain off the proposed track over the culvert, a lower point has been located on the western side of the culvert (See drawing RJ510518 HEH 17133040 DR CH 0002 for details).

The longitudinal gradients used in the design are in line with HCC TG1 and fall below the maximum permitted in the guidance, being 1:10 (10%) for all routes with a speed limit of 30mph or less. The crossfall used on the design is 1% and both (long fall & crossfalls) are acceptable for the proposed track and permeable surface materials. A gradient of 1:3 has been used for all verges / embankments to tie back into the existing ground.

Fill material and gradients around the proposed culvert have not been finalised at this time, however an indicative excavation area to enable installation of the culvert is shown and structural fill to the culvert has been proposed.

Prior to the drafting of this report, other Improvement works have been carried out between chainage 0.000 and 40.000 with Type 1 material. This area is unaffected by the proposals except where works are required to tie into the proposed culvert levels (the tie in works are expected at chainage 38.000).

5. Collision assessments, passive safety measures and vehicular/pedestrian restraint systems

5.1. Design set-up & approach - Complete

A Collision Risk Assessment has been completed for Route 1 which determined that Road Restraint Systems or other risk-reducing measures are not required for the scheme.

5.2. Associated documents & risks

Associated documents: Provide links to Collision Risk Assessments, associated relevant studies, investigation reports, calculations/working, key meeting notes etc

Collision Risk Assessment

[RJ510518-HEH-Design-Collision Risk Assessment.docx](#)

6. Drainage design

6.1. Design set-up & approach - Complete

A high-level drainage review was undertaken after direction from the Client to proceed with the “do minimum” option (i.e. to not upgrade the existing track either side of the SINC crossing). No drainage design is required, as the majority of the track will remain untouched by this scheme and existing ground levels fall naturally towards the SINC along the length of the track.

7. Structures design

7.1. Design set-up & approach - Complete

Agreed design checker: TBC

A strategic decision was taken by the Client to instruct a design and build developer to undertake detailed design, allowing them to tailor the design to their chosen methods of construction (such as using precast elements).

As such full structural design calculations have not been undertaken at this stage, and the sizing of concrete elements is indicative and based on experience of similar structures, specifically the Woodhouse Gully culvert.

The preliminary structures design has focussed on the overall form, sizing (including internal box size and invert/soffit/spill levels relating to flood modelling), position of the structure, and obtaining Environment Agency (EA) approval which will be required for the FRAP application to be agreed prior to construction. The FRAP cannot be agreed until suitable RAMS from a contractor have been submitted to the EA, however obtaining an agreement in principle for the preliminary design will mitigate the risk of the EA asking for significant design changes at a later stage.

The preliminary design was agreed with the EA after review of the Options Feasibility Report (including flood modelling undertaken by Atkins) and the completed preliminary design drawings.

7.2. Associated documents & risks

Associated documents: Provide links to associated relevant studies, investigation reports, calculations/working, key meeting notes etc

Email confirming EA approval of preliminary design
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EA Approval Email - Outlook.pdf

Item No.	H&S risks associated with this element of design Provide cross-reference to the associated row in the CDM Hazard & Risk Assessment Sheet (use this to feed into App1/23 of the Contract Specification and the Pre-Construction H&S Information where appropriate - The Risks detailed in the contract docs & Pre-Construction H&S Information are to be only those relevant to the construction which are remaining & aren't obvious to a suitably experienced contractor)
	Refer to CDM 2015 – Hazard Identification and Risk Assessment

Table of departures associated with this element of design

Departure No (include link to form)	Departure description	Approved / Rejected	Date
N/A			

7.3. Preliminary design - **Complete**

An oversized RC box culvert was recommended in the Bottom Copse Feasibility Report (Jan 2024), as agreed by the Client.

The preliminary design has been undertaken in accordance with current design codes and EA requirements, who were consulted throughout the feasibility and preliminary design stages.

Structural elements such as wing walls, aprons, upstands, etc. have been indicatively sized based on experience of similar structures and will need to be designed in accordance with the DMRB, Eurocodes and the Approval in Principle (AIP) at detailed design. The AIP has been partially completed by HCC at the preliminary design stage and will be finalised by the detailed designer prior to approval by the TAA.

The design life of the structure will be 120 years and it will be designed to support load models 1 and 2 from Eurocodes.

Aspects of the design considered critical for EA approval of the preliminary design include the internal sizing and length of the culvert box, the invert/bed levels, the spill level over the culvert, and the 500mm gravel bed (for ecology including fish spawning). If these details are changed, they will need to be re-approved by the EA.

The design is informed by recommendations from the flood modelling report undertaken by Atkins in 2023. By keeping the maximum carriageway/spill level approximately the same level as the original structure, upstream flood risk remains unchanged even if the culvert becomes blocked. The internal sizing of the box is also larger than the minimum recommended to allow easier access for maintenance and minimise blockages. The longitudinal carriageway gradient falls toward the structure from either side and if the culvert surcharges during flood conditions the water will pass over the structure and fall back into the watercourse immediately downstream.

Maintenance and inspection of the inside of the box will be limited to dry periods when water levels are low or near non-existent (as is common for this watercourse). The internal height of the box has been set as high as possible bearing in mind the restriction on increasing the spill level over the structure.

Some design details remain unconfirmed and have been intentionally left for the detailed designer. This includes the sizing and setting out of elements including

the wing walls, headwalls and aprons to allow the developer flexibility to use precast and off-the-shelf units, if suitable. The precast box will be designed and provided by a specialist contractor in agreement with the Approval in Principle.

1.5m high timber guardrails suitable for pedestrians and cyclists will be provided behind the head and wing walls. No road restraint system is required over the structure.

Construction of the culvert will require a temporary watercourse diversion to be designed by the contractor and agreed with the EA as part of the FRAP. Due to the location of the structure away from live traffic and services, a simple channel diversion adjacent to the structure should be sufficient.

Geotechnical Investigations and Design

Geotechnical site investigations were completed in 2023 by external consultant Terra Firma. The investigations included bore holes, window sampling and laboratory testing of samples. Two boreholes and four window samples were completed for the site.

Generally speaking, topsoil and made ground make up the first 1-1.5 m below ground level, with an underlying strata of alluvium 0.6 – 2.3 m thick below, and a clay Wittering Formation below that to a depth of over 10 m (the limit of the boreholes). There is a relatively high water table across the site, with no contaminants of concern found within the soil samples.

To mitigate potential unacceptable differential settlement, structure pad foundations would need to be extended into the underlaying Alluvium with a presumed bearing capacity of 35 kN/m² at 2 m below ground level used for design purposes. If loading is higher a piled solution may have to be considered.

8. Trees & landscaping

8.1. Design set-up & approach - Complete

An Arboricultural Advice Note was completed which confirmed the Route 1 site to be under two main designations;

1. A Tree Preservation Order reference no 114-E, an area order covering all tree species present at the time of the TPO being made (date to be confirmed, but assume all are covered).
2. A SINC. This aims to safeguard the site for wildlife and will trigger special consideration through planning.

Consent to Tree Works Application No. T/24/98217, to lift the crown of the trees on both sides of the Route 1 track to a height of 4.5m above the access track from the gate to playing field, was approved on 4th Nov 2024 and is valid for a period of two years. Further consent must be obtained for any trees that need to be removed either through the planning process or a separate Tree Works application to the LPA, Eastleigh Borough Council.

A site survey and Tree Constraints Plan has been completed by the HCC Arboricultural team. There are no trees of high importance (veteran, ancient, rare) on the site, but further consultation with the Arboricultural team will be required by the Developer during the detailed design stage and once likely construction methods are known.

8.2. Associated documents & risks

Associated documents: Provide links to associated relevant studies, investigation reports, calculations/working, key meeting notes etc
Tree Constraints Plan P-EBC-BotleySINCHaulRd-TCP-1.0.pdf
Tree Survey Data P-EBC-BotleySINC-DATA-Nov24-1.0.pdf
Arboriculture Advice Note P-EBC-BotleySINCCulv-TECH-SS24720-1.0.pdf

9. Ecology

9.1. Design set-up & approach - Complete

The HCC Ecological Team have completed an extended baseline habitat survey and have confirmed that Biodiversity Net Gain (BNG) is not triggered for this scheme.

The bird nesting window will place restrictions on constructions works affecting woody areas between March and July, which will need to be factored into any works programme along with the potential fisheries window which will be confirmed by the Environment Agency.

9.2. Associated documents & risks

Associated documents: Provide links to associated relevant studies, investigation reports, calculations/working, key meeting notes etc
24.0827 Woodhouse Lane Ecological Appraisal 2025.10.03.pdf

10. Site/Construction

10.1. Design set-up & approach - Complete

The HCC site supervision team has completed a buildability review for the completed preliminary design with no outstanding comments.

10.2. Associated documents & risks

Associated documents: Provide links to associated relevant studies, investigation reports, calculations/working, key meeting notes etc
Preliminary Design Buildability Review Route 1 Buildability Review Document.pdf
Preliminary Design Buildability Review Route 1 Buildability Review Email - Outlook.pdf

Appendix A - Road Safety Audits

Road Safety Audit Documents
09317 - RSA1 - Woodhouse Meadows, Botley Route 1 - Report.pdf