Addendum to Flood Risk Assessment
Land at North-West Haverhill

September 2010

BIDWELLS

www.mlm.uk.com

North West Haverhill Urban Extension

Addendum No.1

to

Flood Risk Assessment & Drainage Strategy dated 13 February 2009

MLM Consulting Engineers Ltd
North Lodge
25 London Road
Ipswich
Suffolk
IP1 2HF

T: 01473 231100
F: 01473 231515
E: steve.cox@mlm.uk.com
W: www.mlm.uk.com

Project Ref: JJH/612263/JRC
Date: 20 September 2010
Revision: 1

Prepared: ..... James Calvert
Chartered Engineer

Checked: ..... Steve Cox
Director

Approved: ..... John Hawkins
Director

Contents

Appendices

Appendix A MLM Drawings

- 612263/541 – Section Through Storage Crates and Chapel Farm Park Allotments
- 612263/542 – Section Through Storage Pond to Existing Ditch
- 612263/543 – Section Through Storage Pond to Flow Control Manhole
- 612263/544 – Section Through Storage Pond to Flow Control Manhole
- 612263/545 - Section Through Storage Pond at Linear Park West
- 612263/550 – Watercourse Catchment Plan
- 612263/600 – Surface Water Drainage Strategy Sheet 1 of 29
- 612263/601 – Surface Water Drainage Strategy Sheet 2 of 29
- 612263/602 – Surface Water Drainage Strategy Sheet 3 of 29
- 612263/603 – Surface Water Drainage Strategy Sheet 4 of 29
- 612263/604 – Surface Water Drainage Strategy Sheet 5 of 29
- 612263/605 – Surface Water Drainage Strategy Sheet 6 of 29
- 612263/606 – Surface Water Drainage Strategy Sheet 7 of 29
- 612263/607 – Surface Water Drainage Strategy Sheet 8 of 29
- 612263/608 – Surface Water Drainage Strategy Sheet 9 of 29
- 612263/609 – Surface Water Drainage Strategy Sheet 10 of 29
- 612263/610 – Surface Water Drainage Strategy Sheet 11 of 29
- 612263/611 – Surface Water Drainage Strategy Sheet 12 of 29
- 612263/612 – Surface Water Drainage Strategy Sheet 13 of 29
- 612263/613 – Surface Water Drainage Strategy Sheet 14 of 29
- 612263/614 – Surface Water Drainage Strategy Sheet 15 of 29
- 612263/615 – Surface Water Drainage Strategy Sheet 16 of 29
- 612263/616 – Surface Water Drainage Strategy Sheet 17 of 29
- 612263/617 – Surface Water Drainage Strategy Sheet 18 of 29
- 612263/618 – Surface Water Drainage Strategy Sheet 19 of 29
- 612263/619 – Surface Water Drainage Strategy Sheet 20 of 29
- 612263/620 – Surface Water Drainage Strategy Sheet 21 of 29
- 612263/621 – Surface Water Drainage Strategy Sheet 22 of 29
- 612263/622 – Surface Water Drainage Strategy Sheet 23 of 29
- 612263/623 – Surface Water Drainage Strategy Sheet 24 of 29
- 612263/624 – Surface Water Drainage Strategy Sheet 25 of 29
- 612263/625 – Surface Water Drainage Strategy Sheet 26 of 29
- 612263/626 – Surface Water Drainage Strategy Sheet 27 of 29
- 612263/627 – Surface Water Drainage Strategy Sheet 28 of 29
- 612263/628 – Surface Water Drainage Strategy Sheet 29 of 29

Appendix B Microdrainage Calculations

- Microdrainage Printouts for Networks 1 to 10 (excluding Network 3)

Appendix C Correspondence

- Letter MLM to Bidwells 12 March 2010
- Email EA to MLM 19 March 2010
- Email MLM to EA 29 March 2010
- Letter EA to SEBC 14 April 2010
- Letter MLM to AW 15 September 2010

1 Introduction

1.1 This Addendum to the Flood Risk Assessment has been prepared on behalf of The North West Haverhill Consortium of Landowners and relates to a planning application submitted to St Edmundsbury Borough Council (SEBC) on 30 April 2009. The application seeks planning permission for the development of approximately 48 hectares (ha) of land to the north west of Haverhill for a new urban extension to the town and associated relief road comprising "mixed use development including construction of relief road and associated works and landscaping buffer; residential development, a primary school, local centre including retail and community uses, public open space, landscaping, infrastructure, servicing and other associated works" (Application Ref: SE/09/1283).

1.2 The FRA Addendum has been prepared following various amendments to the surface water drainage strategy in response to discussions and negotiations which have taken place in relation to the application since its registration on 30 October 2010. It specifically responds to various concerns expressed by the Environment Agency (EA), Anglian Water (AW) and the Local Planning Authority, St Edmundsbury Borough Council (SEBC) in relation to the surface water drainage strategy. The FRA Addendum updates and should be read in conjunction with the April 2009 Flood Risk Assessment submitted with the planning application.

2 Environment Agency Requirements

2.1 As part of the consultation in relation to the planning application, the proposals for the surface water drainage were the subject of an objection by the Environment Agency (EA) (ref: AC/2009/110413/02-L01 shown in Appendix C) as they considered that the surface water proposals were not sufficiently developed to demonstrate how run-off from the proposed development would be attenuated on site and discharged at rates not exceeding existing greenfield run-off rates.

2.2 In response to the EA's concerns, surface water modelling was undertaken using Microdrainage Software to demonstrate how the surface water run-off from the site would be collected, routed, attenuated and discharged from the site. These calculations demonstrated that discharge rates from the site could be restricted to the equivalent existing greenfield run-off rates of:

Return Period (years)	Greenfield Run-off Rate (l/s/ha)
1	1.99
30	5.41
100	7.43

2.3 Surface water drainage calculations (Microdrainage) and drawings were issued to the Environment Agency (EA) on 12 March 2010. Further clarification was sought by the EA on 19 March 2010 and this additional information was issued to the EA on 29 March 2010.

2.4 Following the submission of the surface water drainage information to the EA a response was received on 14 April 2010. In its response, although the EA maintained its objection to the development due to Anglian Water (AW) not having accepted the discharges into its sewers, it did state that the information submitted in respect of the surface water drainage strategy “is sufficient for an outline planning application for a major development”.

2.5 Although the EA were satisfied that the surface water run-off from the site could be managed and discharged at equivalent existing greenfield run-off rates, the layout did not meet the requirements of the Local Planning Authority (LPA). A meeting was held on 06 August 2010 with LPA representatives to discuss its requirements.

2.6 Discussions were also held with AW regarding the connection of two ditches to AW sewers in Gurlings Close and Forest Glade. AW required proof that the watercourses connected into its sewers and that a CCTV survey should be undertaken to demonstrate the connections.

3 Local Planning Authority (LPA) Requirements

3.1 During the consultation on the planning application the LPA expressed concerns that the proposed surface water drainage layout would place a significant maintenance burden on them due to a reliance on below ground attenuation crates. The Council did not want to adopt below ground storage due to the potential difficulties and cost of maintenance associated with them. A meeting was held on 06 August 2010 with LPA representatives to discuss its requirements in detail.

3.2 One of the main areas of concern was the 850m^2 attenuation tank within the area adjacent to Chapel Farm Park which is allocated for allotments. Discussions around this area in particular have led to the proposal to build in a rainwater harvesting capability into the design.

3.3 The LPA also wished to see more open features such as ponds, swales and rills within the design to provide a more sustainable approach and create a more pleasant feel to the residential areas within the development.

3.4 It was agreed that the surface water drainage system would be remodelled to achieve:

- Removal of below ground attenuation from areas of public open space generally, except beneath the allotments and at the east end of the site where additional storage should be provided to provide water for irrigation. It was agreed that in these particular locations the LPA would be potentially willing to adopt the below ground attenuation systems.

- Below ground attenuation elsewhere to be provided in car parking areas within the residential areas, which would not require LPA adoption. Instead their maintenance would be by a management company set up to maintain shared private areas.

- Increase in the use of swales/rills across the site. It was discussed that these features are only practicable for storage purposes where the roads run parallel with the contours, but could be used for conveyance on steeper slopes.

4 Drainage Design

4.1 The drainage design was previously split into eight networks all with separate outfalls to one of the three watercourses that cross the site. The areas that were required to be amended were residential areas 1 to 5 inclusive. Residential areas 6 to 8 inclusive were not required to be amended as they contained no below ground attenuation in locations where they would be adopted by the LPA, except at the eastern extent as noted in Section 3.4.

4.2 To eliminate the need for below ground attenuation in some areas, the flow rate into the sewers within the highway network needs to be minimised. These sewers discharge to attenuation ponds adjacent to the watercourses. The public open space suitable for attenuation and adjacent to the watercourses is limited, therefore the space available for attenuation ponds is small. This problem is accentuated by the land available being typically sloping as per the majority of the site.

4.3 To limit the flow to the sewers, each of the residential areas 1 to 5 was remodelled to provide below ground attenuation in areas which will form parking courts within each block of housing. The discharge from each of these was limited to a maximum of 5l/s to minimise the attenuation requirement in the ponds at the bottom of the drainage networks.

4.4 The results of the remodelling of these drainage networks are contained within **Appendix B** with drawings showing the revised layout contained in **Appendix A.** Areas 2, 4 and 5 were remodelled with the outfall locations and the allowable discharge rates remaining the same as the original drainage model.

4.5 Areas 1 and 3 were treated differently from the other remodelled areas. This was due to the available space for a pond at the outfall for network 3 being extremely limited and therefore there not being sufficient open storage at this location. To resolve this issue, areas 1 and 3 were combined in one model. This allowed the drainage from this new combined catchment area to have two outfalls into watercourse A. To model this, a hydrobrake was used to control the discharge from the first pond (previously the crate storage and discharge from Area 3) with an offline weir also modelled at the same node. The discharge from the weir overflow was routed to a swale which was the head of a run in the original Area 1 model. This arrangement allows the maximum discharge from the former Area 3 to be discharged into the watercourse at this location whilst not causing flooding or uncontrolled discharge to the watercourse at this location. The effect of overflowing some of the water from the original Area 3 into Area 1 was to require an increase in the size of the pond at the second outfall (originally the outfall for Area 1).

4.6 The new combined network (labelled residential area 1) includes below ground attenuation within each of the car parking areas serving residential blocks.

4.7 The total discharge from the two discharge locations (ponds) for the combined network is the same as the combined discharge from the previous networks 1 and 3. To demonstrate this, the two outfalls are linked in the model by including the existing watercourse and taking the final outfall from the system to be a length of the watercourse downstream of the second outfall.

4.8 The remodelled drainage meets the requirement of not exceeding the existing greenfield discharge rates that had been accepted by the EA in the previous drainage design. This is in accordance with both Planning Policy Statement 25 (PPS25) Development and Flood Risk and CIRIA document C697 The SUDS Manual. Through the use of rainwater harvesting within storage tanks, not least for use within the allotments but also as a source of water for the maintenance of open spaces, the volume of run-off from the site will also be reduced, this is also in accordance with CIRIA C697.

4.9 The models show a small volume of flooding in the 100 year climate change events. This minor flooding will be contained within the road ways and routed to the ponds for attenuation. There will be no uncontrolled discharge off site.

4.10 Please note that the numbering system for the residential areas has been amended due to the increase in the number of pipe runs needed in the new models. The table below summarises the changes:

Residential Area	Previous Pipe Numbers	New Pipe Numbers
1	1.000 to 15.000	100.000 series
2	20.000 to 37.000	200.000 series
3	40.000 to 46.000	Included in 100.000 series
4	50.000 to 60.000	400.000 series
5	70.000 to 78.000	500.000 series
6#	80.000 to 83.000	600.000 series
7#	90.000 to 100.000	700.000 series
8#	110.000 to 115.000	800.000 series
9*	N/A	900.000 series
10*	N/A	950.000 series

* = These new networks were previously in residential area 3 but now have separate outfalls.

= These networks have not been amended except for renumbering.

5 Anglian Water Approval

5.1 Two of the three receiving watercourses discharge to AW sewers to the south of the proposed development, one in a public space at the bottom of Gurlings Close and one in Forest Glade. The discharge locations can be seen on drawing 612263/550 in **Appendix A**.

5.2 CCTV investigation was undertaken to confirm the connection of the two watercourses to the AW sewers. The results of this were issued to AW on 15 September 2010, see letter in **Appendix C**. This letter sets out the findings of the CCTV survey and the proposed discharge rates to the two watercourses that connect to the AW sewers. The proposed maximum discharge rates are equivalent to the existing greenfield run-off rates for the 100 year return period and in fact provide betterment in that it is proposed to restrict run-off from the 100 year rainfall event including allowance for climate change, to the existing 100 year greenfield run-off rate.

6 Conclusions

6.1 The FRA Addendum has been prepared following various amendments to the surface water drainage strategy in response to discussions and negotiations which have taken place in relation to the application since its registration. It specifically responds to various concerns expressed by the Environment Agency, Anglian Water and St Edmundsbury Borough Council in relation to the surface water drainage strategy.

6.2 The surface water drainage networks have been remodelled following comments received from the Local Planning Authority.

6.3 The drainage designs for residential areas 1 to 5 inclusive have been remodelled to remove below ground attenuation from areas adoptable by the local authority, except in two areas, namely the allotments and the east of the site. The attenuation in these areas will be designed to provide a water resource to the allotment users and the Local Authority.

6.4 The discharge rates from the site are designed to be no greater than existing equivalent greenfield run-off rates. This includes for the 100 year rainfall event including allowance for climate change to discharge to the receiving watercourses at a rate not exceeding the existing 100 year greenfield run-off rate.

6.5 The revised drainage design decreases flood risk downstream of the site as the total volume discharged will be reduced by the rainwater harvesting features incorporated in the design.

6.6 Consequently, as a result of the proposed amendments to the surface water drainage design it is considered that the revised proposals effectively respond to the various consultation issues in relation to the surface water drainage strategy. The proposed development will not have any significant detrimental effects in terms of surface water drainage and flood risk and are fully compliant with PPS25 and relevant Development Plan policies. We therefore consider that there are no substantive drainage reasons why the proposals should not be granted planning permission by SEBC.

Appendix A - MLM Drawings

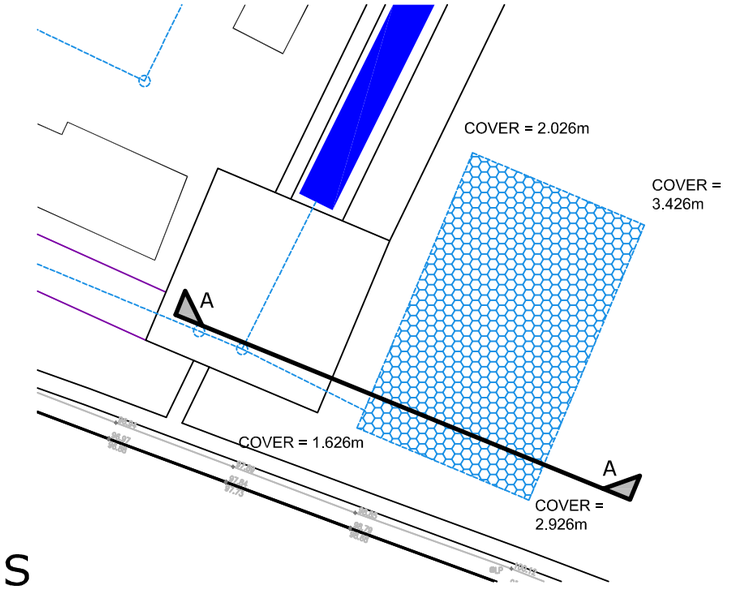
612263/541 – Section Through Storage Crates and Chapel Farm Park Allotments
612263/542 – Section Through Storage Pond to Existing Ditch
612263/543 – Section Through Storage Pond to Flow Control Manhole
612263/544 – Section Through Storage Pond to Flow Control Manhole
612263/545 - Section Through Storage Pond at Linear Park West
612263/550 – Watercourse Catchment Plan
612263/600 – Surface Water Drainage Strategy Sheet 1 of 29
612263/601 – Surface Water Drainage Strategy Sheet 2 of 29
612263/602 – Surface Water Drainage Strategy Sheet 3 of 29
612263/603 – Surface Water Drainage Strategy Sheet 4 of 29
612263/604 – Surface Water Drainage Strategy Sheet 5 of 29
612263/605 – Surface Water Drainage Strategy Sheet 6 of 29
612263/606 – Surface Water Drainage Strategy Sheet 7 of 29
612263/607 – Surface Water Drainage Strategy Sheet 8 of 29
612263/608 – Surface Water Drainage Strategy Sheet 9 of 29
612263/609 – Surface Water Drainage Strategy Sheet 10 of 29
612263/610 – Surface Water Drainage Strategy Sheet 11 of 29
612263/611 – Surface Water Drainage Strategy Sheet 12 of 29
612263/612 – Surface Water Drainage Strategy Sheet 13 of 29
612263/613 – Surface Water Drainage Strategy Sheet 14 of 29
612263/614 – Surface Water Drainage Strategy Sheet 15 of 29
612263/615 – Surface Water Drainage Strategy Sheet 16 of 29
612263/616 – Surface Water Drainage Strategy Sheet 17 of 29
612263/617 – Surface Water Drainage Strategy Sheet 18 of 29
612263/618 – Surface Water Drainage Strategy Sheet 19 of 29
612263/619 – Surface Water Drainage Strategy Sheet 20 of 29
612263/620 – Surface Water Drainage Strategy Sheet 21 of 29
612263/621 – Surface Water Drainage Strategy Sheet 22 of 29
612263/622 – Surface Water Drainage Strategy Sheet 23 of 29
612263/623 – Surface Water Drainage Strategy Sheet 24 of 29
612263/624 – Surface Water Drainage Strategy Sheet 25 of 29
612263/625 – Surface Water Drainage Strategy Sheet 26 of 29
612263/626 – Surface Water Drainage Strategy Sheet 27 of 29
612263/627 – Surface Water Drainage Strategy Sheet 28 of 29
612263/628 – Surface Water Drainage Strategy Sheet 29 of 29

NOTES

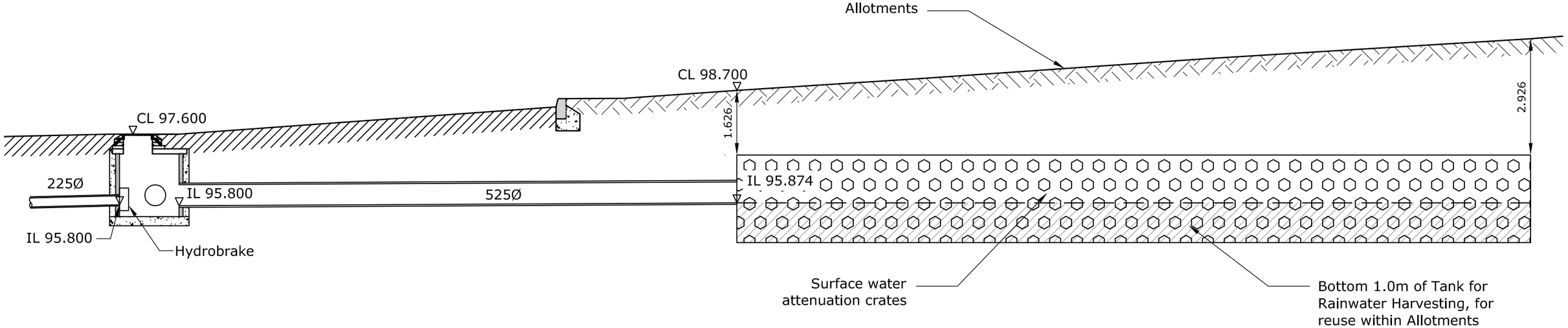
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM MLM PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.

3. DETAILS ARE PRELIMINARY; NOT FOR CONSTRUCTION



PLANS
NOT TO SCALE



SECTION A-A

Rev	Date	Description	Made	Ckd
B	14/09/10	Updated to suit revised layout	AS	
A	05/08/10	FIRST ISSUE	AP	JRC

MLM

Consulting Civil, Structural & Building Services Engineers

25, London Road, Ipswich, Suffolk IP1 2HF
Tel: 01473 231100 Fax: 01473 231515
Website: www.mlm.uk.com

Ashford * Cambridge * Chelmsford * London * Norwich.

Drawing Status: **INFORMATION**

Client: NORTH WEST HAVERHILL LANDOWNERS CONSORTIUM

Project: NORTH WEST HAVERHILL URBAN EXTENSION

Drg Title: SECTION THROUGH STORAGE CRATES AT CHAPEL FARM PARK ALLOTMENTS

Drawn	Checked	Approved	Date
AP	JRC	JJH	30/07/2010

Scales: 1:100 @ A3

Drg No.: 612263/541

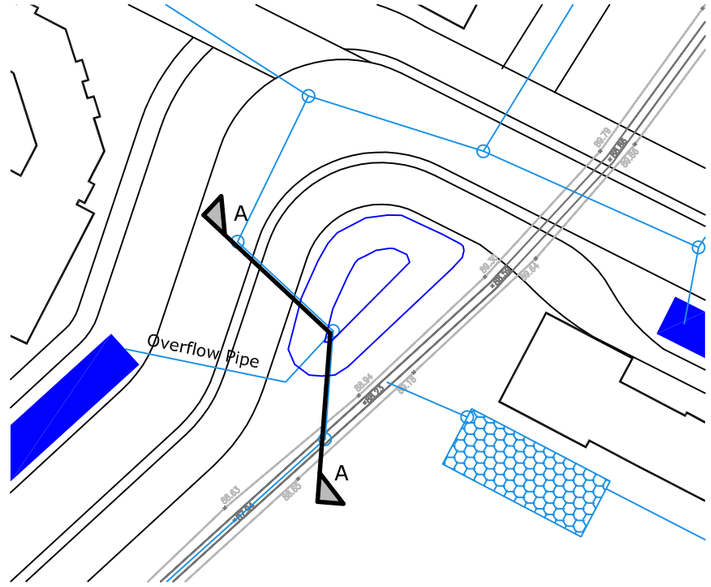
Rev: B

NOTES

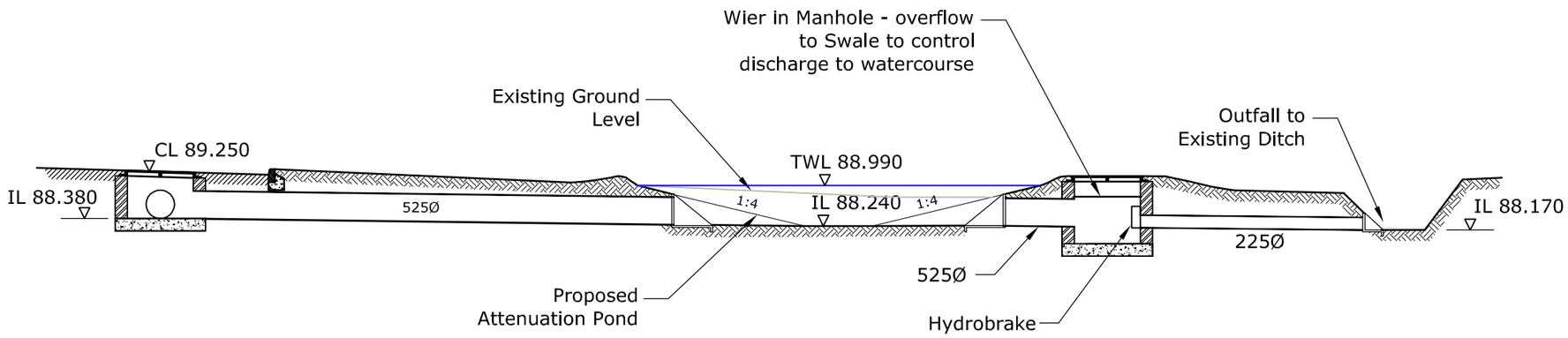
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM MLM PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.

3. DETAILS ARE PRELIMINARY; NOT FOR CONSTRUCTION



PLANS
NOT TO SCALE



SECTION A-A

Rev	Date	Description	Made	Ckd
A	14/09/10	FIRST ISSUE	AS	

MLM

Consulting Civil, Structural & Building Services Engineers
25, London Road, Ipswich, Suffolk IP1 2HF
Tel: 01473 231100 Fax: 01473 231515
Website: www.mlm.uk.com
Ashford * Cambridge * Chelmsford * London * Norwich.

Drawing Status: INFORMATION

Client: NORTH WEST HAVERHILL LANDOWNERS CONSORTIUM

Project: NORTH WEST HAVERHILL URBAN EXTENSION

Drg Title: SECTION THROUGH STORAGE POND TO EXISTING DITCH

Drawn	Checked	Approved	Date
AS	JRC	JJH	14/09/2010

Scales: 1:100 @ A3

Drg No.: 612263/542

Rev: A

NOTES

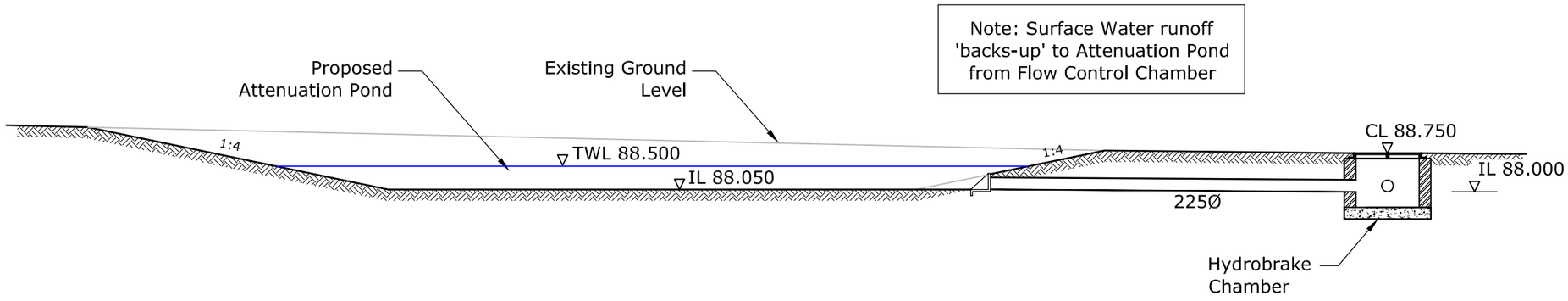
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM MLM PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.

3. DETAILS ARE PRELIMINARY; NOT FOR CONSTRUCTION

PLANS

NOT TO SCALE



SECTION A-A

Rev	Date	Description	Made	Ckd
A	14/09/10	FIRST ISSUE	AS	

MLM

Consulting Civil, Structural & Building Services Engineers

25, London Road, Ipswich, Suffolk IP1 2HF
Tel: 01473 231100 Fax: 01473 231515
Website: www.mlm.uk.com

Ashford * Cambridge * Chelmsford * London * Norwich.

Drawing Status: INFORMATION

Client: NORTH WEST HAVERHILL LANDOWNERS CONSORTIUM

Project: NORTH WEST HAVERHILL URBAN EXTENSION

Drg Title: SECTION THROUGH STORAGE POND TO FLOW CONTROL MANHOLE

Drawn	Checked	Approved	Date
AS	JRC	JJH	14/09/2010

Scales: 1:100 @ A3

Drg No.: 612263/543

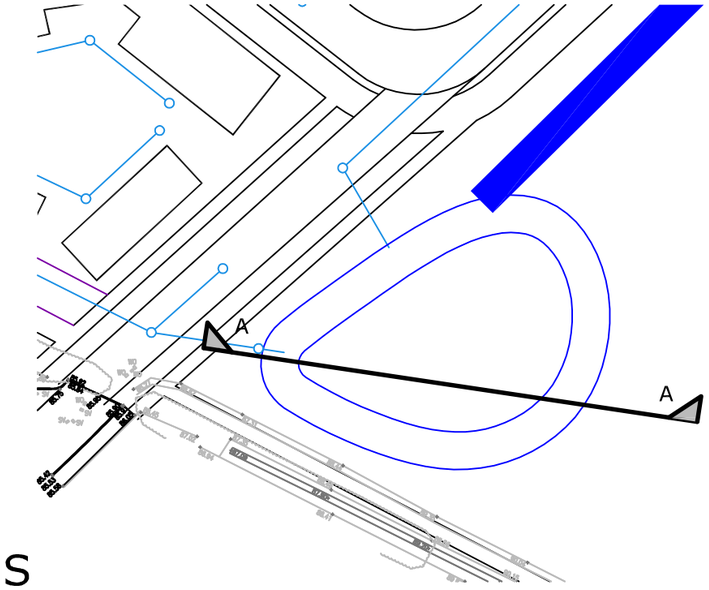
Rev: A

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

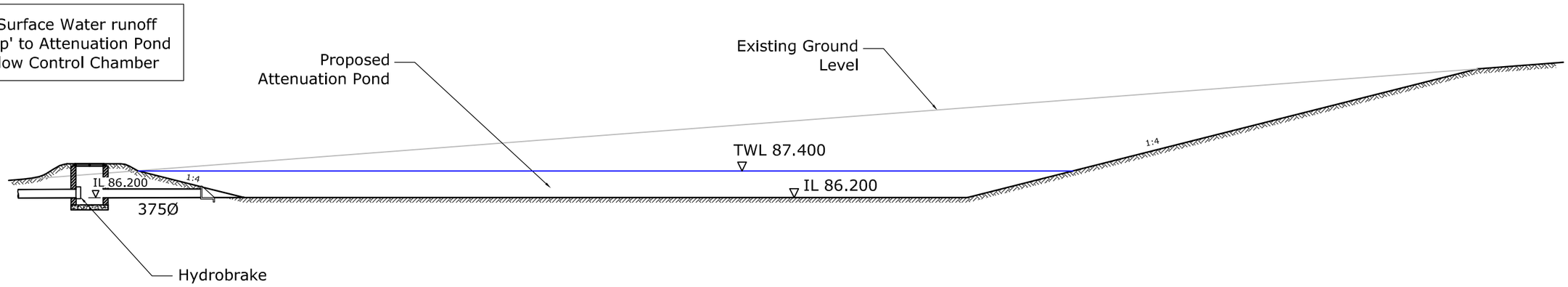
2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM MLM PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.

3. DETAILS ARE PRELIMINARY; NOT FOR CONSTRUCTION



PLANS

NOT TO SCALE



SECTION A-A

Rev	Date	Description	Made	Ckd
A	14/09/10	FIRST ISSUE	AS	

MLM

Consulting Civil, Structural & Building Services Engineers

25, London Road, Ipswich, Suffolk IP1 2HF
Tel: 01473 231100 Fax: 01473 231515
Website: www.mlm.uk.com

Ashford * Cambridge * Chelmsford * London * Norwich.

Drawing Status: INFORMATION

Client: NORTH WEST HAVERHILL LANDOWNERS CONSORTIUM

Project: NORTH WEST HAVERHILL URBAN EXTENSION

Drg Title: SECTION THROUGH STORAGE POND TO FLOW CONTROL MANHOLE

Drawn	Checked	Approved	Date
AS	JRC	JJH	14/09/2010

Scales: 1:50 @ A3

Drg No.: 612263/544

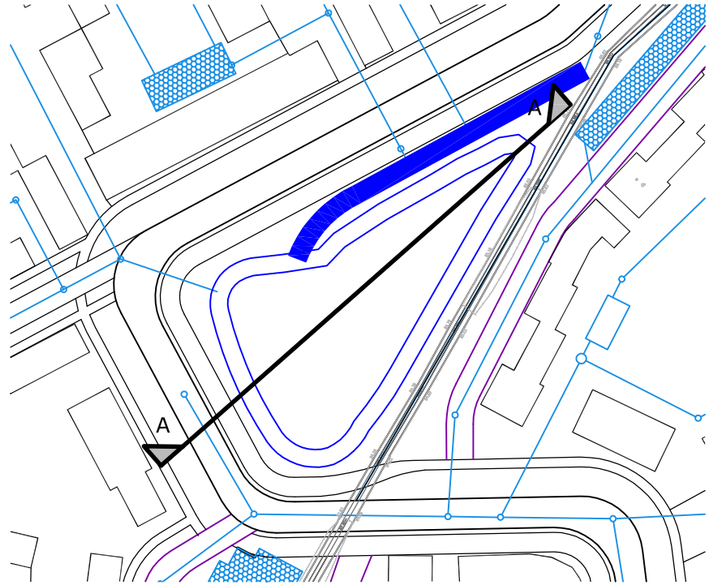
Rev: A

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

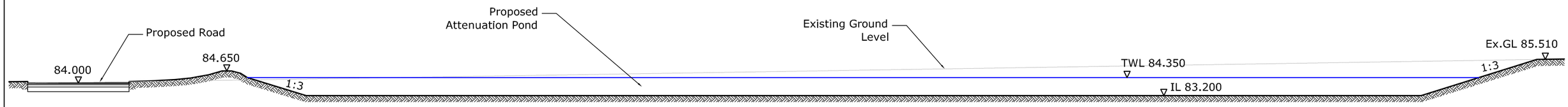
2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM MLM PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.

3. DETAILS ARE PRELIMINARY; NOT FOR CONSTRUCTION



PLANS

NOT TO SCALE



SECTION A-A

Rev	Date	Description	Made	Ckd
A	20/09/10	FIRST ISSUE	AS	JRC

MLM

Consulting Civil, Structural & Building Services Engineers

25, London Road, Ipswich, Suffolk IP1 2HF
Tel: 01473 231100 Fax: 01473 231515
Website: www.mlm.uk.com

Ashford * Cambridge * Chelmsford * London * Norwich.

Drawing Status: INFORMATION

Client: NORTH WEST HAVERHILL LANDOWNERS CONSORTIUM

Project: NORTH WEST HAVERHILL URBAN EXTENSION

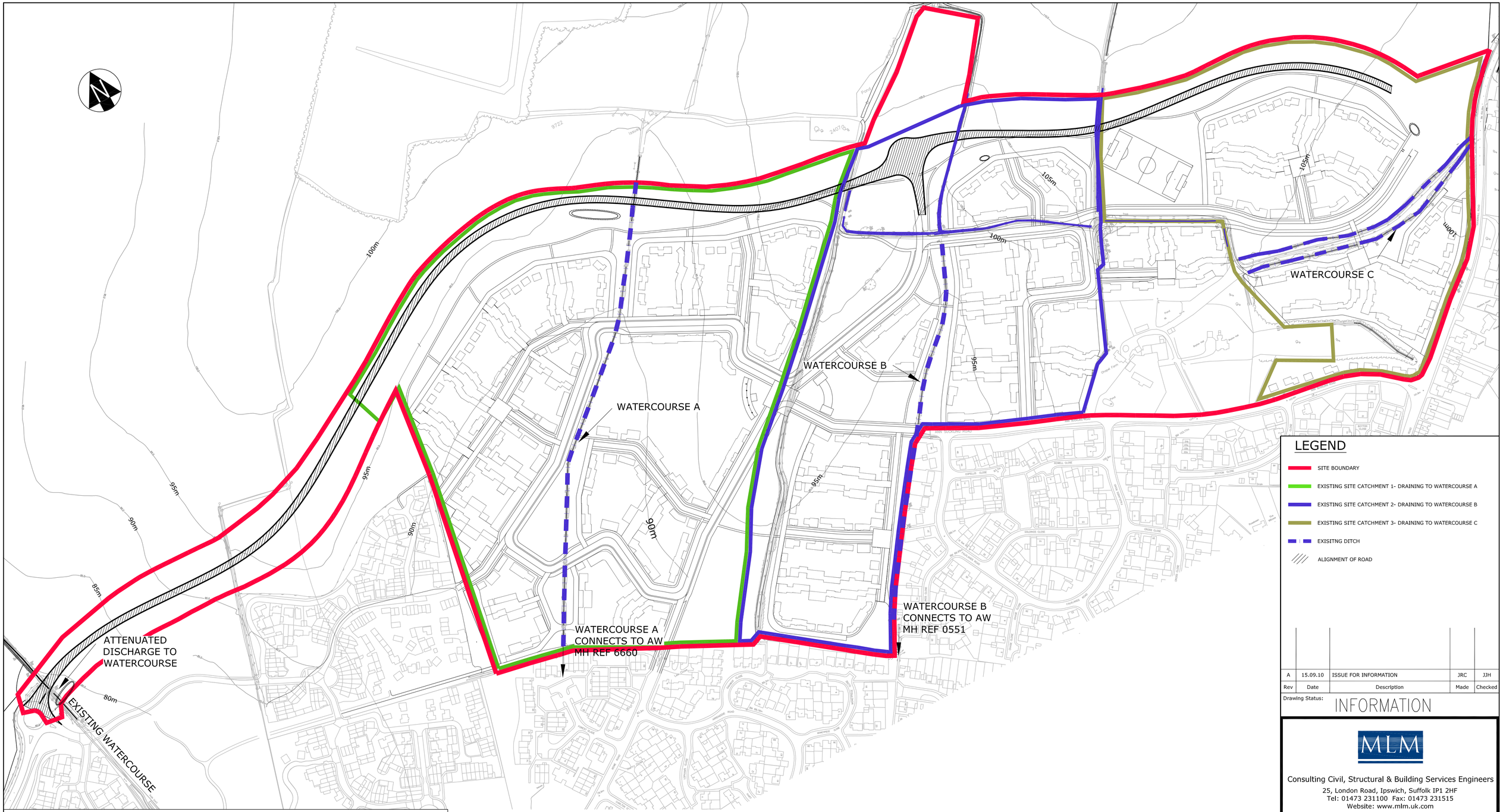
Drg Title: SECTION THROUGH STORAGE POND

Drawn	Checked	Approved	Date
AS	JRC	JJH	20/09/2010

Scales: 1:50 @ A3

Drg No.: 612263/545

Rev: A



NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM MLM PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.

LEGEND

- SITE BOUNDARY
- EXISTING SITE CATCHMENT 1- DRAINING TO WATERCOURSE A
- EXISTING SITE CATCHMENT 2- DRAINING TO WATERCOURSE B
- EXISTING SITE CATCHMENT 3- DRAINING TO WATERCOURSE C
- EXISITNG DITCH
- ALIGNMENT OF ROAD

Rev	Date	Description	Made	Checked
A	15.09.10	ISSUE FOR INFORMATION	JRC	JJH

Drawing Status: INFORMATION

MLM
Consulting Civil, Structural & Building Services Engineers
25, London Road, Ipswich, Suffolk IP1 2HF
Tel: 01473 231100 Fax: 01473 231515
Website: www.mlm.uk.com
Ashford * Cambridge * Chelmsford * London * Norwich.

Client
NORTH WEST HAVERHILL LANDOWNERS CONSORTIUM

Project
NORTH WEST HAVERHILL URBAN EXTENSION

Drawing Title
WATERCOURSE CATCHMENT PLAN

Drawn	Checked	Approved	Date
JRC	JJH	JJH	15 SEPT 10

Scales
1:1,000 @ A1
1:2,000 @ A3

Drawing No. 612263/550

Rev A

PROPOSED BRIDGE REQUIRED OVER EXISTING STREAM FULL EXTENT OF BRIDGE DETAILS T.B.C

MH 12
C.L. 80.800
I.L. 78.006

PN 1.011/ 15000/495

PN 1.010/ 12000/495

PN 1.009/ 12000/510

MH 11
C.L. 81.200
I.L. 78.348

MH 10
C.L. 81.600
I.L. 78.388

MH 13
C.L. 80.600
I.L. 77.970
I.L. 79.480 (OVERFLOW)

FLOW CONTROL LIMITING DISCHARGE FROM MANHOLE 14 TO EXISTING DITCH. OVERFLOW PIPE TO LEAVE MANHOLE 14 AT THE 1 IN 30 YEAR WATER LEVEL

MH 15
C.L. 80.160
I.L. 77.765

FLOW CONTROL LIMITING DISCHARGE FROM MANHOLE 12 TO EXISTING DITCH. OVERFLOW TO BE USED WITH OUTGOING IL SET AT 1 IN 30 YEAR WATER LEVEL

OVERFLOW

I.L. 79.48

9000/500

3000/525

PN 1.012/1500/150

MH 14
C.L. 79.900
I.L. 77.800

MH 16
C.L. 79.340
I.L. 77.725

POND IL 79.48
TOP W.L. IN 100 YR + CC STORM = 80.02

HEADWALL
PIPE I.L. 77.500
DITCH I.L. 77.350

CONDER BYPASS PETROL INTERCEPTOR
CNSB1.5/2
1.0m DIAMETER
1.4m LENGTH

HEADWALL
PIPE I.L. 77.800
DITCH I.L. 77.250

Bush
Sp:4.50
Ht:3.00

HAWTHORN
Sp:7.00
Di:0.40
Ht:5.00

HAWTHORN
Sp:4.50
Di:0.25
Ht:4.00

HAWTHORN
Sp:4.50
Di:0.45
Ht:4.00

H.CHESTNUT
Sp:12.00
Di:1.00
Ht:8.00

Stem(x2)

RS

RS1

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM MLM PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.

3. RAINWATER HARVESTING WILL BE ENCOURAGED THROUGHOUT THE DEVELOPMENT.

4. WHEREVER POSSIBLE, POSITIVELY DRAINED IMPERMEABLE SURFACING WILL BE KEPT TO A MINIMUM.

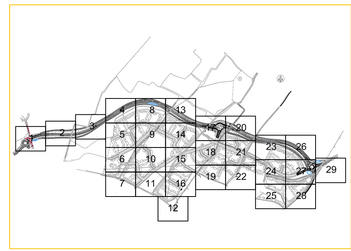
5. WHERE OTHER METHODS OF STORAGE ARE IMPRACTICAL, BELOW GROUND STORAGE CAN BE PROVIDED WITHIN THE SUB-BASE OF PERMEABLE PAVING, FRENCH DRAINS, OR IN CRATES/TANKS

6. WHEREVER POSSIBLE, BELOW GROUND TANKS/ CRATES WILL BE LIMITED TO ROOF WATER OR STORAGE OF EXTREME STORM EVENTS WHERE THE RISK OF POLLUTION IS LESS.

7. OPEN WATER FEATURES SUCH AS DETENTION BASINS AND SWALES LOCATED IN PUBLIC OPEN SPACE ARE LIKELY TO BE ADOPTED BY ST. EDMUNDSBURY BOROUGH COUNCIL. OTHER STORAGE LOCATED IN PRIVATE AREAS WILL REMAIN PRIVATE.

8. ROAD LAYOUT TAKEN FROM MLM DRAWINGS 612263/97_P1, 98_P1, 99_P1 & 100_P1.

9. INDICATIVE PROPOSED DEVELOPMENT LAYOUT TAKEN FROM BIDWELLS DRAWING SW51000002-22 REVISION N.



LEGEND

- SITE BOUNDARY
- SWALE
- RILL
- OVERFLOW
- 5.000/450 PIPE NO./DIAMETER
- POND
- ATTENUATION CRATES

Rev	Date	Description	Made	Checked
P1	14.09.10	ISSUE FOR APPROVAL	AS	JRC

Drawing Status: PRELIMINARY

MLM

Consulting Civil, Structural & Building Services Engineers
25, London Road, Ipswich, Suffolk IP1 2HF
Tel: 01473 231100 Fax: 01473 231515
Website: www.mlm.uk.com
Ashford * Cambridge * Chelmsford * London * Norwich.

Client
NORTH WEST HAVERHILL LANDOWNERS CONSORTIUM

Project
NORTH WEST HAVERHILL URBAN EXTENSION

Drawing Title
SURFACE WATER DRAINAGE STRATEGY SHEET 1 OF 29

Drawn	Checked	Approved	Date
AS	JRC	JJH	14.09.2010

Scales
1:250 @ A1
1:500 @ A3

Drawing No. 612263/600

Rev P1

MH 8
C.L. 83.000
I.L. 78.789

PN 1.006/900Ø/500

PN 1.007/900Ø/504

MH 7
C.L. 84.600
D.D. 83.100 (300Ø INLET)
I.L. 78.881 (900Ø OUTLET)

PN 1.005/300Ø/17

MH 6
C.L. 89.200
I.L. 87.890

PN 1.004/ 300Ø/18

PN 1.008/ 10500/500

MH 9
C.L. 82.700
I.L. 78.613

ADDITIONAL DISCHARGE FROM FUTURE EXPANSION AREA TO DITCH.

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM MLM PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.

3. RAINWATER HARVESTING WILL BE ENCOURAGED THROUGHOUT THE DEVELOPMENT.

4. WHEREVER POSSIBLE, POSITIVELY DRAINED IMPERMEABLE SURFACING WILL BE KEPT TO A MINIMUM.

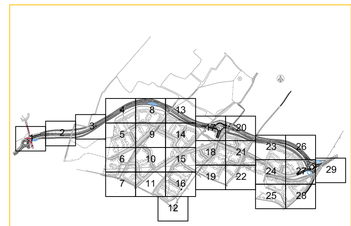
5. WHERE OTHER METHODS OF STORAGE ARE IMPRACTICAL, BELOW GROUND STORAGE CAN BE PROVIDED WITHIN THE SUB-BASE OF PERMEABLE PAVING, FRENCH DRAINS, OR IN CRATES/TANKS

6. WHEREVER POSSIBLE, BELOW GROUND TANKS/ CRATES WILL BE LIMITED TO ROOF WATER OR STORAGE OF EXTREME STORM EVENTS WHERE THE RISK OF POLLUTION IS LESS.

7. OPEN WATER FEATURES SUCH AS DETENTION BASINS AND SWALES LOCATED IN PUBLIC OPEN SPACE ARE LIKELY TO BE ADOPTED BY ST. EDMUNDSBURY BOROUGH COUNCIL. OTHER STORAGE LOCATED IN PRIVATE AREAS WILL REMAIN PRIVATE.

8. ROAD LAYOUT TAKEN FROM MLM DRAWINGS 612263/97_P1, 98_P1, 99_P1 & 100_P1.

9. INDICATIVE PROPOSED DEVELOPMENT LAYOUT TAKEN FROM BIDWELLS DRAWING SW51000002-22 REVISION N.



LEGEND

- SITE BOUNDARY
- SWALE
- RILL
- OVERFLOW
- 5.000/450 PIPE NO./DIAMETER
- POND
- ATTENUATION CRATES

Rev	Date	Description	Made	Checked
P1	14.09.10	ISSUE FOR APPROVAL	AS	JRC

Drawing Status: PRELIMINARY

MLM

Consulting Civil, Structural & Building Services Engineers
25, London Road, Ipswich, Suffolk IP1 2HF
Tel: 01473 231100 Fax: 01473 231515
Website: www.mlm.uk.com
Ashford * Cambridge * Chelmsford * London * Norwich.

Client
NORTH WEST HAVERHILL LANDOWNERS CONSORTIUM

Project
NORTH WEST HAVERHILL URBAN EXTENSION

Drawing Title
SURFACE WATER DRAINAGE STRATEGY SHEET 2 OF 29

Drawn	Checked	Approved	Date
AS	JRC	JJH	14.09.2010

Scales
1:250 @ A1
1:500 @ A3

Drawing No. 612263/601

Rev P1

MH 2
C.L. 96.600
I.L. 95.005

PN 1.000/2250/89

PN 1.001/2250/34

MH 3
C.L. 94.700
I.L. 92.925

PN 1.002/2250/29

MH 4
C.L. 92.800
I.L. 91.530

PN 1.003/3000/20

MH 5
C.L. 91.400
I.L. 89.870

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM MLM PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.

3. RAINWATER HARVESTING WILL BE ENCOURAGED THROUGHOUT THE DEVELOPMENT.

4. WHEREVER POSSIBLE, POSITIVELY DRAINED IMPERMEABLE SURFACING WILL BE KEPT TO A MINIMUM.

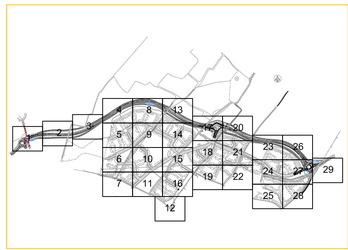
5. WHERE OTHER METHODS OF STORAGE ARE IMPRACTICAL, BELOW GROUND STORAGE CAN BE PROVIDED WITHIN THE SUB-BASE OF PERMEABLE PAVING, FRENCH DRAINS, OR IN CRATES/TANKS

6. WHEREVER POSSIBLE, BELOW GROUND TANKS/ CRATES WILL BE LIMITED TO ROOF WATER OR STORAGE OF EXTREME STORM EVENTS WHERE THE RISK OF POLLUTION IS LESS.

7. OPEN WATER FEATURES SUCH AS DETENTION BASINS AND SWALES LOCATED IN PUBLIC OPEN SPACE ARE LIKELY TO BE ADOPTED BY ST. EDMUNDSBURY BOROUGH COUNCIL. OTHER STORAGE LOCATED IN PRIVATE AREAS WILL REMAIN PRIVATE.

8. ROAD LAYOUT TAKEN FROM MLM DRAWINGS 612263/97_P1, 98_P1, 99_P1 & 100_P1.

9. INDICATIVE PROPOSED DEVELOPMENT LAYOUT TAKEN FROM BIDWELLS DRAWING SW51000002-22 REVISION N.



LEGEND

- SITE BOUNDARY
- SWALE
- RILL
- OVERFLOW
- 5.000/450 PIPE NO./DIAMETER
- POND
- ATTENUATION CRATES

Rev	Date	Description	Made	Checked
P1	14.09.10	ISSUE FOR APPROVAL	AS	JRC

Drawing Status: PRELIMINARY

MLM

Consulting Civil, Structural & Building Services Engineers
25, London Road, Ipswich, Suffolk IP1 2HF
Tel: 01473 231100 Fax: 01473 231515
Website: www.mlm.uk.com
Ashford * Cambridge * Chelmsford * London * Norwich.

Client
NORTH WEST HAVERHILL LANDOWNERS CONSORTIUM

Project
NORTH WEST HAVERHILL URBAN EXTENSION

Drawing Title
SURFACE WATER DRAINAGE STRATEGY SHEET 3 OF 29

Drawn	Checked	Approved	Date
AS	JRC	JJH	14.09.2010

Scales
1:250 @ A1
1:500 @ A3

Drawing No. 612263/602

Rev P1

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM MLM PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.

3. RAINWATER HARVESTING WILL BE ENCOURAGED THROUGHOUT THE DEVELOPMENT.

4. WHEREVER POSSIBLE, POSITIVELY DRAINED IMPERMEABLE SURFACING WILL BE KEPT TO A MINIMUM.

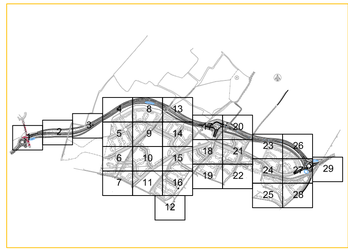
5. WHERE OTHER METHODS OF STORAGE ARE IMPRACTICAL, BELOW GROUND STORAGE CAN BE PROVIDED WITHIN THE SUB-BASE OF PERMEABLE PAVING, FRENCH DRAINS, OR IN CRATES/TANKS

6. WHEREVER POSSIBLE, BELOW GROUND TANKS/ CRATES WILL BE LIMITED TO ROOF WATER OR STORAGE OF EXTREME STORM EVENTS WHERE THE RISK OF POLLUTION IS LESS.

7. OPEN WATER FEATURES SUCH AS DETENTION BASINS AND SWALES LOCATED IN PUBLIC OPEN SPACE ARE LIKELY TO BE ADOPTED BY ST. EDMUNDSBURY BOROUGH COUNCIL. OTHER STORAGE LOCATED IN PRIVATE AREAS WILL REMAIN PRIVATE.

8. ROAD LAYOUT TAKEN FROM MLM DRAWINGS 612263/97_P1, 98_P1, 99_P1 & 100_P1.

9. INDICATIVE PROPOSED DEVELOPMENT LAYOUT TAKEN FROM BIDWELLS DRAWING SW51000002-22 REVISION N.



LEGEND

- SITE BOUNDARY
- SWALE
- RILL
- OVERFLOW
- 5.000/450 PIPE NO./DIAMETER
- POND
- ATTENUATION CRATES

Rev	Date	Description	Made	Checked
P1	14.09.10	ISSUE FOR APPROVAL	AS	JRC

Drawing Status: PRELIMINARY

MLM

Consulting Civil, Structural & Building Services Engineers
25, London Road, Ipswich, Suffolk IP1 2HF
Tel: 01473 231100 Fax: 01473 231515
Website: www.mlm.uk.com
Ashford * Cambridge * Chelmsford * London * Norwich.

Client
NORTH WEST HAVERHILL LANDOWNERS CONSORTIUM

Project
NORTH WEST HAVERHILL URBAN EXTENSION

Drawing Title
SURFACE WATER DRAINAGE STRATEGY SHEET 4 OF 29

Drawn	Checked	Approved	Date
AS	JRC	JJH	14.09.2010

Scales
1:250 @ A1
1:500 @ A3

Drawing No. 612263/603

Rev P1

MH 1
C.L. 97.100
I.L. 95.535

MH 13
C.L. 96.720
I.L. 93.088

MH 14
C.L. 96.560
I.L. 93.033 (7800)
I.L. 92.883 (9000)

MH 15
C.L. 96.220
I.L. 92.808

MH 16
C.L. 95.830
I.L. 92.726 (9000)
I.L. 92.576 (10500)

PN 3.003/

PN 3.002/9000/599

PN 3.001/9000/600

PN 3.000/7500/600

132.002 / SWALE

132.003 / 150

132.004 / SWALE

132.005 / 150

127.000 / 225

127.001 / 225

126.000 / 225

129.000 / 225

105m³ @ 1.0m Deep
5l/s Discharge

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM MLM PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.

3. RAINWATER HARVESTING WILL BE ENCOURAGED THROUGHOUT THE DEVELOPMENT.

4. WHEREVER POSSIBLE, POSITIVELY DRAINED IMPERMEABLE SURFACING WILL BE KEPT TO A MINIMUM.

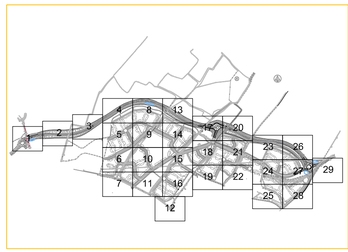
5. WHERE OTHER METHODS OF STORAGE ARE IMPRACTICAL, BELOW GROUND STORAGE CAN BE PROVIDED WITHIN THE SUB-BASE OF PERMEABLE PAVING, FRENCH DRAINS, OR IN CRATES/TANKS

6. WHEREVER POSSIBLE, BELOW GROUND TANKS/ CRATES WILL BE LIMITED TO ROOF WATER OR STORAGE OF EXTREME STORM EVENTS WHERE THE RISK OF POLLUTION IS LESS.

7. OPEN WATER FEATURES SUCH AS DETENTION BASINS AND SWALES LOCATED IN PUBLIC OPEN SPACE ARE LIKELY TO BE ADOPTED BY ST. EDMUNDSBURY BOROUGH COUNCIL. OTHER STORAGE LOCATED IN PRIVATE AREAS WILL REMAIN PRIVATE.

8. ROAD LAYOUT TAKEN FROM MLM DRAWINGS 612263/97_P1, 98_P1, 99_P1 & 100_P1.

9. INDICATIVE PROPOSED DEVELOPMENT LAYOUT TAKEN FROM BIDWELLS DRAWING SW51000002-22 REVISION N.



LEGEND

- SITE BOUNDARY
- SWALE
- RILL
- OVERFLOW
- 5.000/450 PIPE NO./DIAMETER
- POND
- ATTENUATION CRATES

Rev	Date	Description	Made	Checked
P1	14.09.10	ISSUE FOR APPROVAL	AS	JRC

Drawing Status: PRELIMINARY

MLM

Consulting Civil, Structural & Building Services Engineers

25, London Road, Ipswich, Suffolk IP1 2HF
Tel: 01473 231100 Fax: 01473 231515
Website: www.mlm.uk.com

Ashford * Cambridge * Chelmsford * London * Norwich.

Client
NORTH WEST HAVERHILL LANDOWNERS CONSORTIUM

Project
NORTH WEST HAVERHILL URBAN EXTENSION

Drawing Title
SURFACE WATER DRAINAGE STRATEGY SHEET 5 OF 29

Drawn	Checked	Approved	Date
AS	JRC	JJH	14.09.2010

Scales
1:250 @ A1
1:500 @ A3

Drawing No. 612263/604

Rev P1

102m³ @ 1.0m Deep
5l/s Discharge

96m³ @ 1.0m Deep
5l/s Discharge

5 l/s DISCHARGE ALLOWANCE INTO PIPE 133.000 FOR FUTURE EXPANSION. ADDITIONAL DISCHARGE FROM FUTURE EXPANSION AREA TO DITCH AT WEST BOUNDARY OF SITE.

Hydrobrake
30l/s @ 1.05m Head

132.006 / 300
135.000 / 225
134.000 / 225
129.000 / 225
126.000 / 225
126.001 / 225
126.002 / 150
129.001 / 225
126.003 / RILL
134.001 / 225
126.004 / 300
134.002 / 150
132.007 / 300
134.002 / 150
136.000 / 1050
134.003 / 1050
132.008 / 1050
133.000 / 1050
131.000 / 225
126.005 / 300
132.009 / 375
131.001 / 225
130.000 / 225
138.000 / 300
130.001 / 225
130.002 / 150
137.000 / 300
130.003 / 150
139.000 / 300
137.001 / 300

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM MLM PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.

3. RAINWATER HARVESTING WILL BE ENCOURAGED THROUGHOUT THE DEVELOPMENT.

4. WHEREVER POSSIBLE, POSITIVELY DRAINED IMPERMEABLE SURFACING WILL BE KEPT TO A MINIMUM.

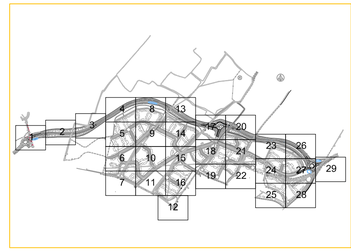
5. WHERE OTHER METHODS OF STORAGE ARE IMPRACTICAL, BELOW GROUND STORAGE CAN BE PROVIDED WITHIN THE SUB-BASE OF PERMEABLE PAVING, FRENCH DRAINS, OR IN CRATES/TANKS

6. WHEREVER POSSIBLE, BELOW GROUND TANKS/ CRATES WILL BE LIMITED TO ROOF WATER OR STORAGE OF EXTREME STORM EVENTS WHERE THE RISK OF POLLUTION IS LESS.

7. OPEN WATER FEATURES SUCH AS DETENTION BASINS AND SWALES LOCATED IN PUBLIC OPEN SPACE ARE LIKELY TO BE ADOPTED BY ST. EDMUNDSBURY BOROUGH COUNCIL. OTHER STORAGE LOCATED IN PRIVATE AREAS WILL REMAIN PRIVATE.

8. ROAD LAYOUT TAKEN FROM MLM DRAWINGS 612263/97_P1, 98_P1, 99_P1 & 100_P1.

9. INDICATIVE PROPOSED DEVELOPMENT LAYOUT TAKEN FROM BIDWELLS DRAWING SW51000002-22 REVISION N.



LEGEND

- SITE BOUNDARY
- SWALE
- RILL
- OVERFLOW
- 5.000/450 PIPE NO./DIAMETER
- POND
- ATTENUATION CRATES

Rev	Date	Description	Made	Checked
P1	14.09.10	ISSUE FOR APPROVAL	AS	JRC

Drawing Status: PRELIMINARY

MLM

Consulting Civil, Structural & Building Services Engineers

25, London Road, Ipswich, Suffolk IP1 2HF
Tel: 01473 231100 Fax: 01473 231515
Website: www.mlm.uk.com

Ashford * Cambridge * Chelmsford * London * Norwich.

Client
NORTH WEST HAVERHILL LANDOWNERS CONSORTIUM

Project
NORTH WEST HAVERHILL URBAN EXTENSION

Drawing Title
SURFACE WATER DRAINAGE STRATEGY SHEET 6 OF 29

Drawn	Checked	Approved	Date
AS	JRC	JJH	14.09.2010

Scales	Drawing No.	Rev
1:250 @ A1 1:500 @ A3	612263/605	P1

225.000 / 150
224.002 /150
224.003 / 150
224.004 / 150
224.005 / 225
226.000 / 225
226.001 / 300
200.014 / 300
200.012 / 300
200.011 / 300
200.010 / 300
200.009 / 300
200.008 / 300
200.007 / 300
209.002 / 225
209.003 / 225
209.001 /225
209.004 / 225
211.000 / 225
208.000 / 1050
208.001 / 1050
206.001 /225
206.002 /225
207.001 /225
206.003 / 1050

5 l/s
50m² @ 1.0m Deep
5l/s Discharge

AREA 2 DISCHARGE TO DITCH MAX
ALLOWED DISCHARGE RATES
7.5 ha
1yr - 14.9 l/s
30yr - 40.6 l/s
100yr - 55.7 l/s

5 l/s
130m² @ 1.2m Deep
6l/s Discharge

5 l/s
70m² @ 1.0m Deep
5l/s Discharge

Pipe:450ø
IL:80.755

POND FEATURE ON LINE OF DITCH. NOT
ATTENUATION FACILITY

HYDROBRAKE 22 l/s @ 1.5m HEAD

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM MLM PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.

3. RAINWATER HARVESTING WILL BE ENCOURAGED THROUGHOUT THE DEVELOPMENT.

4. WHEREVER POSSIBLE, POSITIVELY DRAINED IMPERMEABLE SURFACING WILL BE KEPT TO A MINIMUM.

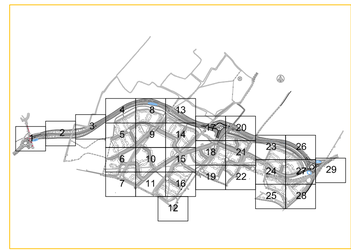
5. WHERE OTHER METHODS OF STORAGE ARE IMPRACTICAL, BELOW GROUND STORAGE CAN BE PROVIDED WITHIN THE SUB-BASE OF PERMEABLE PAVING, FRENCH DRAINS, OR IN CRATES/TANKS

6. WHEREVER POSSIBLE, BELOW GROUND TANKS/ CRATES WILL BE LIMITED TO ROOF WATER OR STORAGE OF EXTREME STORM EVENTS WHERE THE RISK OF POLLUTION IS LESS.

7. OPEN WATER FEATURES SUCH AS DETENTION BASINS AND SWALES LOCATED IN PUBLIC OPEN SPACE ARE LIKELY TO BE ADOPTED BY ST. EDMUNDSBURY BOROUGH COUNCIL. OTHER STORAGE LOCATED IN PRIVATE AREAS WILL REMAIN PRIVATE.

8. ROAD LAYOUT TAKEN FROM MLM DRAWINGS 612263/97_P1, 98_P1, 99_P1 & 100_P1.

9. INDICATIVE PROPOSED DEVELOPMENT LAYOUT TAKEN FROM BIDWELLS DRAWING SW51000002-22 REVISION N.



LEGEND

- SITE BOUNDARY
- SWALE
- RILL
- OVERFLOW
- 5.000/450 PIPE NO./DIAMETER
- POND
- ATTENUATION CRATES

Rev	Date	Description	Made	Checked
P1	14.09.10	ISSUE FOR APPROVAL	AS	JRC

Drawing Status: PRELIMINARY

MLM

Consulting Civil, Structural & Building Services Engineers
25, London Road, Ipswich, Suffolk IP1 2HF
Tel: 01473 231100 Fax: 01473 231515
Website: www.mlm.uk.com
Ashford * Cambridge * Chelmsford * London * Norwich.

Client
NORTH WEST HAVERHILL LANDOWNERS CONSORTIUM

Project
NORTH WEST HAVERHILL URBAN EXTENSION

Drawing Title
SURFACE WATER DRAINAGE STRATEGY
SHEET 7 OF 29

Drawn	Checked	Approved	Date
AS	JRC	JJH	14.09.2010

Scales
1:250 @ A1
1:500 @ A3

Drawing No. 612263/606

Rev P1