Network Rail & Chiltern Railways

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EWR P1 – SW Drainage Assessment (AP13)

Wallingford HydroSolutions Limited

Network Rail & Chiltern Railways

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For and on behalf of Wallingford HydroSolutions Ltd.

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Date **18th August 2015**

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Contents

1 Purpose

This document constitutes a surface water drainage assessment (SWDA), as required by Condition 13 of the Order under the Transport and Works Act 1992 (TWA) obtained by Chiltern Railways for the construction of the East West Rail Phase 1 (EWR P1) project between Bicester and Oxford. This document also provides the information required by the National Planning Policy Framework (NPPF), in considering the surface water drainage aspects of a Flood Risk Assessment for new development.

This surface water drainage assessment considers the requirements for the development of AP13 – Northfield Farm Overbridge – Cherwell District Council Planning Ref: 14/00165/DISC.

Figure 1 shows the location of the Assessment Point in relation to the overall railway development.

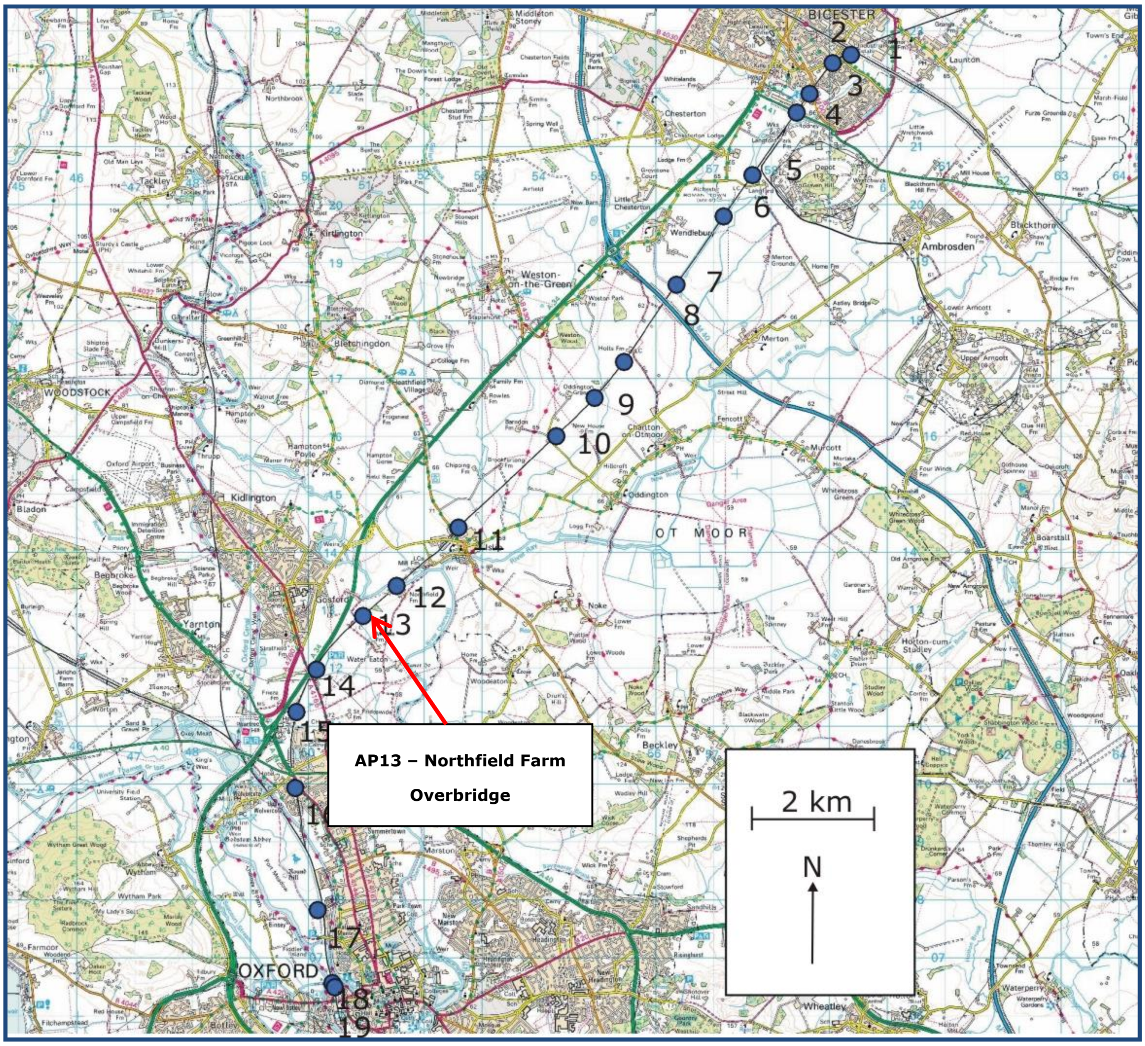

Figure 1 - Overview of the scheme with Assessment Points shown.

Condition 13 of the TWA Order requires that:

'No construction of any one of the following elements of development shall commence until a surface water drainage assessment and scheme for that element (as identified in the Level 2 Flood Risk Assessment Revised, July 2010 (Inquiry document CD/2.22), unless stated otherwise here) has been submitted to and approved in writing by the local planning authority, in consultation with the Environment Agency:

- *AP1 Bicester Chord.*
- *AP2 Tubbs Lane footbridge.*
- *AP3 Bicester Town station.*
- *AP4 A41 overbridge.*
- *AP6 Elm Tree Farm/Langford Lane Overbridge (modified to accord with the revised proposal shown on Revised Sheets 8b, 35 and 37 of the Deposited Plans and Sections (Inquiry Document CD/1.28).*
- *AP7 Merton footbridge.*
- *AP8 Holts Farm overbridge.*
- *AP9 Oddington Footbridge No 5.*
- *AP10 Oddington overbridge.*
- *AP11 Islip station in Phase 1.*
- *AP11 Islip station in Phase 2.*
- *AP13 Northfield Farm overbridge.*
- *AP14 Water Eaton Parkway.*
- *AP14a Banbury Road Sidings*
- *AP15 Gosford and Water Eaton Footbridge No 10.*
- *AP18 Sheepwash Bridge.*
- *AP19 Oxford station.*

The surface water drainage assessments shall follow the methodology set out in the Scope of Surface Water Drainage Assessment, July 2010, agreed by the Environment Agency. Each surface water drainage assessment shall demonstrate that surface water discharge rates and volumes from that element of the development will not increase flood risk, or taken together with other relevant works in the same catchment, can be maintained at or below the agreed limits, using sustainable drainage techniques. Development shall be in accordance with the approved surface water drainage assessment and scheme.'

Therefore the purpose of this document is to obtain approval of the local planning authority, in consultation with the Environment Agency (EA), for the surface water drainage assessment for AP13 Northfield Farm Overbridge, thus discharging the requirements of Condition 13 of the TWA Order and meeting the surface water drainage requirements of NPPF.

2 Proposed Development

2.1 Overview

EWR P1 is a major package of infrastructure investments including: the doubling of the line between Bicester town and Oxford North Junction; a new independent line being built between Oxford North Junction and Oxford station, using a disused track bed parallel to the existing railway; the existing stations at Bicester Town and Islip will be rebuilt, and a new station built at Water Eaton Parkway. The following section describes the proposed works at AP13 in more detail.

2.2 AP13 – Northfield Farm Overbridge

The Northfield Farm overbridge is to be demolished as it is too low for W12+ gauge specifications, and the existing Water Eaton No. 5 crossing is to be closed. They are to be replaced by an overbridge close to the location of the current Water Eaton No. 5 crossing, along with approximately 1km of farm road to enable access. This is illustrated in Figure 2.

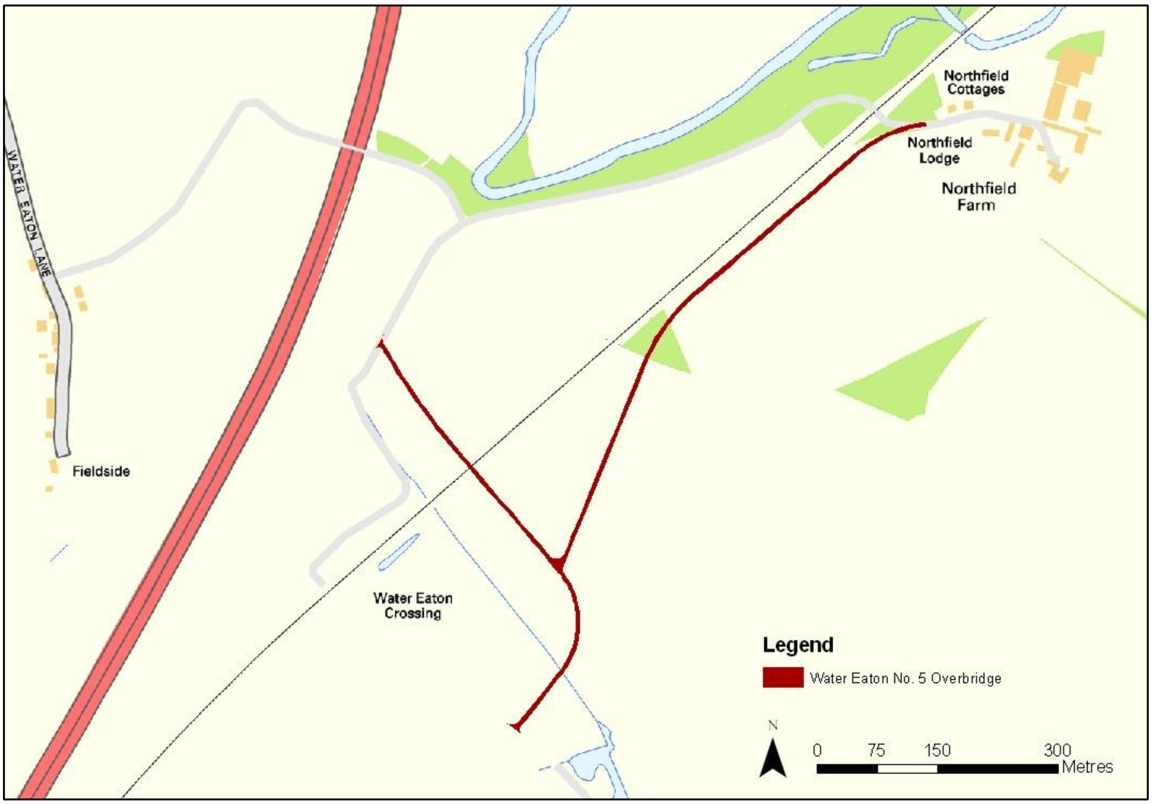

Figure 2 **– Indicative Layout of the AP 13, Northfield Farm Overbridge.** Contains Ordnance Survey Data © Crown copyright and database right 2013.

3 Management of Surface Water Runoff

3.1 Planning Requirements

It is a recognised development requirement that the post-development stormwater runoff rates discharged from any new development should not be greater than flows currently generated from the site, whether this be at greenfield or existing brownfield run-off rates. Exceptions generally only apply where it is not practical to achieve this due to the size of the hydraulic control unit. In this situation overcompensation at neighbouring sites will be provided to ensure that over the whole scheme surface water runoff is reduced. These commitments are in line with guidance set out in the NPPF and through discussions with the EA. The following sections describe the calculation procedure followed to obtain these rates.

3.2 Runoff Assessments

Pre-development (i.e greenfield or brownfield) and post-development peak surface water runoff rates have been calculated for the 1:1yr, 1:30yr, 1:100yr for AP13. Appendix 1 outlines the methodology used in the estimation of the peak surface water runoff rates. It should be noted that following discussions with the EA this analysis has not considered runoff from embankments, as these are permeable hence can be assumed to generate runoff at the greenfield rate. The following sections present the data used and the results of the surface water runoff calculations.

3.2.1 Area Assessment

Table 1 details the areas of permeable and impermeable surfaces at AP13 pre- and post-development. The areas have been taken from the Atkins drainage design plans[1] for AP10 Oddington Overbridge prepared as part of the GRIP Stage 5 detailed design process (please see Appendix 2).

Table 1 - Surface types and areas at assessment points.

Assessment Point	Type	Existing Brownfield		Post Development		Increase in Impermeable area (ha)
		Impermeable extent (ha)	Permeable extent (ha)	Impermeable extent (ha)	Permeable extent (ha)	
AP13 Northfield Farm Overbridge	**Greenfield**	0	2.90	0.75	2.15	0.75

3.2.2 Surface Water Runoff Rates

Greenfield runoff rates were calculated as described in Appendix 1. Greenfield runoff rates have been based on a total area of 2.90ha which comprises of the hard surfaced roadway and the permeable embankments, which Atkins has confirmed are both positively draining into the proposed surface water drainage system at Northfield Farm Overbridge, and are presented in Table 2 below.

[1] Atkins. East West Rail Phase 1 Drainage Designs. GRIP 5. (April. 2015)

Table 2 – Surface Water Runoff rates.

Return Period	Limiting Discharge rate (l/s)
1:1	4.08
1:100	15.34

4 Design Statements & Commitments

As part of the EWR Phase 1 scheme, five overbridges and several access tracks are proposed to facilitate the closing of a number of level crossings along the existing railway and to provide access to local communities. Atkins has prepared drainage designs for AP13 Northfield Farm Overbridge as part of the GRIP 5[1] detailed drainage designs (please see Appendix 2). This design shows the general drainage arrangements proposed at each site to sustainably manage surface water. WHS has estimated the target discharge rates (see Table 2 in section 3.2.2) that need to be achieved at AP13 Northfield Farm Overbridge to manage surface water. The following sections describe the drainage layout and SuDS components used to sustainably manage surface water runoff.

4.1 Target Discharge Rates

The drainage design for AP13 needs to ensure that discharge from site is limited to greenfield runoff rates (as per Table 2). However, the greenfield runoff rates for the lower return period events are very small (i.e less than 5l/s for the 1 in 1 year event). Through liaison with Gordon Hunt (Drainage Engineer) from Oxfordshire County Council (OCC) it has been agreed that limiting flows to such a small rate would result in a high risk of outfall blockage and associated maintenance issues and is considered to be impractical. Therefore the emphasis has been on controlling runoff for the larger return period events (i.e 1 in 100 year plus an allowance for climate change events), which are the more critical rainfall events when considering management of off-site flood risk.

4.2 AP13 – Northfield Farm Overbridge

The proposed drainage infrastructure for AP13 Northfield Farm Overbridge comprises of roadside drainage ditches that collect and convey surface water runoff generated by the road into several oversized drainage ditches that provide formal attenuation storage. There are three formal outfalls from the drainage network all discharging into a small watercourse located to the west of the proposed overbridge. Each outfall is controlled to a peak flow of 5.1l/s for the 1 in 100 year (plus a 30% increase in rainfall intensity to account for climate change) using hydrobrake flow control devices as shown in the GRIP Stage 5[1] drainage designs provided in Appendix 2.

It should be noted that the initial Form 001 drainage designs for AP13 had up to 7 separate outfall locations each controlling discharge to 5l/s (i.e 35l/s in total). This design was subsequently discounted because having such a large number of outfalls made controlling post development runoff back down to the greenfield rates extremely difficult and impractical. For example, to achieve the greenfield rate of 15.34l/s would of meant using extremely small control structures that are susceptible to blockage and would of resulted in localised flooding issues. As a result the final GRIP Stage 5[1] designs have been optioneered to provide the most practical drainage solution with the number of outfalls reduced to three each controlling discharge to 5.1l/s (i.e 15.3l/s in total). This option seeks to achieve SuDS requirements while minimising the risk of blockages ensuring drainage systems perform their intended function and can be easily maintained by the adopting authority.

On request of the landowner the eastern section of the access track will drain directly onto the adjacent farmland. This was the preferred solution over having open ditches which is seen as a health and safety risk and ongoing maintenance liability. The ground profile in this area is essentially flat which will ensure that runoff will simply flow off the track onto the adjacent fields and be allowed to either infiltrate into the ground at natural rates of flow overland following natural flow routes. Based on this arrangement it is anticipated that runoff from this section of track will not be increased and can be allowed to freely discharge onto the fields. This approach has been discussed with Gordon Hunt (OCC) and he agrees that this is a practical solution for this rural location. However, to minimise localised flooding of the road itself the track would need to be slightly raised above the existing ground level and have appropriate cross fall provided to ensure that surface water does not stand on the road.

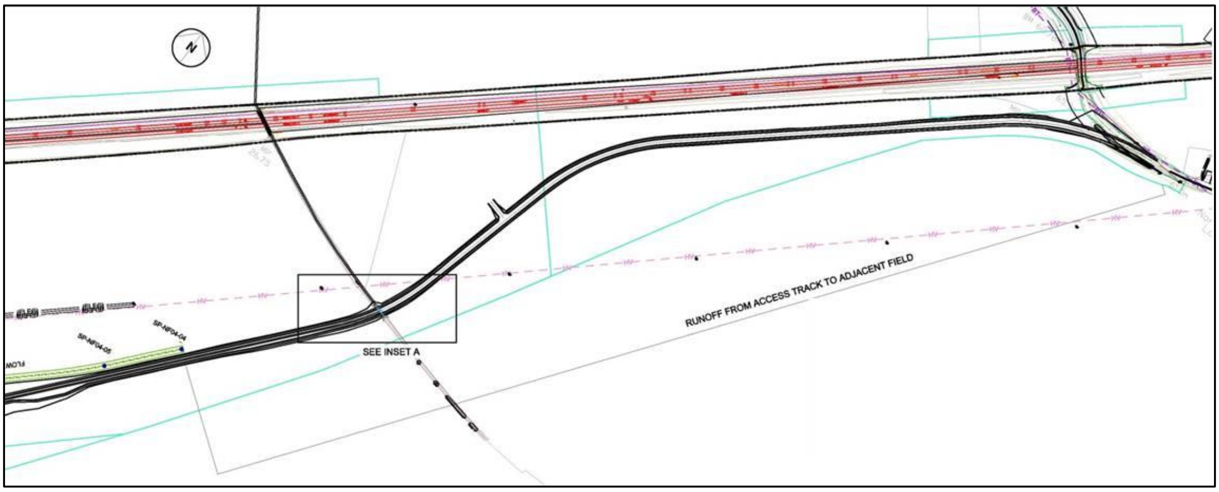

Figure 3 – Eastern Section of the Access Track with no Formal Drainage Network and Surface Water Allowed to Runoff onto Adjacent Farmland and allowed to Infiltrate at Natural Rates.

5 Conclusion

The proposed drainage arrangements at AP13 Northfield Farm Overbridge will achieve the target discharge rates presented in Table 2. This will ensure that post-development runoff rates from this development are reduced to pre-development equivalents for the 1 in 100 year plus climate change event. We consider that the information provided in this surface water drainage assessment is sufficient to comply with Condition 13 of the TWA Order and the surface water drainage requirements of NPPF.

Appendix 1 – Surface Runoff Calculations Methodology

1.1 Introduction

Guidance issued by DEFRA[2] states that post development the stormwater runoff discharges from urban developments should approximate to the site greenfield response over an extended range of storm frequencies of occurrence (return periods). However, it is accepted that drainage proposals may be measured against the existing drainage performance of the site (brownfield). In addition the peak rate of runoff into a watercourse should be no greater than the undeveloped rate of runoff, although similarly exceptions apply where it is not practical to achieve this. The guidance outlines methodologies for estimating storage volumes for stormwater control for development sites and also provides methodologies for the estimation of peak rates of runoff from greenfield sites.

For clarification, the greenfield rate refers to the volumes and peak flows associated with an undeveloped site whilst brownfield relates to a site which has been previously developed hence a proportion of the site is impermeable.

As part of the East West Rail Phase 1 development surface water runoff volumes for greenfield and brownfield conditions are required. In addition, peak runoff rates are also required for greenfield and brownfield conditions. Section 1.2 outlines the methodology for the estimation of the surface water runoff volumes whilst Section 1.3 outlines the methodology for estimating the peak runoff rates. Note that there is no guidance on estimating brownfield peak runoff rates, and the guidance states that greenfield runoff rates should be considered as indicative only due to the limitations of the methodologies.

1.2 Surface Water Runoff Methodology

The DEFRA guidance recommends the use of Institute of Hydrology Report 124 (IH124)[3] for estimating surface water runoff. However, recent research into flood design for small catchments[4] suggests that the FEH statistical method[5] and the Revitalised Flood Hydrograph (ReFH)[6] event-based method both outperform the older methods. The report states that these are applicable across the range of catchment sizes used in their development and that the continued recommendation of outdated methods such as IH124 and ADAS 345 is inappropriate. The research notes that there is little evidence to suggest that the accuracy of the FEH methods when applied to ungauged catchments is particularly scale dependent and recommends the use of current versions of the FEH statistical approach or the ReFH rainfall-runoff model except on highly permeable (BFIHOST > 0.65) or urbanised catchments (URBEXT2000>0.15) where the results of the ReFH model can be less reliable. The research recommends that for catchments smaller than 0.5 km^2 and plot scale, which is relevant for the development sites within the East West Rail Phase 1 development, runoff estimates should be derived from FEH methods applied to the nearest suitable catchment above 0.5 km^2 for which descriptors can be derived from the FEH CD-ROM and scaled down by the ratio of catchment areas.

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[2] Kellagher R, 2012, Preliminary rainfall runoff management for developments, DEFRA R&D Technical Report W5-074/A/TR/1 Revision E

[3] Marshall D, C, W. Bayliss, A, C,. Flood Estimation for small catchments. Institute of Hydrology Report 124.

[4] Environment Agency, 2012, Estimating flood peaks and hydrographs for small catchments: Phase 1, SC090031

[5] Robson, A.J. and Reed, D.W. (1999) Statistical procedures for flood frequency estimation. Volume 3 of the Flood Estimation Handbook. Centre for Ecology & Ecology.

[6] NERC (CEH). 2005. Revitalised FSR/FEH rainfall runoff method. Spreadsheet application version 1.4.http://www.ceh.ac.uk/feh2/SpreadsheetimplementationofReFH.html

Following the guidance, and taking into account this research, greenfield runoff hydrographs were calculated using 6.25 hour duration design rainfall events for the required return period event using a conjunction of the IH124 and ReFH rainfall runoff method.

IH124

Greenfield peak runoff rates have been calculated using the small catchment statistical method, IH124 methodology, in conjunction with the growth curves factors specified within the NERC Flood Studies Supplementary Reports 2[7] and 14[8]

A catchment area of 50 ha was assumed for each site with the results expressed as runoff rates per unit area to facilitate scaling to the development area. A key catchment descriptor within the method is the soil class(es) as defined by the Winter Rainfall Acceptance Potential (WRAP) map[9]. This is an extremely coarse map which is mapped at a scale of 1:625,000 and as such does not contain sufficient information for determining local soil and underlying substrate permeability. At design level the selection of appropriate soil class values would be informed by local soil maps coupled within infiltration tests. For the purposes of defining runoff rates for this assessment the soil permeability classes and substrate classes within the Hydrology of Soil Types (HOST) classification[10] were used to guide soil class selection. The HOST classification has replaced the WRAP map in all current flood estimation procedures.

ReFH

Given that there is no available flood event data on which to calibrate the ReFH model, the catchment descriptors for each site were obtained from the FEH CD ROM v3. The nearest 1km cell to each site was used to obtain the rainfall parameters required for the rainfall Depth Duration Frequency (DFF) ReFH model. Where this is not possible catchment scale parameters were obtained for the nearest small river reach.

The ReFH model was run using the 6.25 hour event for the 1 in 1 year, 1 in 30 year and 1in 100 year events. Allowances for climate change were made for the 1:100 year event by increasing the rainfall intensity by 30% in accordance with current Planning Policy Statement guidance[11]. Note that current DEFRA[12] guidance advises increasing rainfall intensities by 20% for 2080 and beyond, so the adopted values are conservative. A catchment area of 50 hectares was assumed and results are then scaled to the site level.

Development of final runoff rates

The ReFH and IH124 methodologies produce independent runoff rates for the given return periods. Current research into small catchments[13] indicates that more recent methodologies are generally more reliable that the older (IH124) methodologies. The differences between the peak runoff rates were resolved by adjusting the BFIHOST or WRAP classes. For most of the sites the peak runoff from

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[7] Faulkner, D.S. 1999. Rainfall Frequency Estimation. Flood Estimation Handbook Vol. 2, Institute of Hydrology, Wallingford, UK.
[8] Institute of Hydrology,1983 Review of regional growth curves. Flood Studies Supplementary Report 14. Institute of Hydrology, Wallingford, UK
[9] Natural Environment Research Council, 1975. Flood Studies Report.
[10] Boorman, D. B., Hollis, J. M. and Lilly, A., Hydrology of soil types: a hydrologically-based classification of the soils of the United Kingdom. Institute of Hydrology Report 126.
[11] Communities and Local government (CLG), 2010, Planning Policy Statement 25.
[12] Kellagher R, 2012, Preliminary rainfall runoff management for developments, DEFRA R&D Technical Report W5-074/A/TR/1 Revision E
[13] Environment Agency, 2012, Estimating flood peaks and hydrographs for small catchments: Phase 1, SC090031.

IH124 was rescaled to be similar to ReFH. Since ReFH is not considered as reliable in high permeability catchments (taken to be where the BFIHOST is greater than 0.6) in highly permeable catchments the IH124 estimates for peak runoff were given a greater weighting.

Calculation of current brownfield and potential post development runoff volumes

The assessment of current brownfield and potential post-development runoff volumes for each return period is conducted:

- by assuming a runoff coefficient of unity for impermeable areas;
- calculating a gross direct runoff volume by taking the product of the areal extent of the impermeable area and the corresponding rainfall event profile;
- calculating the equivalent greenfield runoff profile for the impermeable area by taking the product of the greenfield runoff hydrograph (expressed in units of runoff per unit area) and the impermeable areas, and estimating the net runoff volume for the impermeable area.

This nett runoff volume represents the runoff volume that has to be captured, and preferably infiltrated to maintain runoff at the greenfield rate. For the 1:100 year event the runoff calculations have included an overall increase in event rainfall depth of 30% for the impermeable runoff estimate to allow for climate change.

Surfaces assumed to be impermeable in this outline design level assessment include roofs, car parks, pavements, roads, bridge structures and platforms. As such this represents a worst case scenario as it ignores the detailed design potential for at-source mitigation.

1.3 Brownfield Peak Runoff

The greenfield peak runoff can be obtained from the IH124 and ReFH methodologies. However, DEFRA[14] do not provide guidance on producing peak runoff for brownfield sites. Whilst ideally runoff volumes and peak runoff should be returned to the greenfield level, it is accepted that this is not always possible. In these circumstances maintaining the current runoff or peak flows is acceptable hence brownfield peak runoff values are required.

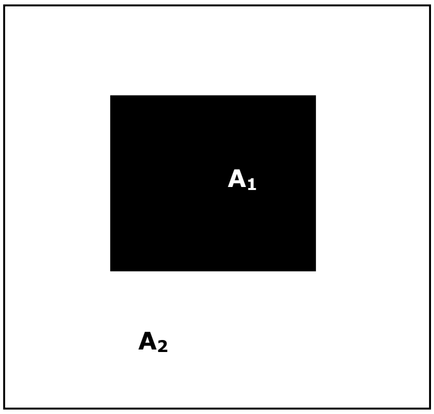
It is widely accepted that increasing the impermeable extents within a catchment, or development site in this case, increases runoff volume and decrease the response time within the catchment[15].

The following methodology has been developed to calculate the Brownfield peak flow:

1) Consider a site to contain an impermeable surface of area A_1 (m^2) and permeable surface of area A_2 (m^2), as per diagram below

[14] Kellagher R, 2012, Preliminary rainfall runoff management for developments, DEFRA R&D Technical Report W5-074/A/TR/1 Revision E

[15] Chow V. T., Maidment D. R. and Mays L. W., 1988, Applied Hydrology, McGraw-Hill, New York, USA.



2) Calculations within ReFH assume that A_1 and A_2 are both greenfield hence we already have the design rainfall *P* (mm) and the greenfield runoff *Q* (mm) for the design hydrograph.

3) For a completely impermeable surface, A_1 and A_2 are impermeable, the following is proposed:

$$Q = 0.7 \times P + 0.3 \times Q$$

It is assumed that 70% of the rainfall becomes direct runoff. The value of 70% is used as this is generally recommended for use within the UK[16,17]. A proportion of the rainfall is also delayed through the system and this is reflected by adding 30% of the greenfield runoff.

The result is a hydrograph which has a faster time to peak, higher peak and greater total runoff than the greenfield hydrograph.

4) For a mixed impermeable/greenfield site these two components are combined according to the proportion of each within the development site.

$$Q = \left[\frac{A_2}{A_1 + A_2} \times Q\right] + \left[\frac{A_1}{A_1 + A_2} \times 0.7 \times P\right] + \left[\frac{A_1}{A_1 + A_2} \times 0.3 \times Q\right]$$

5) The peak flows can then be extracted from the hydrographs and rescaled to cumecs.

[16] Institute of Hydrology, 1999, Flood Estimation Handbook, Vols 1 – 5.
[17] Department of Environment/National Water Council, 1981, Design and analysis of Urban Storm Drainage:the Wallingford Procedure, National Water Council, UK.

An example is presented within Figure 4.

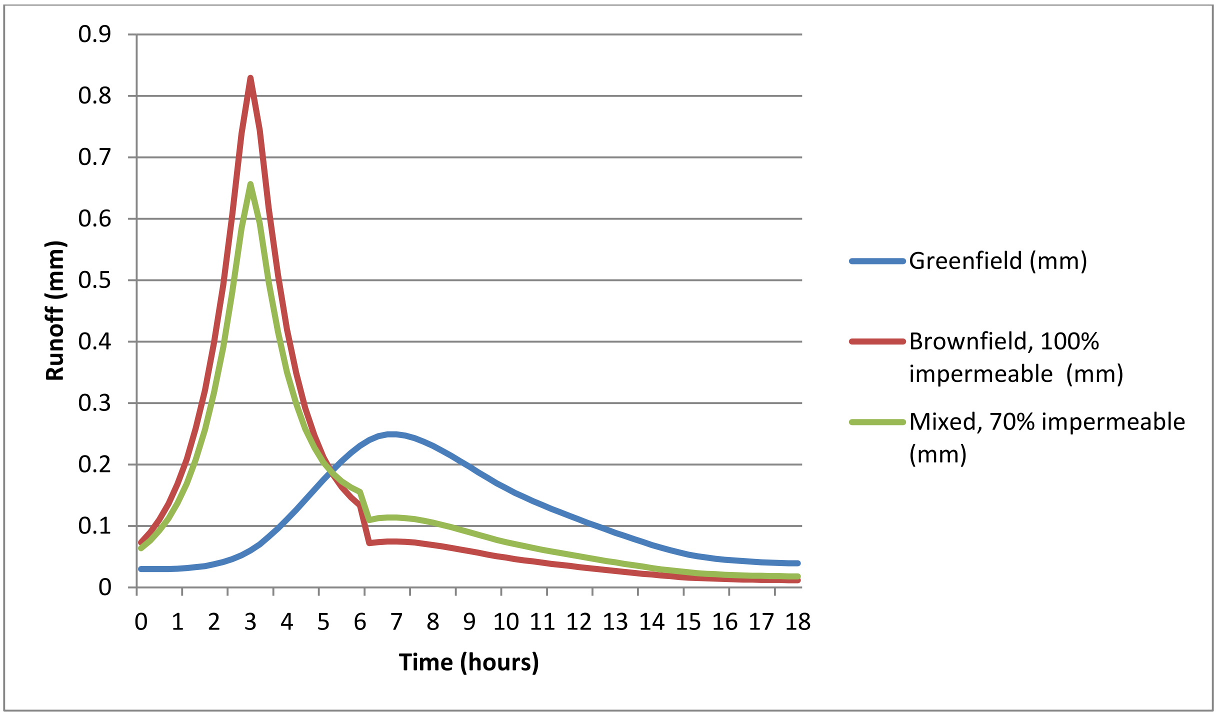


Figure 4 Example Hydrograph for a Greenfield, 100% impermeable and 70% impermeable site.

1.4 Determining the development site area

For most sites the development site considered is the same as the footprint of the development thus the post development will be 100% impermeable. i.e. if a footbridge is being built then the footprint of the footbridge is considered to be the development site and the site is initially 100% greenfield and post development 100% impermeable.

Some sites are more complex, for example the development of Islip and Water Eaton Parkway Stations. The proposal indicates that the aim will be to retain the runoff associated with the existing site (or greenfield where possible) which means that agreement of the development site extent may affect the amount of flood storage which must be allowed for. In these cases the development site is considered to be the addition of the existing and proposed development site. Post development all sites will be 100% impermeable unless land at any of the sites is returned to greenfield which is unlikely. This is illustrated for Islip Station, Figure 2, where the development site is the combined area of existing and proposed developments.

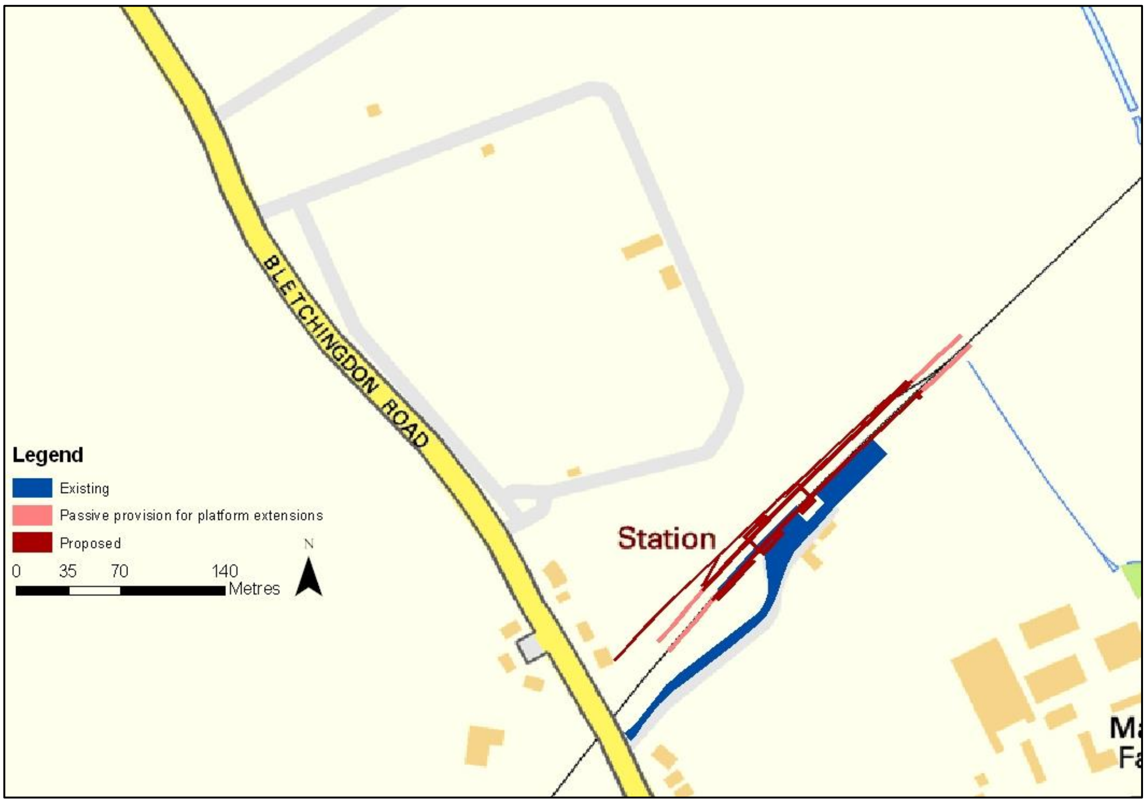
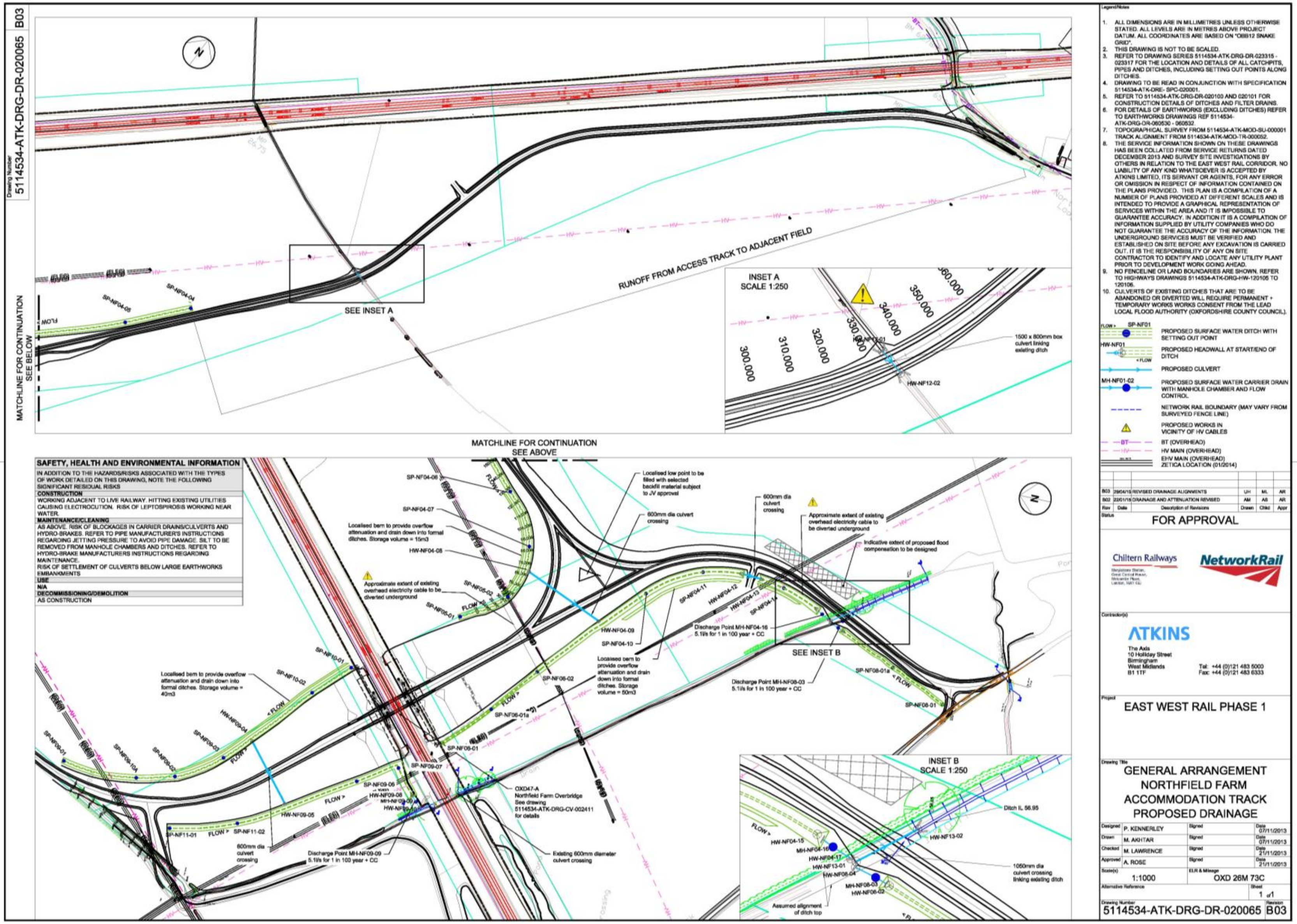


Figure 5 Existing and post development site at Islip Station.

Appendix 2 – (AP13) Northfield Farm Overbridge Drainage Design


Drawing Number
5114534-ATK-DRG-DR-020065 B03
SEE INSET A
RUNOFF FROM ACCESS TRACK TO ADJACENT FIELD
MATCHLINE FOR CONTINUATION SEE BELOW
INSET A
SCALE 1:250
1500 x 800mm box culvert linking existing ditch
HW-NF12-02
MATCHLINE FOR CONTINUATION SEE ABOVE
SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
IN ADDITION TO THE HAZARDS/RISKS ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS
CONSTRUCTION
WORKING ADJACENT TO LIVE RAILWAY. HITTING EXISTING UTILITIES CAUSING ELECTROCUTION. RISK OF LEPTOSPIROSIS WORKING NEAR WATER.
MAINTENANCE/CLEANING
AS ABOVE. RISK OF BLOCKAGES IN CARRIER DRAINS/CULVERTS AND HYDRO-BRAKES. REFER TO PIPE MANUFACTURER'S INSTRUCTIONS REGARDING JETTING PRESSURE TO AVOID PIPE DAMAGE. SILT TO BE REMOVED FROM MANHOLE CHAMBERS AND DITCHES. REFER TO HYDRO-BRAKE MANUFACTURERS INSTRUCTIONS REGARDING MAINTENANCE.
RISK OF SETTLEMENT OF CULVERTS BELOW LARGE EARTHWORKS EMBANKMENTS
USE
N/A
DECOMMISSIONING/DEMOLITION
AS CONSTRUCTION
Localised low point to be filled with selected backfill material subject to JV approval
600mm dia culvert crossing
Approximate extent of existing overhead electricity cable to be diverted underground
Indicative extent of proposed flood compensation to be designed
Localised bem to provide overflow attenuation and drain down into formal ditches. Storage volume = 15m3
Discharge Point MH-NF04-16 5.1l/s for 1 in 100 year + CC
SEE INSET B
Discharge Point MH-NF08-03 5.1l/s for 1 in 100 year + CC
Localised bem to provide overflow attenuation and drain down into formal ditches. Storage volume = 40m3
OXD47-A
Northfield Farm Overbridge
See drawing 5114534-ATK-DRG-CV-002411 for details
Discharge Point MH-NF09-09 5.1l/s for 1 in 100 year + CC
Existing 600mm diameter culvert crossing
INSET B
SCALE 1:250
Ditch IL 56.95
1050mm dia culvert crossing linking existing ditch
Assumed alignment of ditch top
Legend/Notes
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED. ALL LEVELS ARE IN METRES ABOVE PROJECT DATUM. ALL COORDINATES ARE BASED ON "OBB12 SNAKE GRID".
2. THIS DRAWING IS NOT TO BE SCALED.
3. REFER TO DRAWING SERIES 5114534-ATK-DRG-DR-023315 - 023317 FOR THE LOCATION AND DETAILS OF ALL CATCHPITS, PIPES AND DITCHES, INCLUDING SETTING OUT POINTS ALONG DITCHES.
4. DRAWING TO BE READ IN CONJUNCTION WITH SPECIFICATION 5114534-ATK-DRE- SPC-020001.
5. REFER TO 5114534-ATK-DRG-DR-020100 AND 020101 FOR CONSTRUCTION DETAILS OF DITCHES AND FILTER DRAINS.
6. FOR DETAILS OF EARTHWORKS (EXCLUDING DITCHES) REFER TO EARTHWORKS DRAWINGS REF 5114534-ATK-DRG-DR-060530 - 060532.
7. TOPOGRAPHICAL SURVEY FROM 5114534-ATK-MOD-SU-000001 TRACK ALIGNMENT FROM 5114534-ATK-MOD-TR-000052.
8. THE SERVICE INFORMATION SHOWN ON THESE DRAWINGS HAS BEEN COLLATED FROM SERVICE RETURNS DATED DECEMBER 2013 AND SURVEY SITE INVESTIGATIONS BY OTHERS IN RELATION TO THE EAST WEST RAIL CORRIDOR. NO LIABILITY OF ANY KIND WHATSOEVER IS ACCEPTED BY ATKINS LIMITED, ITS SERVANT OR AGENTS, FOR ANY ERROR OR OMISSION IN RESPECT OF INFORMATION CONTAINED ON THE PLANS PROVIDED. THIS PLAN IS A COMPILATION OF A NUMBER OF PLANS PROVIDED AT DIFFERENT SCALES AND IS INTENDED TO PROVIDE A GRAPHICAL REPRESENTATION OF SERVICES WITHIN THE AREA AND IT IS IMPOSSIBLE TO GUARANTEE ACCURACY. IN ADDITION IT IS A COMPILATION OF INFORMATION SUPPLIED BY UTILITY COMPANIES WHO DO NOT GUARANTEE THE ACCURACY OF THE INFORMATION. THE UNDERGROUND SERVICES MUST BE VERIFIED AND ESTABLISHED ON SITE BEFORE ANY EXCAVATION IS CARRIED OUT. IT IS THE RESPONSIBILITY OF ANY ON SITE CONTRACTOR TO IDENTIFY AND LOCATE ANY UTILITY PLANT PRIOR TO DEVELOPMENT WORK GOING AHEAD.
9. NO FENCELINE OR LAND BOUNDARIES ARE SHOWN. REFER TO HIGHWAYS DRAWINGS 5114534-ATK-DRG-HW-120105 TO 120106.
10. CULVERTS OF EXISTING DITCHES THAT ARE TO BE ABANDONED OR DIVERTED WILL REQUIRE PERMANENT + TEMPORARY WORKS WORKS CONSENT FROM THE LEAD LOCAL FLOOD AUTHORITY (OXFORDSHIRE COUNTY COUNCIL).
PROPOSED SURFACE WATER DITCH WITH SETTING OUT POINT
PROPOSED HEADWALL AT START/END OF DITCH
PROPOSED CULVERT
PROPOSED SURFACE WATER CARRIER DRAIN WITH MANHOLE CHAMBER AND FLOW CONTROL
NETWORK RAIL BOUNDARY (MAY VARY FROM SURVEYED FENCE LINE)
PROPOSED WORKS IN VICINITY OF HV CABLES
BT (OVERHEAD)
HV MAIN (OVERHEAD)
EHV MAIN (OVERHEAD) ZETICA LOCATION (01/2014)
B03 29/04/15 REVISED DRAINAGE ALIGNMENTS UH ML AR
B02 22/01/15 DRAINAGE AND ATTENUATION REVISED AM AS AR
Rev Date Description of Revisions Drawn Chkd Appr
Status
FOR APPROVAL
Chiltern Railways
NetworkRail
Contractor(s)
ATKINS
The Axis
10 Holliday Street
Birmingham
West Midlands
B1 1TF
Tel: +44 (0)121 483 5000
Fax: +44 (0)121 483 6333
Project
EAST WEST RAIL PHASE 1
Drawing Title
GENERAL ARRANGEMENT
NORTHFIELD FARM
ACCOMMODATION TRACK
PROPOSED DRAINAGE
Designed P. KENNERLEY Date 07/11/2013
Drawn M. AKHTAR Date 07/11/2013
Checked M. LAWRENCE Date 21/11/2013
Approved A. ROSE Date 21/11/2013
Scale(s) 1:1000
ELR & Mileage OXD 26M 73C
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Drawing Number
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Revision B03