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ENVIRONMENTAL STATEMENT: ADDENDUM

HALE WHARF

Prepared for

Muse Developments and the Canal and River Trust

By

RAMBOLL

January 2017

HALE WHARF

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Ramboll
240 Blackfriars Road
London
SE1 8NW
United Kingdom
T +44 (0)20 7631 5291
www.ramboll-environ.com

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APPENDICES

1. INTRODUCTION

1.1 CONTEXT

In May 2016, a joint venture between Muse Developments and the Canal Trust (''the Applicant'') submitted a hybrid planning application (outline and part-detailed) with supporting Environmental Statement (ES), hereafter referred to as the 'ES 2016', to the London Borough of Haringey (LBH) for a proposed development on a site known as Hale Wharf, Ferry Lane, Tottenham Hale, London (National Grid Reference: TQ3484689614) (the 'application site').

For the purposes of the planning application submitted to LBH in May 2016 the full description of the proposed development comprises the following, hereafter referred to as the 'proposed development':

"Outline planning permission (for the entire site) for a residential led mixed use development comprising the demolition of existing buildings and structures; the construction of buildings across the site to include residential (up to 505 units) and flexible retail or business uses (Use Classes A1-A5 or B1); pedestrian/cycle footbridges, modification works to the existing vehicular access and associated highway works; refurbishment of existing infrastructure (including provision of an on-site energy centre, if required), landscaping and public realm works; new servicing arrangements; car/cycle parking; and associated and facilitating works.

All matters are reserved for the pedestrian footbridges, Phases 2 and 3 Buildings and detailed permission is sought with no matters reserved for the Phase 1 Buildings.

The detailed component of the application (Phase 1 buildings only) comprises the demolition of existing buildings; the construction of buildings ranging from 16 to 21 storeys to accommodate 249 residential units and 307m2 (GIA) of flexible retail or business uses (Use Classes A1-A5 or B1); modification works to the existing vehicular access and associated highway works; infrastructure (including provision of an on-site energy centre, if required), landscaping and public realm works; new servicing arrangements; car/cycle parking; and associated and facilitating works."

The hybrid planning application was received as valid by LBH on 7 June 2016 under reference number HGY/2016/1719 and refused planning permission at the special Sub Planning Committee held on 1st November 2016.

In a letter dated 4 January 2017 the Mayor of London notified LBH of his reasons to call the application in and determine the above planning application himself.

Further to this decision and as a result of recent discussions with the Greater London Authority (GLA) the Applicant proposes to make minor adjustments to the proposed development prior to the determination of the hybrid planning application by the Mayor of London. These modifications are to ensure that there is no conflict with the Green Belt.

This Addendum to the original ES (2016) has been prepared to consider whether the minor adjustments to the proposed development alter the findings of the Environmental Impact Assessment (EIA) and the Standalone Environmental Assessments undertaken in regards to the likely significant effects on the environment. As such, this letter should be read in conjunction with the original ES (2016), the Habitat Regulations Assessment (HRA) Screening and Water Framework Directive (WFD) Assessment documents submitted.

A summary of the potential changes to the assessment of significant effects reported in the ES (2016) is given in Section 4 of this Addendum.

1.2 AMENDMENTS TO THE PROPOSED DEVELOPMENT

As shown on the revised parameter plans and site wide landscape general arrangements at Appendix A, it is proposed to reduce the development footprint of buildings in the northern part of the application site. The change has been made to remove any ambiguity about whether the proposed buildings would fall within the Green Belt, and to demonstrate that they do not. The maximum building extent shown on the parameters plans has been re-repositioned approximately 38 metres further south, however no changes to the overall maximum height of the building extents have been made. A comparison elevation sketch between the originally submitted illustrative scheme and the now proposed illustrative scheme is provided within the Sketch at Appendix A, as well as the revised planning drawings of the area where buildings can be located (development zone in grey); also provided at Appendix A.

As set out in Chapter 3 of the ES 2016, due to the intricacy of the hybrid planning application, in addition to the detailed element of the design, an illustrative design for the outline element was demonstrated at application drawings 535_02_07_020 to 535_02_07_026 and 535_02_07_030. This provided both visual and geometric context for the purposes of the technical assessments within the ES. These drawings have now been superseded by drawing numbers 535_02_07_100_PL2, 535_02_07_200_PL2, 535_02_07_300_PL2, 535_02_07_030_PL2, which demonstrate the reduced parameters within the outline element of the hybrid planning application.

No change is proposed to the maximum number of dwellings (505) or floorspace (46,100 sq.m) to be provided within the development. The revised illustrative scheme at Appendix A shows how there is potential to increase the heights of three of the blocks within the height parameters which were already proposed, whilst staying within the maximum height parameters. Sketch 535_02_SK_111 shows how this can be achieved within the height parameters, whilst omitting Block G.

Due to the degree of flexibility of the permission being sought within the outline phases of the proposed development, a number of maximum parameters (as per the Rochdale envelope approach) were identified and assessed within the EIA to ensure that the necessary empirical data (for example trip generation) could be compiled and interpreted so as to inform this ES. The professional team has undertaken the assessments based on the worst case parameters for the proposed development. The following maximum parameters have been assessed in the ES (2016):

- 505 residential units across all three phases of development; 249 within Phase 1 and up to 256 within Phases 2&3;
- 1,607 m2 of flexible commercial space across all three phases of development, comprising the following:
- 170 m2 in Block A – Land Use Class A1 (Office);
- 32 m2 in Block B – Land Use B1 (Estates Office);
- 105 m2 in Block B – Land Use Class B1 (Office);
- 200 m2 in Block C – Land Use Class A3-A5 (Café/Food); and
- 1,100 m2 in Block K – Land Use Class B1 (Office).

The proposed alterations to the proposed development, to ensure that there is no conflict with the Green Belt, do not change the description of the proposed development and do not go beyond the above maximum parameters assessed within the EIA.

The assumptions made within Chapter 3 of the ES (2016) for the demolition and construction phases and activities undertaken within these phases remain valid. Phase 2 and 3 will no longer

include block G, however it is intended that the proposed development will still be built out as per the indicative programme set out in Chapter 3 of ES (2016).

A "window of opportunity" was previously identified to undertake the nosiest demolition and construction activities on site. This took into account the Spring, Winter and Moulting Period for Heron, Pochard, Tufted Duck Cormorant, Gadwell and Shoveler which are located within the nearby Walthamstow Reservoirs. This has not changed and therefore, the demolition of the existing buildings would remain within the four month window of opportunity between June to September.

The anticipated programme is to consist of initial enabling works, demolition, building works, footbridge construction and external works. It is assumed the enabling works and site establishment timescale would be reduced to maintain the anticipated programme pivoted around demolition and implementation of the necessary acoustic hoarding on site occurring during the four month window of opportunity (June to September).

No changes are proposed to the alternative Energy Strategy assessed as part of the ES (2016), if the preferred option is not implemented through an offsite connection to the district heating centre at Hale Village, via the proposed Hale Village Green Link Bridge (HVGLB).

1.3 PREPARATION OF THE ES ADDENDUM

The original ES (2016) and this ES Addendum letter have been compiled by Ramboll and present the results of the EIA process carried out by a number of technical specialists. The specialists are presented in Table 1 below, together with their respective disciplines and contribution to the EIA.

Table 1: EIA Technical Team

EIA Component	Technical Consultant
Transport	Odyssey Markides
Air Quality	Ramboll
Noise & Vibration	Ramboll
Ground Conditions & Contaminated Land	Ramboll
Buried Archaeology	Ramboll
Surface Water & Flood Risk	Ramboll
Daylight, Sunlight & Overshadowing	Hilson Moran
Wind Microclimate	Element Energy & BMT Fluid Mechanics
Lighting	Ramboll
Ecology	Ramboll
Socio-economics	Ramboll
Townscape, Heritage & Visual Impact Assessment	Richard Coleman City Designer

The proposed changes to the development do not result in anticipate additional technical disciplines being required. Therefore the original scoping for the project remains valid.

The adjustments to the proposed development potentially alter the finding of some of the detailed assessments set out in the original ES (2016) and Standalone Environmental Assessments. This Addendum letter sets out, where necessary, the revised technical assessments and provides clarifications as to the review of potential impacts associated with the minor alterations of the proposed development. The EIA team listed in Table 1 have reviewed their assessments contained within ES (2016) against the minor alterations to the proposed development with commentary provided in this addendum.

Both the ES (2016) and this Addendum have been prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2011, as amended in 2015[1].

The ES (2016), this ES Addendum and supporting documents are available for inspection by the public during normal office hours at the Planning Department of LBH at the following address:

Development Management
River Park House
255 High Road
Wood Green
London
N22 8HQ

Comments on the planning application should be forwarded to the GLA, using the following email address: halewharf@london.gov.uk

2. TECHNICAL DISCIPLINE CLARIFICATIONS ON THE LIKELY SIGNIFICANT EFFECTS

The revised technical assessments and clarifications set out below are numbered in accordance with the structure of the ES (2016).

2.1 Chapter 4 Alternatives and Design Evolution

Incorporation of additional green landscaping to replace the former footprint of Block G within the Green Belt and the extension of the biodiverse strip along with River Lee Navigation Channel are further design iterations.

2.2 Chapter 5 Transport

Oddessey Markides have undertaken a review of Chapter 5 Transport of the ES (2016), including the Transport Assessment, Travel Plan and Service and Delivery Plan (Appendix 5.A, 5.B and 5.C of ES 2016) and confirm no changes are required based on the proposed minor amendments to the scheme. There has been no change to Transport guidance or policy and the baseline defined in the ES (2016) is considered to still be valid for the purposes of the impact assessment.

It is understood that the minor changes to the scheme include the removal of Block G with the increase of Block C, D and E by one level within the maximum parameters of the proposed development. As such, there are no changes proposed to the total number of dwellings or total floorspace. It is therefore confirmed that the minor scheme amendments will not result in any

[1] The Town and Country Planning (Environmental Impact Assessment) (Amendment) Regulations 2015. London: HMSO, 2015. SI 2015/660

changes to the conclusions of the previously submitted highways and transport reports within the ES (2016).

It is acknowledged that as a result of the above described minor scheme amendments the illustrative masterplan layout of the proposed development has changed. With regard to the swept path assessments previously undertaken as part of the Transport Assessment, it is noted that the changes do not undermine the proposed layout with the removal of Block G. Further swept path assessments will be provided at the detailed (reserved matters) application stage and are not deemed to be necessary at this stage to demonstrate the acceptability of the scheme in highways and transport terms.

Mitigation measures addressed in the ES (2016) remain unchanged.

Residual and cumulative effects addressed in the ES (2016) remain unchanged.

2.3 Chapter 6 Air Quality

A review has been undertaken to establish if changes to the original scheme affect the air quality assessment presented in the ES (2016). There has been no change to air quality guidance or policy. The baseline defined in the ES (2016) is considered to still be valid for the purposes of the impact assessment.

The Dust Risk Assessment is unaffected by the proposed changes, and the residual impact from dust remains the same (negligible and not significant) as previously assessed. As the traffic generated by the development scheme remains unchanged, the impact assessment on existing receptor locations remains the same as those reported in the ES (2016). Introduction of sensitive receptors within the additional storey on Blocks D, E and F of the revised illustrative scheme is likely to be similar to receptors on lower floors within the same block (predicted to range between 30 - 31 $\mu g/m^3$ for NO_2 and 22 $\mu g/m^3$ for PM_{10} in 2021) and pollutant levels are likely to be lower than the fifth floor receptors due to additional vertical dispersion. These additional new receptors would be within the UK air quality objective levels and fall into APEC category A (No air quality grounds for refusal; however mitigation of any emissions should be considered) and therefore the site would remain suitable for its intended uses.

Mitigation measures addressed in the ES (2016) remain unchanged.

Residual and cumulative effects addressed in the ES (2016) remain unchanged.

Our assessment identifies that the conclusions made within Chapter 6 of the submitted ES (2016) remain valid and there is no change to the conclusions set out in the ES (2016).

The ES (2016) considered an on-site CHP as an alternative to connection to the offsite district heating centre at Hale Village. The conclusions of this assessment remain valid for the amended scheme.

Clarifications on the Air Quality Neutral Assessment submitted as part of the ES (2016) were made during the LBH consultation period and submitted to the LBH 9th August 2016 (reference 61033510/AQ1), please see Appendix B. The GFA, trip rates and energy demand of the residential use remains unchanged and therefore the conclusions remain the same as those within the ES (2016).The development scheme would remain Air Quality Neutral.

2.4 Chapter 7 Noise and Vibration

This section of the addendum outlines any changes relating to noise from the ES (2016) that may arise as result of the new scheme.

The methodology (including baseline survey, standards, and criteria) for the noise and vibration assessment remain the same as those outlined in the ES (2016). There are no changes to relevant guidance and policy relating to noise since submission of the ES in 2016. As a result, the baseline noise and vibration conditions identified in the ES (2016) are considered to still be valid for the purposes of the impact assessment.

The removal of block G means that construction will cover a smaller area. The northern developed area will be curtailed and therefore the extent of the construction noise and vibration will be slightly reduced to northern receptors including the SPA and Ramsar sites. Although a positive change for noise and vibration sources, the extent of the change in limited and likely to give to a negligible change in the impact. As a result the proposed mitigation should remain as outlined in the ES (2016).

As the demolition and construction, activities, methodologies and assumptions for the proposed development remain unchanged, the piling methods assumed for the noise impact assessment remain valid.

The change in building massing will also have a negligible impact on the sound insulation requirements of the façade. Indicative façade sound insulation mark-ups are presented in Figure 8.A.of Volume 2 A3 Figures of the ES (2016). The façades which require mechanical ventilation and attenuated natural ventilation are unlikely to change as there is only 1 additional storey. However, the final sound insulation requirements of the façade should be checked during detailed design stages.

No changes in operational plant are proposed and no addition noise or vibration sources have been identified.

As a result of the changes proposed in this revised scheme, the residual and cumulative effects of the Noise and Vibration Chapter remain unchanged from those outlined in the ES 2016. The conclusions made within Chapter 8 of the submitted ES (2016) remain valid and there is no change to the conclusions set out in the ES (2016).

2.5 Chapter 8 Ecology

A review has been undertaken to establish if changes to the original scheme affect the ecology assessment presented in the ES (2016).

There have been no changes to relevant Ecological Impact Assessment (EcIA) guidance since preparation of the ES (2016), therefore the methods used in the EIA and to compile the ecological assessment in the ES (2016) remain valid. Alterations to the strategic policies identified in the ES (2016) are currently under public consultation, however the proposed alteration to the policy discussed in the ES (2016) (SP13) is terminology-based and does not affect the conclusions drawn within Chapter 8 of the ES (2016). Development management policies are also being prepared for adoption in 2017, these are in line with the key considerations within the ES (2016) and therefore are not likely to have a bearing on the conclusions. The baseline defined in the ES (2016) is considered to remain valid for the purposes of the assessment.

Of the potential effects considered within Chapter 8: Ecology of the ES (2016), the following are considered to require reconsideration as a result of the change to building massing, footprint and supporting landscaping:

- Construction:
  - Change to effects on Habitats as a result of Site Clearance during Enabling Works, Demolition & Construction; and
  - Changes to potential Noise and visual/lighting disturbance to terrestrial species.

- Operation:
  - Over-shadowing effects on aquatic habitats caused by building presence.

The minor changes to construction removing block G from Phases 2 and 3 are likely to result in the remediation of the area previously proposed as Block G and incorporation of this area into the soft landscape design for the site. The ES (2016) identified that approximately 500m^2 of the application site overlaps the Lee Valley Site of Importance to Nature Conservation (SINC), (and that 400m^2 of this is hardstanding and 100m^2 is scrub). It was stated that the proposed development would retain or introduce 135m^2 of soft landscaping in this area, resulting in a 35m^2 betterment where the SINC overlaps the northern part of the application site. This betterment would increase to up to approximately 320m^2 as a result of changing the outline application building footprint where the illustrative scheme shows the removal of the proposed Block G, as this amount of existing hardstanding/building would be replaced with tree, shrub and native wildflower/grassland planting.

The revised design also allows the development to fulfil strategic policy 13 (SP13) of the Haringey Local Plan, which requires all new development to *"protect, enhance, and where possible, extend the existing boundaries of the borough's Green Belt"* by turning an area of hardstanding currently within the Green Belt into vegetation. The new landscaping would provide increased plant diversity, with dense shrubs appropriate for nesting birds, wildflower planting for invertebrates and native/fruiting tall trees to provide further nesting habitat and nectar/sugar rich food sources for invertebrates. Insect and small mammal habitats (in the form of log piles) will also be placed in appropriate areas of the shrub/woodland planting. The SINC is currently estimated to include approximately 95ha of broadleaf woodland. approximately 0.025-0.030ha (250-300m^2) of this would be lost due to the preparation of the proposed bridge landing area adjacent to Pymme's Brook (see ES, 2016). The revised planting now offsets and slightly improves on this loss by providing a combination of approximately 270m^2 of new woodland and approximately 50m^2 of wildflower/grassland planting within the SINC. Although a slight betterment compared to the original scheme proposed, this is not significant at the local scale and therefore the ES (2016) assessment of a beneficial effect (not significant in EIA terms) remains valid.

The construction noise and visual disturbance to birds and water voles will be reduced as a result of removing changing the parameters, which results in Block G being removed from the illustrative proposals, as the spatial extent and duration of piling and construction would be reduced. However, the effect will still occur during the construction of the other blocks so there is no change to the conclusion of an adverse effect (not significant in EIA terms) that was stated within the ES (2016).

During operation, the potential change to the height of Blocks C, D and E as per the revised illustrative scheme will increase the possible shadow lengths within the reservoir which have potential to affect vegetation growth within the vegetated areas surrounding the development, however the area shaded will also be reduced by the removal of Block G. The ES (2016) found that the predicted average light availability within the shaded area was not significantly different to that of the unshaded area and that the plants known to be present in the areas adjacent to the

proposed development are largely tolerant of partial shade, therefore the outcome of the original ES (2016) assessment remains valid.

The assessment of cumulative and residual effects remains as set out within Chapter 8: Ecology of the ES (2016). The conclusions made within ES (2016) remain valid.

2.6 Chapter 9 Ground Conditions and Contamination

A review has been undertaken to determine the impact of the proposed changes on Ground Conditions and Contamination reported within Chapter 9 of the ES (2016).

There are no changes to the methodology, relevant guidance or policy relating to ground conditions and contamination subsequent to the issue of the ES (2016). The baseline defined in the ES (2016) is considered to still be valid for the purposes of impact assessment.

The reduced footprint of the development resulting from the change to the parameters which results in the omission of Block G and potential increase in height of Blocks C, D and E as per the revised illustrative scheme does not change nature of any of the identified significant effects presented in Chapter 9 of the ES (2016).

The proposed development incorporates soft landscaping including a significant centralised area within the public realm design. The principles and recommendations identified within the Geo-environmental and Geotechnical Interpretative Report and Remediation Strategy undertaken (Appendices 9.B and 9.C of Volume 3 Technical Appendices of this ES, 2016) remain valid as the Made Ground is deemed unsuitable for incorporation within these landscaped areas.

Soft landscaping areas constructed in the public realm at ground level, which will now include the landscaped area replacing the previous footprint of Block G, will require at least 600 mm of suitable imported cover which should be separated from the underlying Made Ground by a Teram (or similar) membrane demarcation layer, in order to prevent generation, dermal contact and accidental ingestion of contaminated soils and inhalation of contaminated dusts or airborne asbestos fibres.

No additional mitigation measures are required as a result of the proposed changes. The residual and cumulative effects section of Chapter 9 of the ES (2016) remains unchanged.

In summary, the conclusions made within Chapter 9 and the recommendations within the appendices of the submitted ES (2016) remain valid and there are no changes to the conclusions as a result of the amended proposals.

2.7 Chapter 10 Buried Archaeology

A review has been undertaken to determine the impact of the proposed changes on Buried Archaeology reported within Chapter 10 of the ES (2016).

There are no changes to the methodology, relevant guidance or policy relating to ground conditions and contamination. The archaeological baseline defined in the ES (2016) is considered to still be valid for the purposes of impact assessment.

The reduced footprint of the development resulting from the change to the parameters and omission of Block G and potential increase in height of Blocks C, D and E as per the revised illustrative scheme does not change the nature of any of the identified significant effects without mitigation as presented in Chapter 10 of the ES (2016).

No additional mitigation measures are considered to be required as a result of the proposed changes. The archaeological mitigation strategy recommended within Chapter 10 remains valid and will continue to include a programme of archaeological evaluation with a series of trial trenches. The percentage coverage and trench locations will be agreed in advance of commencement of demolition works with GLAAS, the archaeological advisors to the local authority. The residual and cumulative effects section of Chapter 10 of the ES (2016) remains unchanged.

In summary, the conclusions made within Chapter 10 of the ES (2016) remain valid and there are no changes to the conclusions as a result of the amended proposals.

2.8 Chapter 11 Surface Water and Flood Risk

This section considers the changes to the scheme with regard to surface water and flood risk, originally assessed in Chapter 11 of the ES (2016). The change involves the removal of Block G and increases in height of Blocks C, D and E as per the revised illustrative scheme. There is no change to the overall number of dwellings or floorspace proposed.

There are no changes to the methodology, relevant guidance or policy relating to surface water and flood risk. The baseline defined in the ES (2016) is considered to still be valid for the purposes of impact assessment.

It is noted that the reduced building footprints shown on the parameters and removal of Block G in the illustrative scheme reduces the impermeable area on site compared to the original scheme; however this does not change the underlying principles of the proposed surface water drainage strategy. The Below Ground Drainage Strategy submitted with the ES (2016) as Appendix 11.B has been reviewed in light of the reduced building footprint within the Green Belt. The model and drainage plans have been updated and presented within the Below Ground Drainage Addendum at Appendix C of this Addendum. The changes to the parameters and the removal of Block G and the potential increased height of Blocks C, D and E shown on the illustrative scheme within the maximum parameters does not change the nature of any of the identified significant effects presented in Table 11.6 of the ES (2016).

No additional mitigation measures are required as a result of the proposed changes. The residual and cumulative effects section of Chapter 11 of the ES (2016) remains unchanged.

In summary, the conclusions made within Chapter 11 of the submitted ES (2016) remain valid and there are no changes to the conclusions as a result of the amended proposals.

2.9 Chapter 12 Daylight, Sunlight and Overshadowing

A review has been undertaken to determine the impact of the proposed changes on the daylight, sunlight and overshadowing assessment reported within the ES (2016).

The proposed changes to the scheme parameters result in the omission of Block G from the illustrative scheme, resulting in a potential increase in the height of three of the buildings whilst maintaining the outline maximum height parameters proposed.

The assessment modelling was based on detailed plans for blocks A and B and the outline maximum parameters for the subsequent phases two and three.

There are no changes to relevant policy or guidance that affect the results reported within Chapter 12 of the ES (2016).

The baseline defined in the ES (2016) is considered to be still valid for the purposes of the impact assessment.

As the maximum height outline parameters which formed the basis of the assessment have been maintained; therefore, there is no change to the impact magnitude calculated as a result of the potential increase in height for the three buildings. The omission of Block G at the far northern end of the site is likely to have a negligible effect on the surrounding receptors on the basis that Block G is approximately 200 metres away from the nearest receptor of the Hale Village development and therefore, has a limited impact on the daylight and sunlight availability to the windows of the assessed Block 5 (Kingfisher Heights). The proposed slight reduction in footprint is also likely to have a negligible effect on the results reported within the ES.

The residual and cumulative effects section of Chapter12 of the ES (2016) also remains unchanged.

Based on the above, the conclusions made within Chapter 12 of the submitted ES (2016) remain valid and there is no change to the conclusions set out in the ES (2016).

2.10 Chapter 13 Lighting

The proposed change of reducing the footprint of buildings in the northern part of the site, removing Block G from the illustrative proposals, does not require revision to the ES (2016) Chapter 13 Lighting assessment. The assessment considered the outline maximum height and massing parameters of the buildings within phases two and three.

There are no changes to relevant policy or guidance that affect the results reported within Chapter 13 of the ES (2016) and the baseline conditions defined in ES (2016) is considered to still be valid for the purposes of impact assessment. The residual and cumulative effects discussed in the Chapter 13 of the ES (2016) remain unchanged.

The conclusions made within the Chapter 13 of the submitted ES (2016) remain valid and there is no change to the conclusions set out in the ES (2016).

2.11 Chapter 14 Wind

In 2016, Element Energy undertook a set of fluid dynamic simulations to study the predicted wind microclimate at the site. This was summarised in the Environmental Statement (ES, 2016), Chapter 14: Wind Microclimate dated 21st April 2016. The report identified any areas of concern regarding wind microclimate, including potential exceedances of the criteria. In addition to the CFD study, BMT fluid mechanics was commissioned to undertake a wind tunnel study and recommendations from the BMT study were taken forward in the Environmental Statement.

The CFD microclimate work in the above Environmental Statement was based on the illustrative scheme for the outline phase. We have conducted a review based on the drawings below, drawing on our experience informed by extensive microclimate assessments.

In the original study within the ES (2016), it was identified that the southern aspect of the development, which had the tallest buildings, tended to show higher wind speeds at pedestrian ground floor levels and balconies. In the revised illustrative drawings, Block G is removed, while Blocks C, D, and E increase in height by one floor, whilst the tallest buildings Blocks A and B remain unchanged.

The increase in one floor would have the potential to increase the downdraft on the upwind faces. But these changes are limited and not expected to degrade pedestrian comfort or safety relative

to the conditions identified by us in (ES 2016). From a microclimate assessment, we view the baseline in (ES 2016) still valid for the purposes of an impact assessment.

BMT have completed a programme of wind tunnel studies to assess the wind microclimate for the previously proposed Hale Wharf development. This was summarised in the Chapter 14: Wind Microclimate ES (2016) and in a supporting full technical report. The study concluded that with the introduction of the proposed development, wind conditions rate was suitable, in terms of pedestrian safety, at all locations within and around the application site. In terms of pedestrian comfort, all ground level locations rate as suitable and balconies are also largely suitable. A small number of exceedances of the criteria would occur at balcony levels but with the introduction of wind mitigation measures, balcony location conditions improve and are suitable for at least 95% of the time during summer, therefore complying with the comfort criteria at all locations.

The wind microclimate results in ES (2016) were assessed based on the illustrative scheme for the outline phase, therefore BMT have carried out a review of the changes with respect to the likely impact upon wind conditions within and around the site. BMT have conducted this review on the basis of the drawings listed below, with the review being experience based but being heavily informed by the prior wind tunnel testing methodology.

The revised design represents a minimal change to the scheme described in ES (2016), from a wind microclimate perspective. There is no change to the relevant guidance or policy concerning the changes of the design. The baseline defined in ES (2016) is considered to be still valid for the purposes of the impact assessment.

According to the revised illustrative drawings, Block G is removed, and Blocks C, D and E increase by one floor. The increase in height has the potential to slightly increase the downdraft on the upwind sides of the buildings. However, significant impact on pedestrian level wind conditions is not expected due to the height increase of Buildings C, D and E. The removal of Building G is not expected to have any adverse effects on pedestrian comfort and safety. This is because the removal of the building would only serve to alleviate the effect of funnelling of commonly occurring westerly winds between Block G and the adjacent building, Block F. Moreover, with the removal of Block G, this northernmost portion of the development essentially reverts closely towards existing conditions (where this plot is empty), and where wind conditions are suitable for planned pedestrian uses.

The proposed mitigations and the identified residual impact described in ES (2016) remain valid.

Thus, the revised scheme will not materially change the conclusions of the wind tunnel assessment discussed in Chapter 14: Wind Microclimate of the submitted ES (2016) and there is no change to the conclusions set out in the ES (2016).

2.12 Chapter 15 Socio-economics

The changes to the proposed development will involve a reduction in the footprint of buildings in the northern part of the application site. However, these amendments will not change the proposed maximum number of residential units stated within the ES (2016) which will remain at 505. In addition, the unit size and mix of the dwellings will remain the same as what was assessed in the ES and stated within the memo submitted to the LBH regarding clarifications on the affordable housing provision dated 18/10/2016 (refer to Appendix D). In addition, the commercial floorspace provided within the development will also remain the same at 1,512m^2 Gross Internal Area (GIA) and the proposed development will still bring forward 0.17ha of publically accessible amenity space and 450m^2 of doorstep playable space on-site. It has also been assumed that the demolition and construction programme and cost have remained the same for the purposes of this addendum.

The socio-economic methodology used in the assessment remains valid. There have been no significant changes to recent planning policy with the exception of the the Draft Interim Housing Supplementary Planning Guidance (2015) for London, which was published in March 2016.

Since submission of the ES (2016) there have been updates to the following guidance/data sources:

- Greater London Authority (GLA) London Datastore (2015), 2014 Round Household Projections has been replaced with GLA London Datastore (2016), 2015 Round Household Projections (1);
- Office for National Statistics (ONS) (2015), Annual Business Survey: UK Non-Financial Business Economy, 2014 Provisional Results has been replaced with ONS (2016), Annual Business Survey: UK Non-Financial Business Economy, 2015 Provisional Results (2);
- Labour Market Profile Data (2015) has been replaced with data from 2016 (3);
- Annual Survey of Hours and Earnings (ASHE) Provisional Results (2015) has been replaced with ASHE Provisional Results (2016) (4);
- UK Construction Market Survey (2016) has been replaced with a survey from the third quarter of 2016 (5);
- School data on local facilities and capacity has been replaced with data from 2014/2015 (6) (7);
- NHS data on local services and capacity has been replaced with data released from October 2016 (8) (9); and
- Crime statistics has been replaced with data from November 2016 (10).

These above updates means the following in terms of the baseline conditions:

- Based on the GLA's 2015 Round Household Projections, the LBH's Average Household Size (AHS) for Phase 1 will be 2.362 based on an operational year of 2019, and Phases 2 and 3 will be 2.336 based on an operational year of 2021. Therefore the projected population will be 1,186; a reduction in one from the total population of 1,187 previously stated within the ES (2016).
- Based on the ONS's Annual Business Survey 2015 Provisional Results and the capital construction costs, the total employment over a 12 month term would be for approximately 585 construction jobs. Based on a total construction period of approximately 54 months (dependent on the market requirements at the time of construction); the total average employment generated would be approximately 130 construction jobs over the duration of the demolition and construction phase. This is a decrease in 13 from the total average construction jobs of 143 previously stated within the ES (2016).
- Based on the LBH's Labour Market Profile Data from 2016, the economic activity figures are only marginally different and represent the same conclusions.
- Based on the ASHE Provisional Results (2016), the average income for the Borough is £38,266 compared to the regional average of £44,094. The average wage per week in the Borough is £662 which is lower than the regional average (£775). This indicates that the Borough is approximately 15% behind the London regional average income instead of 30% previously stated within the ES (2016).
- Based on the UK Construction Market Survey from the third quarter of 2016, the conclusions in relation to construction employment remain the same.
- There are 14 primary age facilities within a one mile radius of the application site with a current surplus of 1,156 primary school places. The forecast data for 2020/2021 (when the development would likely become operational) shows that within Planning Area 4 (the area the application site is located within) there would be a slight surplus of 83 primary school places, compared to a deficit of 392 previously stated within the ES (2016). There are 12 secondary age facilities within a two mile radius of the application site with a current surplus

of 1,715 secondary school places. The forecast data for 2020/2021 (when the development would likely become operational) shows a significantly low total net capacity for the identified secondary planning areas with a deficit of 2,251 secondary school places, compared to a deficit of 3,844 previously stated within the ES (2016).

- Seven GP surgeries have been identified within a one mile radius of the application site, all within the Haringey Clinical Commissioning Group (CCG). All of these surgeries are currently accepting new patients; however there is currently an oversubscription against the best practice ratio of 2,357 patients. This has improved since the ES (2016) which noted an oversubscription of 7,104 patients. Following consultation for the ES (2016) a GP surgery was opened in close proximity to the application site to accommodate up to 6,000 patients in August 2016. This will be followed by the opening of one or two permanent GP surgeries in the local area by March 2019 to accommodate 20,000 to 30,000 patients. Therefore these future plans have been taken into consideration within the addendum. However, it should be noted that even though the oversubscription has reduced by 4,747 places, as there is still a significant oversubscription it is considered the effect remains the same.
- Based on the Police UK crime statistics from November 2016, the crime figures are only marginally different and represent the same conclusions.

It is considered these changes will not significantly change the baseline defined in the ES (2016), although they have been taken into consideration for the purposes of the impact assessment.

The potential impact of the proposed development on primary educational facilities has now changed. Within the ES (2016) the potential impact was previously stated as a Slight Adverse effect due to the identified deficit in primary places as a result of the primary pupil projections within the relevant local planning area. As this local planning area is now showing a slight surplus in primary places it is now considered the proposed development would result in a Negligible effect. It should be noted that all other potential impacts stated within the ES (2016) would result in the same effects.

The mitigation measures stated within the ES (2016) remain the same.

The cumulative effects stated within the ES (2016) remain the same.

The residual effect of the proposed development on primary educational facilities has been affected due to the change to the potential impact. Within the ES (2016) following implementation of the mitigation measure to provide financial contributions the residual effect was previously stated as a Negligible effect. However, as there is currently more capacity within primary schools, the residual effect following mitigation would now be Minor Beneficial. All other residual effects stated within the ES (2016) would remain the same.

The conclusions made within Chapter 15 of the submitted ES (2016) remain valid and there are no changes to the conclusions set out in the ES (2016) with the exception of primary educational facilities, where potential impacts are reduced.

Chapter 15 Socio-economics References:

1. **Greater London Authority.** 2015 Round Household Projections (Long-Term Trend-Based Population Scenario). *London Datastore.* [Online] 2016. [Cited: 23 January 2017.] https://data.london.gov.uk/dataset/2015-round-household-projections.

2. **Office for National Statistics.** Annual Business Survey. *UK Non-Financial Business Economy, 2015 Provisional Results.* [Online] 10 November 2016. [Cited: 23 January 2017.] https://www.ons.gov.uk/businessindustryandtrade/business/businessservices/bulletins/uknonfinancialbusineseconomy/2015provisionalresults.

3. —. Labour Market Profile: NOMIS Official Labour Market Statistics. [Online] ONS, 2016. [Cited: 23 January 2017.] https://www.nomisweb.co.uk/.
4. —. Annual Survey of Hours and Earnings (ASHE) Provisional 2016 Results. [Online] ONS, 2016. [Cited: 23 January 2017.] https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/bulletins/annualsurveyofhoursandearnings/2016provisionalresults.
5. **Royal Institute of Chartered Surveyors.** *UK Construction Market Survey.* London : RICS, 2016.
6. **GOV.UK.** Find and compare schools in England. [Online] Open Government Licence, 2017. [Cited: 23 January 2017.] https://www.gov.uk/school-performance-tables.
7. **Department for Education.** School Capacity 2014/2015. [Online] 2016. [Cited: 23 January 2017.] https://www.gov.uk/government/publications/school-capacity-academic-year-2014-to-2015.
8. **National Health Service.** NHS Choices: Find GP Services. [Online] 2017. [Cited: 23 January 2017.] http://www.nhs.uk/Service-Search/GP/LocationSearch/4.
9. **NHS Digital.** Numbers of Patients Registered at a GP Practice - October 2016. [Online] 2016. [Cited: 23 January 2017.] https://www.gov.uk/government/statistics/numbers-of-patients-registered-at-a-gp-practice-october-2016.
10. **Home Office.** Crime and policing in England, Wales and Northern Ireland. [Online] Police UK, 2016. [Cited: 23 January 2017.] https://www.police.uk/.

2.13 Volume 1A Townscape, Heritage and Visual Assessment

Please see Appendix E for the updated Townscape, Heritage and Visual Assessment undertaken by Richard Coleman City Designer.

3. STANDALONE ENVIRONMENTAL ASSESSMENTS

3.1 Habitat Regulations Assessment (HRA) Screening

A review has been undertaken to establish if changes to the original scheme affect the Habitats Regulations Assessment (HRA) Screening Report presented as Technical Appendix 8.A of the ES (2016). There have been no changes to relevant HRA guidance or policy since preparation of the ES and the assessment methodology remains as set out within Technical Appendix 8.A of the ES (2016). In line with normal procedures, the HRA screening assessed the illustrative scheme with all mitigation assumed to be implemented. The baseline defined in the ES (2016) is considered to remain valid for the purposes of the assessment.

Of the potential effects considered during the screening for Likely Significant Effects to the qualifying features of the Lee Valley Special Protection Area (SPA)/Ramsar Site, the following are considered to require reconsideration as a result of the change to building massing and footprint (i.e. removal of Building G from the proposals):

Construction:
- Noise disturbance to birds.

Operation:
- Overshadowing/visual intrusion effects to vegetation and birds.

Commentary on these reconsiderations is provided in Table 1 below.

Table 1 Commentary on the implications of the proposed changes to HRA screening

Effect	Feature of interest	Implications of change	Outcome

Construction			
Noise disturbance	Bittern, gadwall, shoveler	Assessment states that "*During Phase 2, enabling demolition will cause a >3 dB change in sound levels at the southern 5.2 ha of Lockwood Reservoir and north eastern 1.5 ha of Lower Maynard Reservoir.*" The potential risk to bird disturbance was also mitigated by the implementation of bird watching briefs during demolition and piling. The spatial extent of potential noise disturbance will be partly reduced as a result of no piling being required at the northern part of the site where the illustrative scheme previously showed Block G . The duration of the effect will also be smaller as there will be one less piling operation within the programme. Therefore, the proposed changes will not cause an increase in the adverse nature of the effect.	No change to outcome
Operation			
Overshadowing/visual intrusion	Bittern, gadwall, shoveler	The potential sensitivity to the reduction in sightlines from presence of building blocks was assessed. The reduced building footprint and associated removal of Block G from the illustrative scheme presents a small improvement in terms of the distance-to-structure skyline analysis (i.e. less visual intrusion close to the receptor). However the photo montage views indicate that obstructions to views already exist in the forms of bunds and existing residential property to the west, which cover much of the same skyline as the proposed development. The increase in height of Blocks C, D and E are not likely to be perceived by the waterfowl or trigger a behavioural response above that already assessed as part of the outline scheme for these blocks. Please refer to Appendix F for the revised daytime HRA viewpoints (HRA 2, 3 and 4).	No change to outcome
Overshadowing/visual intrusion	Whorled Water Milfoil	The change to the height of Blocks C, D and E shown on the illustrative scheme (within the same maximum height parameters) will increase the potential shadow lengths within the reservoir which may influence future whorled water milfoil growth, however the shaded area will also be reduced by the removal of Block G. The ES (2016) found that the predicted average light availability within the shaded area was not significantly different to that of the unshaded area and that whorled water milfoil is tolerant of part shade, therefore the outcome of the original assessment remains valid.	No change to outcome

There would be no change to the outcome of the HRA Screening report and therefore no additional mitigation would be required.

The assessment of in-combination effects remains as set out within Technical Appendix 8.A of the ES (2016). The conclusions made within the HRA screening report submitted with the ES (2016)

remain valid and there is no change to the conclusions set out in the Technical Appendix 8.A of the submitted ES (2016).

3.2 Water Framework Directive

The Water Framework Directive (WFD) assessment has been completed on the basis of the maximum parameters as utilised for all elements of the ES (2016) and the removal of Block G from the proposed development does not change that assessment scope. The removal of Block G will not result in any changes to the construction methods required on the site, including the river wall surrounding the application site, nor the operational activities through the life of the development. Provision of an additional floor in each of blocks D, E and F as part of the illustrative scheme is not anticipated to result in a significant increase in shading over the adjacent water body. The number of piled foundations will be reduced by a small amount, thus providing a small reduction in the potential for vertical migration of contamination that may exist beneath the site into the underlying aquifer. The potential effects on the water environment associated with construction and operational phases of the revised development are therefore not considered to affect the WFD assessment undertaken to date or the conclusions reached within the assessment. The revised development remains in compliance with the requirements of the WFD.

4. SUMMARY AND CONCLUSION

This Addendum to the ES (2016) considers whether the amendments to the proposed development alter the findings of the original ES (2016) and the Standalone Environmental Assessments undertaken.

Whilst these changes do result in some amendments to the content of the original ES (2016) and the HRA Screening, the amendments are minor and the only change to the assessment of significance of effects set out in the original ES (2016) are as follows:

Chapter 17 Summary of Mitigation and Residual Effects remains unchanged except for the following amendment within Table 17.3 Residual Effects during the Operational Phase of the Proposed Development:

- Socio-economics: The significance of effect on the demand for primary school places has seen a slight improvement due to the recent changes in baseline conditions, which now show additional capacity within the local primary schools. This results in the residual effect changing from Negligible to Slight Beneficial with the incorporation of financial contributions as mitigation.

The summary of residual effects during the demolition and construction phase (Table 17.2) within Chapter 17 of the ES (2016) and the findings within Chapter 16 Cumulative Impact Assessment of the ES (2016) remain valid and unchanged.

The Non-Technical Summary of the ES (2016) also remains unchanged.

APPENDICES

APPENDIX A – Revised Parameter Plans, Landscape General Arrangements and Sketch

APPENDIX B – Clarifications on Air Quality

APPENDIX C – Below Ground Drainage Strategy

APPENDIX D - Socio-Economic Affordable Housing Provision Memo

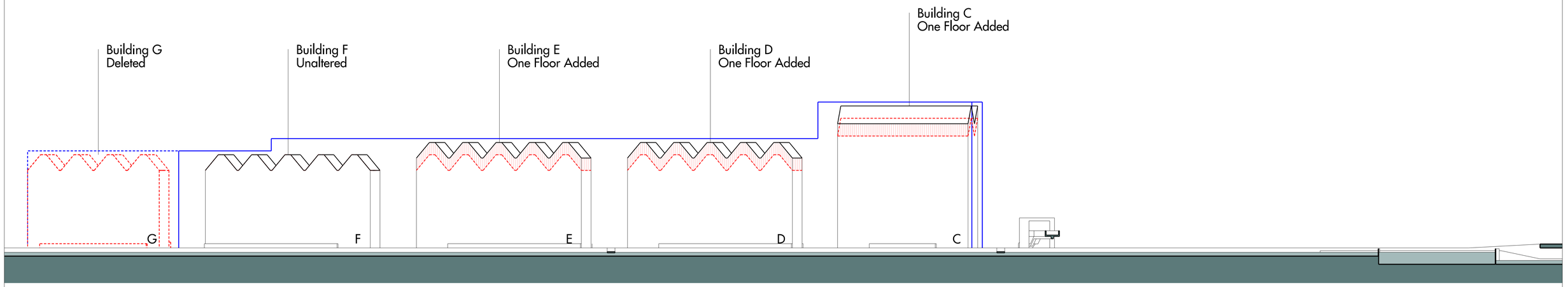
APPENDIX E - Updated Townscape, Heritage and Visual Impact Assessment

APPENDIX F – Revised Daytime HRA Screening Viewpoints

APPENDIX A
Revised Parameter Plans, Landscape General Arrangements and Sketch

KEY

- Maximum Extent of Building Line
- Maximum Extent of Building Line as for Planning Application
- Proposed Height
- Submitted as part of Planning Application



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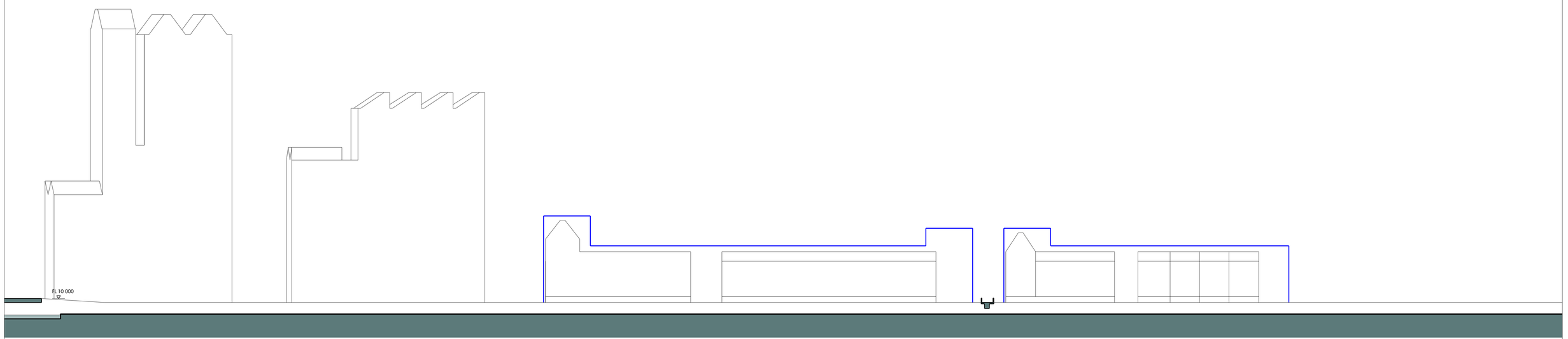

02 EAST ELEVATION

FOR INFORMATION ONLY

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SK	17.01.2017	For Information	

Allies and Morrison
85 Southwark Street
London SE1 0HX
telephone 020 7921 0100
facsimile 020 7921 0101
email info@alliesandmorrison.com

A&M JOB NO: 535_02

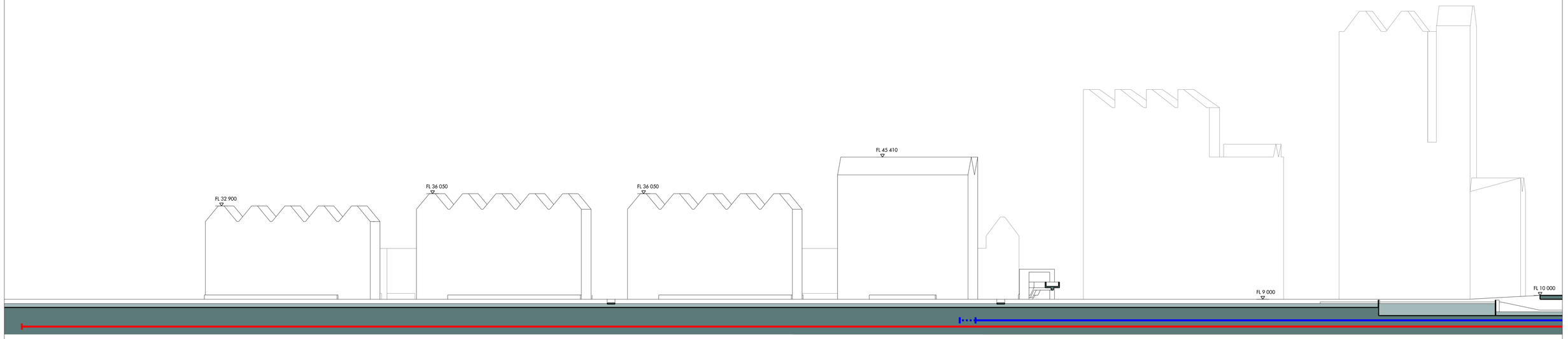
HALE WHARF

BUILDING HEIGHTS COMPARISON SKETCH

535_02_SK_111

SCALE 1:500 @A1 1:1000 @A3

SK
Revision



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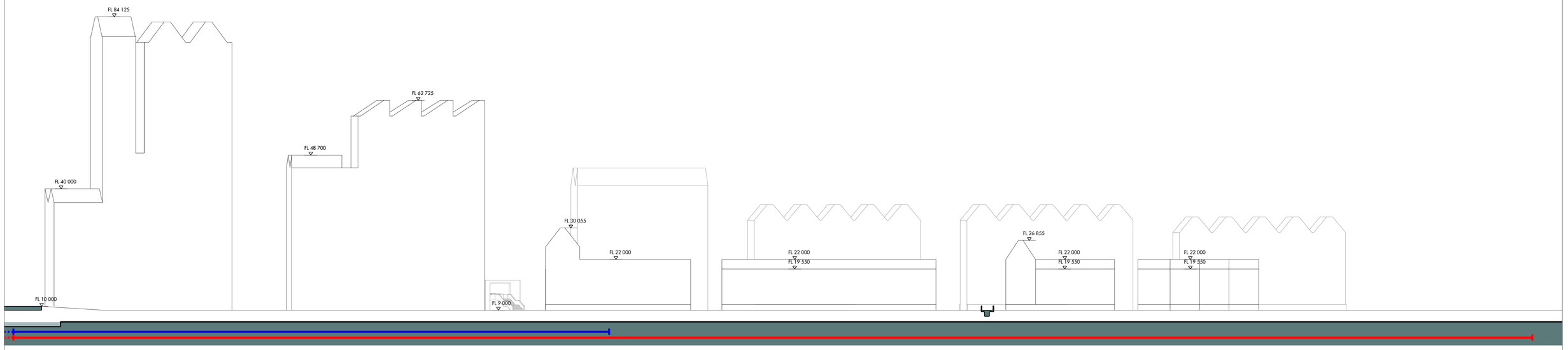

02 EAST ELEVATION

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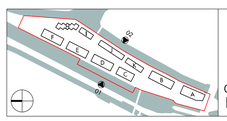


Do not scale from this drawing. Use figured dimensions only. Figured dimensions are in millimetres. All levels are in metres. All dimensions and levels shall be verified on site before proceeding with works. Detailed site survey to be carried out to verify positions and level relationships with site features and ordnance survey. Boundaries are indicative only and are to be verified by others. The architect must be notified of any discrepancy. Where building components are described in the specification as contractor designed, "construction" information relating to those components on this drawing represents design intent only

KEY:
- Extent of Application
- Extent of Application Beyond
- Extent of Detail Portion of Application
- Extent of Detail Portion of Application Beyond

REV	DATE	DESCRIPTION	CKD
PL1	20.05.2016	Issue for Planning	HH
PL2	23.01.2017	Development area amended	HH

Allies and Morrison
85 Southwark Street
London SE1 0HX
telephone 020 7921 0100
facsimile 020 7921 0101
email info@alliesandmorrison.com

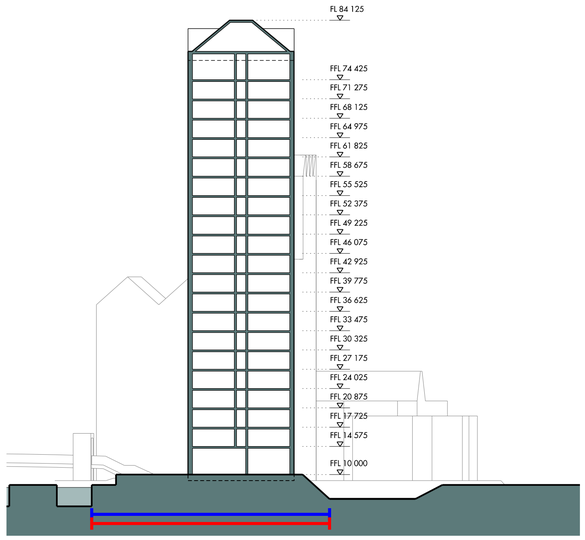
A&M JOB NO: 535_02

HALE WHARF

PROPOSED SITE ELEVATIONS
ILLUSTRATIVE MASTERPLAN
535_02_07_200

SCALE 1:1000 @A3

PL2
Revision



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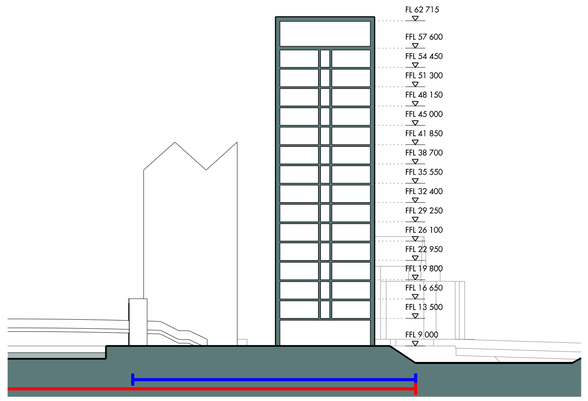

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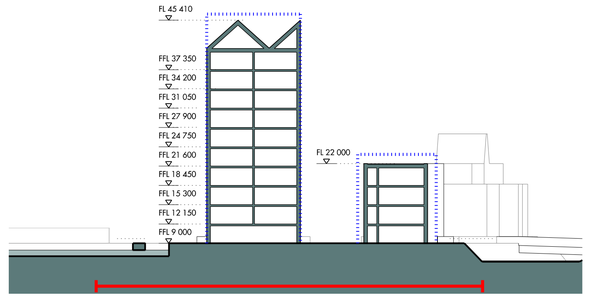

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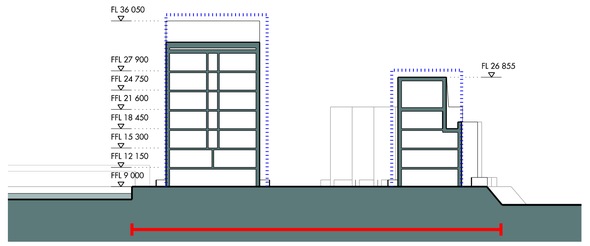

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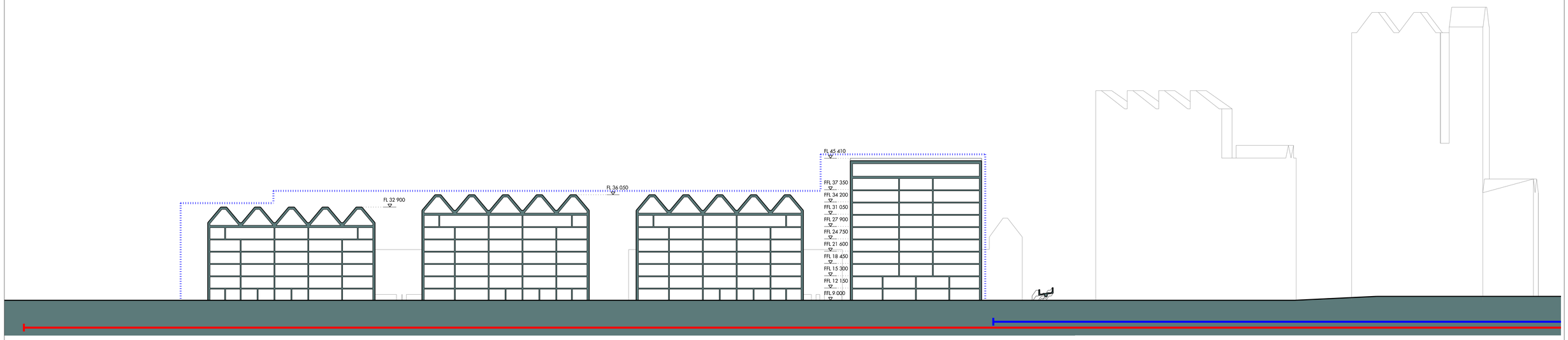

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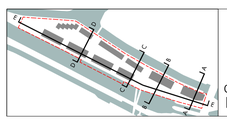

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KEY:
- Extent of Application
- Extent of Detail Portion of Application
- Maximum Extent of Building Line

REV	DATE	DESCRIPTION	CKD
PL1	20.05.2016	Issue for Planning	HH
PL2	23.01.2017	Development area amended	HH

Allies and Morrison
85 Southwark Street
London SE1 0HX
telephone 020 7921 0100
facsimile 020 7921 0101
email info@alliesandmorrison.com

A&M JOB NO: 535_02

HALE WHARF

PROPOSED SITE SECTIONS
ILLUSTRATIVE MASTERPLAN
535_02_07_300

SCALE 1:1000@A3

PL2
Revision

KEY

- Application Boundary
- Detailed Portion of Application
- Outline Portion of Application

Note: Where Outline & Detailed boundaries overlap: Approval is being sought for both Outline and Detailed Consent

- 1 Development Zone
- Maximum Extent of Building Line
- Gap Required Between Buildings for future Bridge Landing
  Minimum 12m Between Building Faces
- Gap Required Between Buildings
  Minimum 10m Between Building Faces
- Gap Required Between Buildings
  Minimum 6m Between Building Faces
- Location of Boaters' Bin Store
  Maximum size 5m x 5m x 3m high

Development Zone 1

Development Zone 2

Development Zone 3

THE PADDOCK

OVERFLOW WEIR

FLOOD RELIEF CHANNEL

RIVER LEE NAVIGATION

TOW PATH

PYMMES BROOK

MILL MEAD ROAD

TOTTENHAM LOCK

FERRY LANE

Outline Approval is sought for buildings in this location - see illustrative plan 535_02_07_100; Detailed Approval is sought for Phase 1 interim car parking in the same area - see landscape plan 435.013.

Outline Approval is sought for a bridge and bridge landing in this location - see parameter plan THGL/234; Detailed Approval is sought for Phase 1 landscape works in the same area - see landscape plan 435.012.

0 5 2.5m

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PL1	20.05.2016	Issue for Planning	HH
PL2	23.01.2017	Development area amended	HH

Allies and Morrison
85 Southwark Street
London SE1 0HX
telephone 020 7921 0100
facsimile 020 7921 0101
email info@alliesandmorrison.com

A&M JOB NO: 535_02

HALE WHARF

DEVELOPMENT ZONES AT GROUND LEVEL PARAMETER PLAN 535_02_07_022

SCALE 1:1000 @A3

PL2
Revision

KEY

- Application Boundary
- Detailed Portion of Application
- Outline Portion of Application

Note: Where Outline & Detailed boundaries overlap: Approval is being sought for both Outline and Detailed Consent

- 1 Development Zone
- Maximum Extent of Building Line
- Gap Required Between Buildings for future Bridge Landing
  Minimum 12m Between Building Faces
- Gap Required Between Buildings
  Minimum 10m Between Building Faces
- Gap Required Between Buildings
  Minimum 6m Between Building Faces

Development Zone 2

Development Zone 1

Development Zone 3

THE PADDOCK

OVERFIELDS YPEWORK

FLOOD RELIEF CHANNEL

RIVER LEE NAVIGATION

TOW PATH

PYMMES BROOK

MILL MEAD ROAD

TOTTENHAM LOCK

FERRY LANE

Outline Approval is sought for buildings in this location - see illustrative plan 535_02_07_100; Detailed Approval is sought for Phase 1 interim car parking in the same area - see landscape plan 435.013.

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0 5 2.5m

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REV	DATE	DESCRIPTION	CKD
PL1	20.05.2016	Issue for Planning	HH
PL2	23.01.2017	Development area amended	HH

Allies and Morrison
85 Southwark Street
London SE1 0HX
telephone 020 7921 0100
facsimile 020 7921 0101
email info@alliesandmorrison.com

A&M JOB NO: 535_02

HALE WHARF

DEVELOPMENT ZONES AT UPPER LEVELS PARAMETER PLAN 535_02_07_023

PL2
Revision

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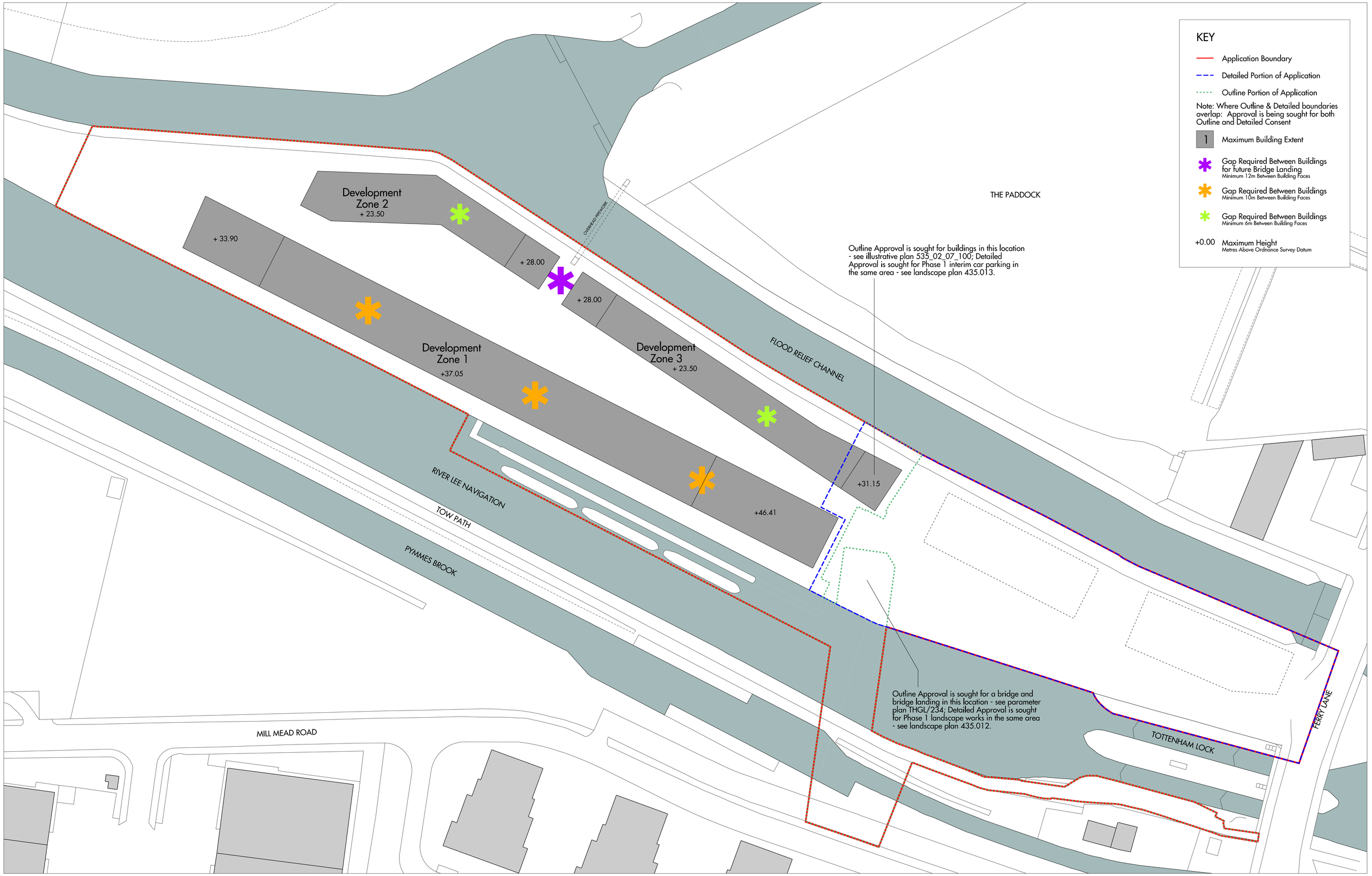

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Do not scale from this drawing. Use figured dimensions only. Figured dimensions are in millimetres. All levels are in metres. All dimensions and levels shall be verified on site before proceeding with works. Detailed site survey to be carried out to verify positions and level relationships with site features and ordnance survey. Boundaries are indicative only and are to be verified by others. The architect must be notified of any discrepancy. Where building components are described in the specification as contractor designed, "construction" information relating to those components on this drawing represents design intent only

REV	DATE	DESCRIPTION	CKD
PL1	20.05.2016	Issue for Planning	HH
PL2	23.01.2017	Development area amended	HH

Allies and Morrison
85 Southwark Street
London SE1 0HX
telephone 020 7921 0100
facsimile 020 7921 0101
email info@alliesandmorrison.com

A&M JOB NO: 535_02

HALE WHARF

BUILDING HEIGHTS PARAMETER PLAN 535_02_07_024

SCALE 1:1000 @A3

PL2
Revision

Development Zone 2

Development Zone 1

Development Zone 3

THE PADDOCK

OVERHEAD WIRWORK

FLOOD RELIEF CHANNEL

RIVER LEE NAVIGATION

TOW PATH

PYMMES BROOK

MILL MEAD ROAD

TOTTENHAM LOCK

FERRY LANE

Outline Approval is sought for buildings in this location - see illustrative plan 535_02_07_100; Detailed Approval is sought for Phase 1 interim car parking in the same area - see landscape plan 435.013.

Outline Approval is sought for a bridge and bridge landing in this location - see parameter plan THGL/234; Detailed Approval is sought for Phase 1 landscape works in the same area - see landscape plan 435.012.

KEY

- Application Boundary
- Detailed Portion of Application
- Outline Portion of Application

Note: Where Outline & Detailed boundaries overlap: Approval is being sought for both Outline and Detailed Consent

- 1 Development Zone
- Gap Required Between Buildings for future Bridge Landing
  Minimum 12m Between Building Faces
- Gap Required Between Buildings
  Minimum 10m Between Building Faces
- Gap Required Between Buildings
  Minimum 6m Between Building Faces
- Location of Boaters' Bin Store
  Maximum size 5m x 5m x 3m high
- Point of Access
  Bridge Interface
- Primary Vehicular Access Route
  Two Lanes
- Primary Vehicular Access Route
  One Lane
- Primary Pedestrian / Cycle Route
- Biodiverse Zone - No Public Access
- Play Space

0 5 25m

Do not scale from this drawing. Use figured dimensions only. Figured dimensions are in millimetres. All levels are in metres. All dimensions and levels shall be verified on site before proceeding with works. Detailed site survey to be carried out to verify positions and level relationships with site features and ordnance survey. Boundaries are indicative only and are to be verified by others. The architect must be notified of any discrepancy. Where building components are described in the specification as contractor designed, "construction" information relating to those components on this drawing represents design intent only

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PL2	23.01.2017	Development area amended	HH

Allies and Morrison
85 Southwark Street
London SE1 0HX
telephone 020 7921 0100
facsimile 020 7921 0101
email info@alliesandmorrison.com

A&M JOB NO: 535_02

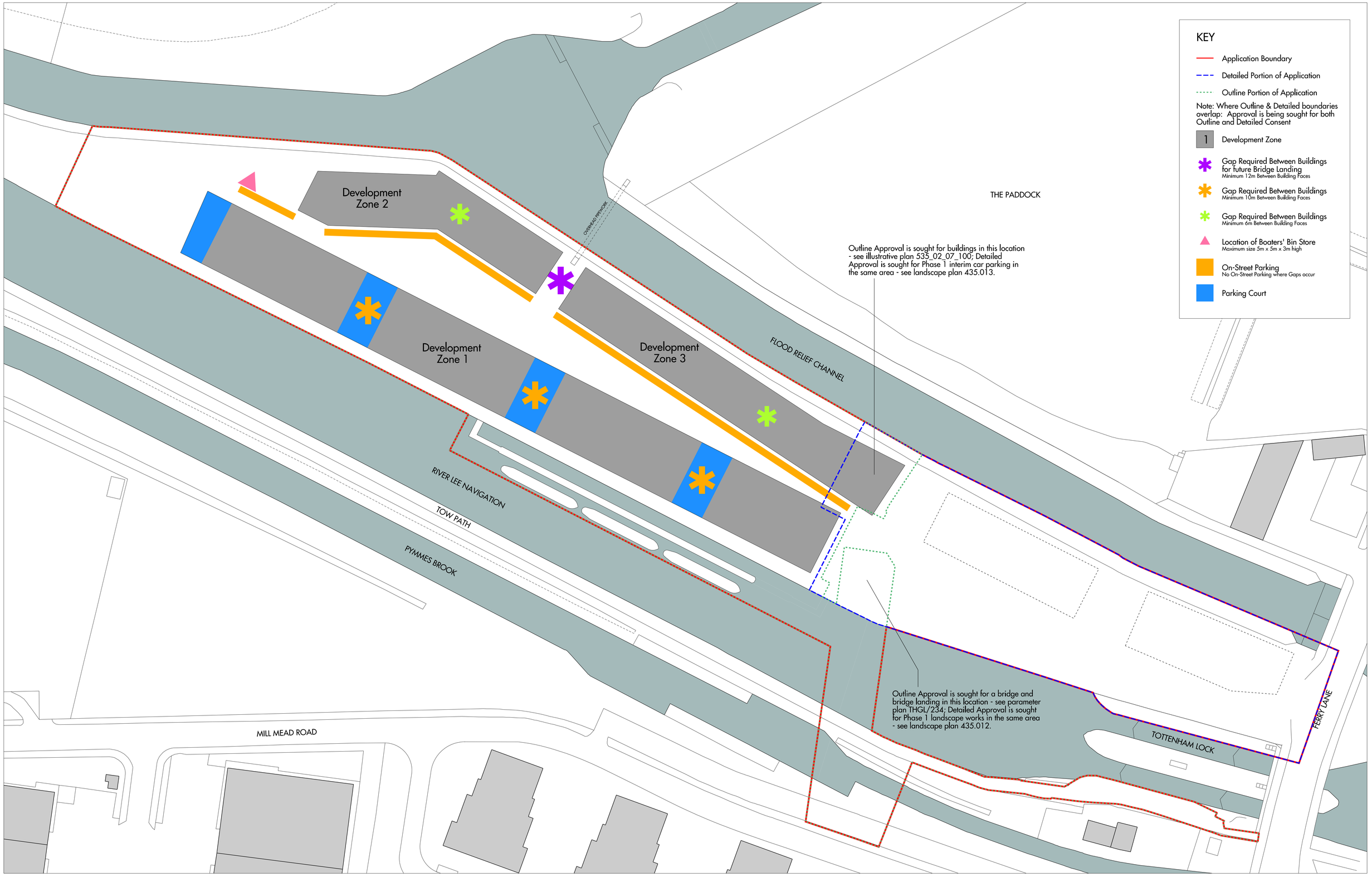
HALE WHARF

ACCESS AND PUBLIC REALM PARAMETER PLAN

535_02_07_025

SCALE 1:1000 @A3

PL2
Revision



0 5 25m

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Allies and Morrison
85 Southwark Street
London SE1 0HX
telephone 020 7921 0100
facsimile 020 7921 0101
email info@alliesandmorrison.com

A&M JOB NO: 535_02

HALE WHARF

CAR PARKING PARAMETER PLAN 535_02_07_026

SCALE 1:1000 @A3

PL2
Revision

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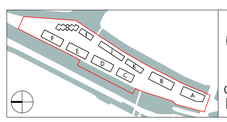
THE PADDOCK
FLOOD RELIEF CHANNEL
RIVER LEE NAVIGATION
TOW PATH
PYMMES BROOK
MILL MEAD ROAD
TOTTENHAM LOCK
FERRY LANE
PROPOSED LEVEL FOOTBRIDGE DO NOT CONSTRUCT PART OF APPLICATION
PROPOSED PEDESTRIAN FOOTBRIDGE ABOVE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY
PROPOSED LEVEL FOOTBRIDGE
ILLUSTRATIVE ONLY



0 5 25m

Do not scale from this drawing. Use figured dimensions only. Figured dimensions are in millimetres. All levels are in metres. All dimensions and levels shall be verified on site before proceeding with works. Detailed site survey to be carried out to verify positions and level relationships with site features and ordnance survey. Boundaries are indicative only and are to be verified by others. The architect must be notified of any discrepancy. Where building components are described in the specification as contractor designed, "construction" information relating to those components on this drawing represents design intent only

KEY:

- Application Boundary
- Detail Portion of Application
- Outline Portion of Application

Where Outline & Detailed boundaries overlap: Approval is being sought for both Outline Consent and Detailed Consent to accommodate for example, but not limited to, facilitating works.

- Residential Space
- Commercial Space
- Office Space
- Bikes / Bins / Services

REV	DATE	DESCRIPTION	CKD
PL1	20.05.2016	Issue for Planning	HH
PL2	23.01.2017	Development area amended	HH

Allies and Morrison
85 Southwark Street
London SE1 0HX
telephone 020 7921 0100
facsimile 020 7921 0101
email info@alliesandmorrison.com

A&M JOB NO: 535_02

HALE WHARF

PROPOSED GROUND FLOOR ILLUSTRATIVE MASTERPLAN 535_02_07_100

SCALE 1:1000 @A3

PL2
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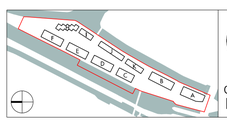
PYMMES BROOK
MILL MEAD ROAD
PROPOSED PEDESTRIAN FOOTBRIDGE ABOVE
SHOWN FOR ILLUSTRATIVE PURPOSES ONLY
PROPOSED LEVEL FOOTBRIDGE
TOTTENHAM LOCK
FERRY LANE
ILLUSTRATIVE ONLY



0 5 25m

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- Application Boundary
- Detail Portion of Application
- Outline Portion of Application

Where Outline & Detailed boundaries overlap: Approval is being sought for both Outline Consent and Detailed Consent to accommodate for example, but not limited to, facilitating works.

REV	DATE	DESCRIPTION	CKD
PL1	20.05.2016	Issue for Planning	HH
PL2	23.01.2017	Development area amended	HH

Allies and Morrison
85 Southwark Street
London SE1 0HX
telephone 020 7921 0100
facsimile 020 7921 0101
email info@alliesandmorrison.com

A&M JOB NO: 535_02

HALE WHARF

PROPOSED ROOF PLAN ILLUSTRATIVE MASTERPLAN 535_02_07_121

SCALE 1:1000 @A3

PL2
Revision

KEY

- Application Boundary
- Detailed Portion of Application
- Outline Portion of Application
- Area of overlap between Detailed and Outline Components of the Application
- Illustrative Building Footprint
- Phase 1
- Phase 2
- Phase 3

THE PADDOCK

Outline Approval is sought for buildings in this location - see illustrative plan 535_02_07_100; Detailed Approval is sought for Phase 1 interim car parking in the same area - see landscape plan 435.013.

Outline Approval is sought for a bridge and bridge landing in this location - see parameter plan THGL/234; Detailed Approval is sought for Phase 1 landscape works in the same area - see landscape plan 435.012.

PROPOSED LEVEL FOOTBRIDGE DOES NOT FORM PART OF APPLICATION

OUTLINE PROPOSED LEVEL FOOTBRIDGE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY

OUTLINE PROPOSED LEVEL FOOTBRIDGE

A

B

C

D

E

F

H

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J

K

FLOOD RELIEF CHANNEL

RIVER LEE NAVIGATION

TOW PATH

PYMMES BROOK

MILL MEAD ROAD

TOTTENHAM LOCK

FERRY LANE

ILLUSTRATIVE ONLY

0 5 25m

Do not scale from this drawing. Use figured dimensions only. Figured dimensions are in millimetres. All levels are in metres. All dimensions and levels shall be verified on site before proceeding with works. Detailed site survey to be carried out to verify positions and level relationships with site features and ordnance survey. Boundaries are indicative only and are to be verified by others. The architect must be notified of any discrepancy. Where building components are described in the specification as contractor designed, "construction" information relating to those components on this drawing represents design intent only

REV	DATE	DESCRIPTION	CKD
PL1	20.05.2016	Issue for Planning	HH
PL2	23.01.2017	Development area amended	HH

Allies and Morrison
85 Southwark Street
London SE1 0HX
telephone 020 7921 0100
facsimile 020 7921 0101
email info@alliesandmorrison.com

A&M JOB NO: 535_02

HALE WHARF

STRATEGIC PHASING
ILLUSTRATIVE
535_02_07_030

SCALE 1:1000 @A3

PL2
Revision

KEY

- Application boundary
- Detailed application boundary
- Outline application boundary
- Green belt boundary

Hard Landscape

Surface Materials

S01 **Surface type 1:** Sureset 6mm, Golden Pearl, Resin bound or similar

S02 **Surface type 2:** Self-binding footpath gravel, gold colour by CEDEC or similar

S03 **Surface type 3:** Granitic concrete setts, 80mm depth x 150mm coursed x lengths of 300mm module laid in a stretcher bond (carriageway) 60mm x 150-400mm coursing x 150-400mm lengths laid in random coursing (footpath), as Hardscape 'Kellen, Tagenta B,C,D and E, ratios dependat on location, breccia finish or similar

S04 **Surface type 4:** Granitic concrete setts, laid in a stretcher bond. 80mm depth x 150mm coursed x lengths of 300mm (carriageway) 60mm depth x 150mm coursed x lengths of 300mm (footpath) as Hardscape 'Kellen, Nemaro Argento, breccia finish or similar

S05 **Surface type 5:** Granitic concrete slabs laid in random coursing. 60mm depth x 150-400mm coursed x lengths of between 200mm - 600mm as Hardscape 'Kellen, Bianco and Bianco 630, breccia finish or similar

S06 **Surface type 6:** Granitic concrete setts laid in a stretcher bond. 80mm depth x 150-300mm coursed x lengths of between 150 - 300mm as Hardscape 'Kellen, Bianco and Bianco 630, breccia finish' or similar

S07 **Surface type 7:** Reinforced grass surface, planted with planting type 1 (PT1), Golpla by Geosynthetics or similar

K01 **Kerb type 1:** Proposed kerb - Pre-cast concrete 255mm x 145mm x 915mm, saxon kerb laid flush on side as Marshalls or similar. 60mm upstand where (u) follows.

E01 **Edging type 1:** Pre-cast concrete. 63mm x 155mm Natural buff conservation edging as Marshalls or similar

E02 **Edging type 2:** Steel edging, Everedge classic, slate, by Everedge or similar

TP1 **Tactile paving 1:** Tactile Blister paving, 400x400x65, Textured Natural by Marshalls or similar

Street furniture and features

PS1 **Parking signage 1:** Bespoke 60x400x400 parking signage

PS2 **Parking signage 2:** Bespoke 60x400x400 parking signage

PS3 **Parking signage 3:** Bespoke 60x400x400 parking signage

BT1 **Bench type 1:** Escofet Banco Sócrates 360 Black or similar

BT2 **Bench type 2:** Escofet Banco Sócrates 240 Black or similar

BT3 **Bench type 3:** Escofet Cubo Sócrates 60 Black or similar

NP1 **Natural play equipment 1:** Informal features for imaginative natural play and incidental seating to include logs, boulders, trees, changes in level and lawn or similar

BO1 **Bollard type 1:** Hardwood timber 1000mm 250mm x 250mm top section by woodscape or simiar

SS1 **Sheffield stands 1:** Sheffield stands by Falco or similar located in an area of S01 (Sureset 6mm, COLOUR, Resin bonded or similar)

TG1 **Tree grill type 1:** Heavy duty pre-fabricated unit with paving finish. Paved top to match surrounding area, 'Castle' by Green Blue Urban or similar.

PA1 **Public art feature 1:** Proposed bespoke public art feature

IH1 **Insect hotels 1:** Bespoke insect hotel in durable corten framework, to form habitat for insects and small amphibians.

BB1 **Bird boxes 1:** Pre-fabricated bird boxes to be secured to suitable trees.

Lighting

LT1 **Lighting type 1:** Tapered column with adjustable luminaires, Sulex Candelabra Olivio Medio LED Triple or similar

Boundary Treatment

RT1 **Railing type 1:** Proposed bespoke 2400mm x 1100mm steel railings, flat and circular galvanised bar construction, painted RAL 7201, with 50mm circular hardwood timber handrail or similar.

Structures

FS1 **Floating structure 1:** New location of existing pontoon with potential extensions. Existing Jetty to be extended incorporating new access points

FS2 **Floating structure 2:** Modular floating rafts, "Floating Riverbanks" by Biomatrix Water or similar.

BS1 **Bridge structure 1:** Proposed footbridge to WWM Architects specification. (see notes)

BN1 **Bin store 1:** Proposed store for Boater's bins. Store to A&M's specification.

Soft Landscape

Groundcover planting

EP1 **Existing planting 1 :** Existing planting to the edge of the flood relief channel to be retained where possible.

PT1 **Planting type 1:** Native wildflower and grassland planting - Incorporating nectar rich species - species may include - Ajuga, Symphytum, Anthriscus, Ranunculus, Lysimachia, Festuca, Bellis, Luzula, Glechoma, Filipendula, Carex, Hypericum, Lychnis, Prunella, Stellaria, Galium, Daucus, Fragaria.

PT2 **Planting type 2:** Shrub planting - species may include: Hypercium,Lonicera, Potentilla, Astilbe, Carex, Choisya, Corylus, Euonymus, Festuca, Hebe, Prunus.

FP1 **Floating planting type 1:** modular floating rafts by Biomatrix Water or similar. Native species mix to include - Carex, Digitalis, Eupatorium, Geum, Filipendula, Juncus, Lychnis, Lycopus, Lysimachia, Lythrum, Mentha, Silene, Typha and Veronica

Hedging

HT1 **Hedge type 1:** Guidance hedging - native species to include - Crataegus, Prunus spinosa, Viburnum opulus, Cornus sanguinea, Fagus sylvatica, Acer campestre. Heights ranging from 1100mm to 1800mm.

HT2 **Hedge type 2:** Division Hedging - Fagus sylvatica Heights ranging from 500mm to 1400mm.

Trees

ET1 **Existing Tree 1:** Existing trees, to be retained where possible.

TT1 **Tree type 1:** Avenue Trees - Platanus acerifolia, 40-45cm, height 10m, Mature. All TT1 trees to use TG1 tree pit.

TT2 **Tree type 2:** Specimen Tree - Salix babylonica 20-25cm, height 5m, Semi-mature

TT3 **Tree type 3:** Fastigiate Trees - Quercus robur 'koster' fastigiata, 20-25cm, height 5m, Semi-mature

TT4 **Tree type 4:** Grouped tree planting - species mix to include - Alnus glutinosa, 20-25cm, height 6m, Semi-mature , Carpinus Betulus, 20-25cm, height 6m, Semi-mature and Pyrus communis, 20-25cm, height 5m, Semi-mature. Selected trees to be clear stem up to a height of 2400mm.

NOTES:

- Soft landscaped areas to be formed of at least 600mm of clean imported cover separated from the Made Ground with a teram (or similar) membrane demarcation layer.

- An explanation and description of the landscape features are provided within the accompanying Design and Access Statement

- Any changes to the specification should be discussed and accepted by Landscape Projects.

- Final selection of materials, tree and plant species and street furniture elements subject to detailed testing and assessment and procurement conditions

- Areas outside of the detailed application boundary are illustrative only.

- Proposed pedestrian footbridge shown for illustrative purposes only (subject to future approval)

- Outline approval is sought for a bridge and bridge landing in this location - see parameter plan THGL/234; Detailed Approval is sought for Phase 1 landscape works - see phase one plan 435.012.

- Landscape adjustments may be required in response to the detailed design of the pedestrian footbridge.

- Where outline and detailed boundaries overlap, approval is being sought for both consent and detailed consent in those areas to accomodate for example, but not limited to, facilitating works.

- Underground pumping station shown in illustrative form only, Engineer to advise, see drawing no. 33510-RAM-XX-00-DR-Z-111

- Landscaping shown within the outline application boundary is for illustrative purposes only.

(1) Do not scale from drawings - use written dimensions only. (2) All dimensions are in millimeters unless noted. (3) All dimensions shall be verified on site before proceeding with the work. (4) Landscape Projects shall be notified of any discrepancies. (5) Engineer to specify all sub-bases. Any below ground construction is indicative.

N

OB	PL3	2017-01-23	Planning resubmission
OB	PL2	2017-01-18	Car park edit
OB	PL1	2016-05-23	Planning

landscapeprojects
Landscape Architecture & Design
31 Blackfriars Road Salford Manchester M3 7AQ
PHONE: 0161 839 8336 FAX: 0161 839 7155
EMAIL: post@landscapeprojects.co.uk

Project Title: **Hale Wharf** London

Drawn Date: 2016-05-23 | Drawn: OB | Checked: NCS

Scale: 1:500 @ A1 | Status: Planning

Drawing Title: **Landscape Masterplan** General arrangement

Drawing No.: **435.010** | Revision: **PL3**

APPENDIX B
Clarifications on Air Quality

RAMBOLL ENVIRON

ENVIRONMENT & HEALTH

MEMO

Job	**Hale Wharf**
Client	**Muse Developments and Canal and River Trust**
Memo no.	**61033510/AQ1**
Date	**09/08/16**
To	**London Borough of Haringey**
From	**Victoria Gouge (Ramboll)**
Copy to	**Quod, Stace, Ramboll, Muse**

Planning Reference: HGY/2016/1719

Response to Environmental Services and Community Safety at London Borough of Haringey (LBH)

Date 09/08/16

Ramboll Environ
Carlton House
Ringwood Road
Woodlands
Southampton
SO40 7HT
United Kingdom

T +44 (0) 238 081 7500
F +44 (0) 845 299 1610
www.ramboll-environ.com

1. Energy Centre / CHP plant

1.1. The application includes provision of an on-site energy centre, only if required as part of the alternative energy strategy, and the Air Quality Impact Assessment (AQIA) as part of an Environmental Statement (ES) has assessed an Energy Centre as an alternative scheme should the connection to a District Heat Network not be viable.

1.2. Please note Hilson Moran have provided additional commentary, as a separate memorandum (Ref: 18335, dated 08/08/16), in response to the comments received regarding the number and detail of the CHP units, if required, as part of the alternative energy strategy.

1.3. Figure 5.19 provided for visual purposes only. The modelling used the latest available information for the assessment. The proposed stack height (if onsite CHP option is taken forward) would be approximately 5m. The figure does not show the proportion of internal stack height situated within the roof void area.

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Registered office:
240 Blackfriars Road
London
SE1 8NW

1.4. Table provided in Appendix 6.D updated below (in red):

Parameter	CHP	Boilers
Make and model	SAV - XRGI 20	MHS Ultramax R3602SB
Fuel	Natural Gas	Natural Gas
Number of units	4	3
Combined data		
Internal flue diameter (mm)	105.7	500
Stack height (m)	77	77
Emission temperature (˚C)	47	47
Emission velocity (m/s)	8.1	5.4
NO_x emission rate (g/s)	0.0011	0.0072
Operating hours	24 hours a day **– all CHP and boilers in operation**	

1.5. Data relating to the CHP was provided by Hilson Moran to Ramboll for modelling purposes only for an alternative scheme should connection to a District Heat Network not be viable. Should an on-site CHP be required, further examination of the most suitable plant would take place and the developer would ensure that the CHP complies with the emission velocity of 10m/s as per the Mayor's Sustainable Design and Construction SPG.

1.6. The air quality modelling has presented the scenario of 4 CHP units as this would provide the necessary energy demand for the proposed development. The Energy Strategy produced by Hilson Moran includes the possibility that the adjacent Newlon Site and Lockkeepers Cottages could be connected to Hale Wharf which would require 5 CHP units. However, this scenario may not be taken forward and therefore the modelling has predicted emissions only associated with the proposed development at Hale Wharf.

1.7. Data Sheets provided for emissions data (as mg/m^3 or mg/kWh).

2. Traffic

2.1 Ian Pinamonti-Hyde at LBH has provided the following comments discussing the Transport Assessment:

"Taking into account the residential, commercial and servicing trips into account, it is proposed that the overall numbers of car/vehicle trips will be lower than the surveyed existing. Based on the low parking proposed this is accepted."

2.2 Transport Consultants Odyssey Markides have drafted a response to address specific traffic related comments however it should be noted that Ian Pinamonti-Hyde of LBH also confirms the trip generations were derived as agreed at the scoping stage and although there are slight differences between TRICS and TRAVEL databases he does not consider these materially different. Please see attached correspondence for reference.

3. Air Quality Modelling Predictions

3.1 The 2014 background level for NO_2 was obtained from background mapping from Defra.

3.2 The closest existing properties to Ferry Lane have been selected as receptors. Baseline predictions, ranging from 31.38µg/m^3 to 40.8µg/m^3 seem reasonable considering that receptors 1-3 are second floor receptors; receptor 4 is a first floor receptor; and receptors 5-8 and 10 are set back from Ferry Lane (>10m). Receptor 9 is the only receptor within 10m of Ferry Lane (representing all properties at ground level along Ferry Lane) and this is predicted to be above the UK National Objective – in line with LAEI predictions. The model verification process has used LBH measured NO_2 levels obtaining a verification factor of 1.48 which suggests the model is performing well.

3.3 The 2021 scenario presented in the assessment is based on the transport emissions only as whilst the proposals include provision of an on-site energy centre, the CHP is only an option for an alteratnvie energy strategy should the connection to a District Heat Network not be viable. Appendix 6.D presents the predicted CHP process contributions at the most likely impacted locations which are the highest receptor locations being closest to the CHP stack exhaust for this alternative scheme.

3.4 The impact assessment provided below shows the with scheme scenario (2021) increased due to the addition of the possible CHP contributions. It can be seen that it does not make any change to the conclusions and the scheme still provides beneficial impacts to existing receptors.

Predicted Concentrations								
Without scheme	With scheme	Increase or decrease	change	Long term average Concentration at receptor in assessment year		% Change in concentration relative to Air Quality Assessment Level (AQAL)	Significance of Impact	Positive or Negative
31.38	31.35	Decrease	0.03	0.785	76-94% of AQAL	0.07	Negligible	Beneficial
31.55	31.50	Decrease	0.05	0.789	76-94% of AQAL	0.13	Negligible	Beneficial
31.52	31.48	Decrease	0.04	0.788	76-94% of AQAL	0.10	Negligible	Beneficial
32.73	32.70	Decrease	0.03	0.818	76-94% of AQAL	0.08	Negligible	Beneficial
36.61	36.47	Decrease	0.14	0.915	76-94% of AQAL	0.35	Negligible	Beneficial
33.72	33.62	Decrease	0.10	0.843	76-94% of AQAL	0.25	Negligible	Beneficial
35.31	35.23	Decrease	0.08	0.883	76-94% of AQAL	0.20	Negligible	Beneficial
35.54	35.45	Decrease	0.09	0.889	76-94% of AQAL	0.22	Negligible	Beneficial
40.76	40.53	Decrease	0.23	1.019	95-102% of AQAL	0.57	Slight	Beneficial
30.56	30.54	Decrease	0.02	0.764	76-94% of AQAL	0.05	Negligible	Beneficial

3.5 Only one area – the residential properties close to Ferry Road (Bream Close) shows an exceedence of the annual mean objective level for NO_2. It should noted however, this location would also exceed in the without development scenario.

4. Air Quality Neutral Assessment

4.1 The London Councils's Website[1] defines Haringey as an Outer London Borough. Therefore the Air Quality Neutral Assessment (AQN) used the correct data and benchmarks within the assessment.

4.2 The Air Quality Neutral Assessment (AQN) has been reviewed and the Transport Calculation has been amended. The updated assessment shows the proposed development is still air quality neutral. Changes are in red.

AQN for Transport

Parameter	Residential	Commercial
GFA (m^2)	~~33,500~~ **46,100**	1,607
Daily Trip Rate	106	3
Annual Trip Rate	38,690	1,095
Average Distance Travelled Per Trip (km)	11.4	10.8
NOx Emission Factor (g/vkm)	0.353	0.353
NO_X Emission Per Year (kg/year)	**155.70**	**4.17**
NO_X Emission Benchmark ~~(g/m^2/year) /~~ (g/dwelling/year)	1553	68.50
NO_X Emission Benchmark (kg/year)	~~**52,025.50**~~ **784**	**110.08**
Is the NO_X Benchmark Exceeded?	**No**	**No**
PM_{10} Emission Factor (g/vkm)	0.0606	0.0606
PM_{10} Emission Per Year (kg/year)	**26.73**	**0.71**
PM_{10} Emission Benchmark ~~(g/m^2/year) /~~ (g/dwelling/year)	267.0	11.8
PM_{10} Emission Benchmark (kg/year)	~~**8,944.50**~~ **135**	**18.96**
Is the PM_{10} Benchmark Exceeded?	**No**	**No**

4.3 The Buildings Calculation has been recalculated with the updated floor area for residential use presented within the Schedule 4 document. The increase in floor area for residential use has increased the benchmark value. The updated assessment shows the proposed development is still air quality neutral. The updated AQN assessment is presented below. Changes are in red.

[1] http://www.londoncouncils.gov.uk/node/1938

AQN for Buildings

Parameter	Residential	Commercial		
		A1	A3-A5	A2 & B1
GFA (m^2)	~~33,500~~ **46,100**	170	200	1237
Energy Use – Gas (kWh/annum)	4,828,222	2043	2043	2043
NO_X Emission Per Year (kg/year)	**379**	**0.4**	**0.4**	**0.4**
NO_X Emission Benchmark (g/m^2/year)	26.2	22.6	75.2	30.8
NO_X Emission Benchmark (kg/year)	~~**877.7**~~ **1207.8**	**3.8**	**15.0**	**38.1**
Is the NO_X Benchmark Exceeded?	**No**	**No**		

4.4 Calculation Excel outputs have also been provided.

5. Haringey Suggested Conditions

5.1 *"Prior to development a revised air quality assessment (including the air quality neutral assessment) taking into account the comments raised above shall be submitted, to the Local Planning Authority for approval."*
Reason: To Comply with Policy 7.14 of the London Plan and the GLA SPG Sustainable Design and Construction.

Response: Following the addtional information provided above, the suggested condition for a revised air quality asssesment should no longer be applicable.

5.2 *"Prior to installation, details of the Ultra Low NOx boilers for space heating and domestic hot water should be forwarded to the Local Planning Authority. The boilers to be provided for space heating and domestic hot water shall have dry NOx emissions not exceeding 40 mg/kWh."*
Reason: To protect local air quality.

Response: The condition relating to the Combustion and Energy Plant should reflect the alternative energy strategy and therefore recognise that the onsite CHP may not be pursued and as such the additional work would not be required. The on-site CHP will only be implemented if a connection to the District Heat Network is not viable.

Information included for reference:
Correspondence from Transport Officer
AQN Data for buildings and transport
SAV Technical Data Sheet
MHS-Ultramax Data Sheet

Lisa Horridge

Subject: FW: hale wharf draft response - 2016/1719

From: McNaugher Robbie [mailto:Robbie.McNaugher@haringey.gov.uk]
Sent: 18 July 2016 11:46
To: Sean Bashforth <sean.bashforth@quod.com>
Cc: Steffan Rees <steffan.rees@quod.com>; Helen Rodger <helen.rodger@quod.com>
Subject: FW: hale wharf draft response - 2016/1719

Sean,

Some draft transport comments below for discussion later.

Kind regards

Robbie

Robbie McNaugher
Team Leader - Development Management

Haringey Council
River Park House, 255 High Road, Wood Green, London N22 8HQ

T. 020 8489 8233
M. 07891809477
E. robbie.mcnaugher@haringey.gov.uk

www.haringey.gov.uk
twitter@haringeycouncil
facebook.com/haringeycouncil

From: Pinamonti-Hyde Ian
Sent: 18 July 2016 11:43
To: McNaugher Robbie
Subject: hale wharf draft response - 2016/1719

Robbie,

Here are draft comments on the above. A final version will follow. Comments are still to come on the Travel Plan and some of the details of Phase 1.

Summarising, so far there are some issues and further details required relating to;

- Parking - management, potential overspill, phase 1 arrangements
- Car club – phase 1 arrangements, longer period of membership funded by applicant for mitigation
- Cycle parking details and confirmation of arrangements

- More detail of highway changes to Ferry Lane needed for our Highways colleagues and to produce an outline S2178 estimate.
- Clarity of pedestrian conditions along Ferry Lane north side footway and mitigation

2016/1719 - Hale Wharf, Ferry Lane, London N17 9NF

This application is an outline application for the whole Hale Wharf site, and a detailed application for the Phase 1 component of the site.

Overall the application seeks to provide buildings across the site to include residential (up to 505 units) and flexible retail or business uses (Use Classes A1-A5 or B1); pedestrian/cycle footbridges, modification works to the existing vehicular highway access and associated highway works; refurbishment of existing infrastructure (including provision of an on-site energy centre, if required), landscaping and public realm works; new servicing arrangements; car/cycle parking; and associated and facilitating works. The footbridges associated with this application include the Hale Village Green Link Bridge (HVGLB) which will connect the site to Hale Village across the River Lee Navigation and Pymmes Brook, a pedestrian footbridge across to the Paddock

The detailed application for Phase 1 incorporates the construction of buildings ranging from 16 to 21 storeys to accommodate 249 residential units and 307m2 (GIA) of flexible retail or business uses (Use Classes A1-A5 or B1); modification works to the existing vehicular access and associated highway works; infrastructure (including provision of an on-site energy centre, if required), landscaping and public realm works; new servicing arrangements; car/cycle parking; and associated and facilitating works.

Transportation comments on the outline element of the application

The application site is located to the far east of the Borough.. The application site is accessed from Ferry Lane to the south and bounded by the River Lee Navigation and the Pymmes Brook to the west and the River Lee flood relief channel to the east. At present the application site primarily contains light industrial units and open industrial/warehouse uses.

The Site has a Public Transport Accessibility Level (PTAL) of 6a/5 at the southern end of the site and 4 at the northern end. It is in close proximity to Tottenham Hale station, being around 260m to the southernmost tip of the Site, providing regular links via the Victoria Line and national rail services. The Site is also served and within walking distances of bus route 41, 76 and 192, accessed from Tottenham Hale Station. The footbridge to be delivered that will connect the site to Hale Village and hence enable an alternative pedestrian and cycle route towards Tottenham Hale station will improve direct accessibility to the station from the development, and accordingly enable an increase of the PTAL from the northern end of the site to a value of 5 from 4.

Tottenham Hale Station has recently had a reconfiguration of the bus station and consent has been granted for improvements to the rail station, to include accessibility and facility improvements. These include a new entrance, an enlarged concourse, step free access to national rail services and improved interchange,

The overall application includes for 11 blocks, comprising 505 residential units, flexible retail or business uses, access/highway alterations and refurbishment of existing infrastructure (including provision of an on-site energy centre, if required), landscaping and public realm works; new servicing arrangements; car/cycle parking; and associated and facilitating works.

Car and Cycle Parking

The application is presenting the proposal as a very low car parking site, with 58 spaces in total, of which 6 will be allocated to the Business Barges, and 2 will be for car club provision, and the remaining 50 for blue badge holders (derived from the 10% of all units being fully accessible and requiring a parking space). These spaces aside there are no parking spaces proposed for the development. The requirement to provide 6 spaces for the Business Barges is queried – the justification for this needs to be provided. The TA comments that this is to match existing provision however given the very low parking for the remainder of the development it seems counter intuitive for this provision to remain and it is not proven that it is needed.

Whilst it is accepted that the site does have very good accessibility to public transport services, and will enable more direct access to Tottenham Hale Station upon completion of the proposed footbridges, there are concerns about the potential for creation of a parking nuisance in the locality. It is acknowledged that opportunities for overspill parking are limited however it is possible and probable.

Census figures from 2011 for the Tottenham Hale Ward recorded car ownership as 0.49 cars per household ward wide.

As proposed, it is accepted and acknowledged that a considerably lower ratio of provision is entirely appropriate, when coupled with the very good access to public transport services, high quality cycle parking to London Plan standards, car club membership and provision, and local goods and services being within walking distance.

However, this is still a large development and included in the residential element are 53 no. 3 bedroom units, which can be considered family units. It is likely that there will be some demand for parking from these units (and some of the smaller units) especially from tradespersons that have vans with equipment, and families or individuals where a vehicle is needed for mobility issues (whilst not being blue badge holders). It is possible that not all of the blue badge bays will be taken up but this is not certain.

Homes for Haringey have reported issues with overspill parking following build out of the Hale Village development, and have extended enforcement hours but still report issues and pressures outside of enforcement hours. A different housing association/trust manages Jarrow Road. Given the potential for further additional pressures, a further piece of work for the Transport Assessment is required to detail what opportunities there are for overspill parking generated by this development, and the appropriate mitigation. This will require looking further than the 200m standard parking stress survey walk distance. Parking stress surveys will be required particularly for the Ferry Lane estate roads to the south side of Ferry Lane.

Overall, a Parking Management Plan will be required for the complete development to manage the residential parking and potential overspill issues. A worked up draft of this will be required with the detailed application.

Considering cycle parking, table 4.2 in the TA details the required provision in terms of absolute numbers site wide for both the residential and non residential land uses. It is also noted that semi vertical racks are proposed for cycle parking. Horizontal cycle parking is required and Sheffield Stands are referred to in Borough Policies. semi vertical cycle parking can be awkward for some cyclists. Ideally all the cycle parking should be horizontal, and given the high numbers to be provided double stacking could be utilised. This needs to be revisited for the detailed applications and full details provided. It is essential that the cycle parking provided is of the highest quality, and easy to use with sufficient space around the cycle storage to encourage the uptake of cycling at the site. This will assist in meeting the Travel Plan mode share targets and of course mitigate the very low parking provision.

Highway Access

The site access off Ferry Lane is intended to be slightly to the west of the existing access to suit the building lines proposed for the site. The progression of the detailed design and highway works to create this will need to be covered by a Section 278 Agreement between the applicant and the Highway Authority. An estimate of the costs for the highway works will be worked up to advise of the costs for this. A more detailed drawing for the revisions to the access proposed is required to enable this estimate to be produced, the drawing needs to show the existing and proposed arrangements on the same drawing.

Swept paths have been provided for the proposed access showing HGV's, refuse vehicles and cars passing through into the site and leaving the site onto Ferry Lane and these appear acceptable however the S278 process will undertake all formal design checks that will be necessary.

Pedestrian and cycle access

Pedestrian and cycle access will be retained from Ferry Lane. Internal footways to the site appear to vary in width, between 2.7m and 1.2m. There is reference to a 26m length of footway north of block C, this does seem counter intuitive as although 1.2m is detailed as adequate in terms of being able to accommodate wheelchairs/pushchairs and parents, for a new development of this size it should be possible to provide sufficiently wide footways, say 2.0m in width. Only a small point but perhaps something to be addressed with the future detailed application.

Included in this proposal are two footbridges – the Hale Village Green Link Bridge (HVGLB) and an additional footbridge that crosses Pymmes Brook, to provide step free access to the towpath, from which lift access will be provided to the
HVGLB.

The HVGLB in particular will enable more direct access to both Hale Village and Tottenham Hale station, as part of the station improvements Network Rail will be implementing a footbridge to connect to Hale Village. This is programmed for completion by early 2018 so should be in advance of the Hale Wharf site build out. It is understood that the developer is not delivering these footbridges, that these will be funded and delivered by the GLA/Haringey. Ideally they would be in place for the occupation of the first phases of

Hale Wharf by 2019 to provide the alternative more direct route to Tottenham Hale Station. It is noted that cyclists will be permitted onto the footbridges (dismounted) and lift access will be available.

A PERS audit was carried out and accompanies this application. The survey generally found that links, crossings and public transport waiting areas rated 'green' apart from The pedestrian crossing of Ferry Lane east of the site, the public transport waiting area at Watermead Way (east) and the pedestrian route to Harris Academy. All of these rated 'yellow' . The Audit Report and the TA do not make suggestions to carry out improvements, given the size of the development it would be appropriate for improvements to be carried out by/funded by the applicant. Although the Ferry Lane pedestrian crossing is to the eastern side of the development , it may still be used by residents of the site as will the route to Harris Academy. Given the development is presented as sustainable and with very low car parking provision routes to and from the site for cyclists and pedestrians should be of a high quality to encourage and facilitate walking.

Pedestrian comfort levels have also been assessed to and from the site, carried out in accordance with TfL's guidance on Pedestrian Comfort Assessments. Overall this did find that in general comfort levels of 'B+' are achieved on the northern footway, however it also details that lower levels of 'C-' and 'D' occur during the peak periods. the assessment for the southern footway details the comfort level as 'A'.

This PCL assessment has identified that by 2021 and with the development in place, the north footway of Ferry Lane will experience a decline in comfort level to level 'E'. The commentary in the Transport Assessment is that the footway is likely to be 'extremely uncomfortable' during the PM peak, and recommends an increase in width or measures to keep the footway as clear as possible. The application makes no proposals for mitigation here, additionally it is not certain what mitigation is provided by the HVGLB footbridge.

Cycle access is as per pedestrian access to the development, via Ferry Lane and the footbridge link. The applicant does not propose any formal cycle facilities within the development based on the relatively low numbers of vehicle movements expected with the low parking provision. This is appropriate.

Mandatory Cycle Lanes are marked on Ferry Lane, and there are formal cycle route facilities in both directions from the site including Toucan Crossings.

Trip generation

The trip generation has been derived as agreed at the scoping stage, partly by adopting separate trip rates for the residential units that will be allocated car parking spaces and those that will not that are to be 'car free'. Iterations were carried out using both the TRICS and TRAVEL databases, there were some slight differences between the two, however nothing materially different. For robustness the higher car trip results were used, however, the absolute numbers of peak car trips are predicted to be low (8 in the AM peak and 6 in the PM). The Trip Generation predictions are based on the 2011 census 'journey to work' mode shares in the Tottenham Hale Ward and are adjusted to reflect the parking provision for the proposed development. Overall the residential element of the development is predicted to generate 338 all mode trips in the AM peak and 258 all mode in the PM peak. Public transport mode shares for the units with parking are predicted to be 65% and for those without parking 83%. The cycle mode is around the Borough average of 3%.

The additional trips from the commercial floor area in the development bring the total trip generation to 402 (two way) in the AM peak and 326 (two way) in the PM peak, with the majority utilising public transport.

Delivery and servicing trips have been derived using data from similar sites and are predicted to number around 25 a day.

Vehicle trip impacts

Taking into account the residential, commercial and servicing trips into account, it is proposed that the overall numbers of car/vehicle trips will be lower than the surveyed existing. Based on the low parking proposed this is accepted.

Public transport impacts

The TA has derived the additional bus and tube/train trips, and predicted that the uplift in demand for bus trips in the peaks will be 125 (am) and 101 (pm). TfL have assessed this uplift against their own records for capacity of the services that will be used by residents and visitors to the development, and have detailed that mitigation in the form of capacity uplifts will be required for the 123 and 192 services, with £850,000 sought to mitigate and provide the necessary capacity uplifts over the next 5 years (from development opening it is assumed).

With regards to the London Underground, the TA predicts 150 trips in the am peak and 120 in the pm. TfL agree with the applicant's derivation and have commented that they do not consider any mitigation necessary for this level of uplift in demand. Future capacity improvements are already earmarked for the Victoria Line and the accompanying interchange improvements forthcoming with the Tottenham Hale station works will also accommodate the development underground trips.

For national rail services from Tottenham Hale, 52 trips are predicted in the AM peak and 43 in the PM peak. This sounds negligible however I am not aware if Network Rail or the franchisee have comments on this.

Servicing, refuse /recycling arrangements

The site access and internal roads have been designed to accommodate vehicles expected to visit the development, including construction vehicles such as 16.5 metre articulated lorries. Swept paths have been provided for refuse vehicles. It is intended for all servicing to take place from the street. It is envisaged that smaller vehicles will used spaces in the public parking courts, and locally widened carriageway in a number of locations to enable stopped larger vehicles to be passed by another car or delivery vehicles. Detailed plans showing the widths and layout will be required for the detailed application.

It is noted that over run areas are proposed within the development, to facilitate refuse collection vehicle manoeuvres, and allow other vehicles to pass. This does appear to work in terms of the swept paths provided, however a more detailed Delivery and Servicing Plan should be provided with clearer drawings.

At this outline stage for the main development indicative areas are proposed for refuse and recycling collections. Detailed proposals are provided for Phase 1 and these are covered later on in this response.

Travel Plan and sustainable travel initiatives

Comments to follow

Car club arrangements for the development – it is noted that there has been dialogue and correspondence between the applicant and Zipcar, and the applicant's proposal is for a year's membership to be provided for each residence in the development plus £50 driving credit. There is reference to provision of cars at the development but no mention of how many – the TA references two so this is assumed to be correct.

It is 'custom and practice' at Haringey for two or three years membership to be funded by a developer, to ensure there is a greater uptake over time of the car club. Given the size of the development, and the very low parking proposed, it is entirely appropriate that a longer period of two or preferably three years membership is provided for each residential unit. TfL are of the same opinion and support a longer period of free membership.

It is not clear where the car club bays are to be located.

Electric Vehicle Charging Points

The development must accord with London Plan requirements for the proportions of parking spaces that are enabled for electric vehicle charging, 20% of them to be available and operational at day 1, and a further 20% to be passively provided so able to be brought into use as demand requires.

Transportation comments on the detailed element of the application

Phase 1 is the closest part of the development to ferry lane. It includes the HVGLB footbridge across river lea navigation and Pymmes brook to connect to Millmead Road In Hale Village. It is understood that this bridge will not be delivered by the developer however it should be in place for the opening of Phase 1 (2019).

2 blocks are included in Phase 1, Blocks A and B. Additionally 307sqm of commercial is included in phase 1.

Block A will include 141 residential units comprising 7 x studio, 54 x one bedroom units, and 80 x two bedroom units, along with 170sqm (GIA) of retail floorspace at ground floor level as well as ancillary areas. 221 cycle parking spaces are proposed. The building will be 21 storey.

Block B, which will be 16 storey, will include 108 residential units comprising 50 x one bedroom units, 51 x two bedroom units and 7 x three bed units, along with 137sqm (GIA) of office floorspace at ground floor level, as well as ancillary areas. 100% of the units in Block B will comprise PRS units. 166 cycle parking spaces are proposed.

Therefore, Phase 1 will include 249 residential units plus the 307 sqm of commercial floor space, so roughly just under half of the quantum of the whole development. Whilst the remainder of the development has been submitted as an outline

There is a temporary car parking arrangement proposed for Phase 1, which is proposed to provide 15 spaces outside Block B, and an additional

However the drawing in the Design and Access statement on page 254 appears to only provide 10 spaces to the north of Block B. This needs to be clarified as according to this drawing only 10 spaces will be provided which will not meet the parking provision requirements for wheelchair accessible apartments both for the number and the recommended walk distances from the residential units according to BS 5400.

Car Club for phase 1

what are arrangements ? Almost half of the units are to be provided in Phase 1 so a single car club space needs to be provided, and additionally it is not detailed where this will go.

Cycle parking

It is proposed for internal secure cycle stores within each of Blocks A and B, and 8 external visitor parking (cycle hoops – are these Sheffield Stands ?) for each Block.

Highway Access

A drawing of greater detail showing the proposed changes in kerbline/highway arrangement is needed to enable Highways to produce an estimate for the S278 works.

Further comments on the details for Phase 1 to follow

As commented above Robbie these comments will be finalised shortly.

Regards,

Ian

Air Quality Neutral Assessment for Buildings

Assumed fuel:	1

Key	
Gas	1
Oil/ Solid Fuel	2

To determine whether benchmarks have been exceeded, enter the number which represents the appropriate zone code and fill in all yellow boxes.

Table 1 - Default emisison factors (2010 LAEI)

Fuel	Land use category	NOx emission factors (kg/kWh)	PM_{10} emission factors (kg/kWh)
Gas	Domestic	0.0000785	N/A
	Industrial/ commercial	0.0001940	N/A

Table 2 - Building Emission Calculation

	Development details		NOx emissions					PM_{10} emissions ONLY F
	Gross Floor Area (m^2)	Energy use (kWh/annum)	NOx emission (kg/annum)	NOx Building Emission Benchmark (g/m^2/annum)	NOx Building Emission Benchmark (kg/annum)	NOx emission minus Building Emission Benchmark (kg/annum)	Is the NOx Benchmark Exceeded?	PM_{10} emission (kg/annum)
Notes	A	B	Calculated from B and Table 1	C [Source Air Quality Neutral Planning support update GLA 80371, April 2014]	Calculated from A and C			Calculated from B and Table 1
Land use category								
Class A1 Shops	170	2043	**0.4**	22.6	**3.8**	-3.4	No	#VALUE!
Classes A3 Restaurants and Cafes, A4 Drinking establisments and A5 Hot food takeaways	200	2043	**0.4**	75.2	**15.0**	-14.6	No	#VALUE!
Classes A2 Financial and professional servicesand Class and B1 Business	1237	2043	**0.4**	30.8	**38.1**	-37.7	No	#VALUE!
Classes B2 general industrial and B7 special industrial			0.0	36.6	0.0	0.0	No	#VALUE!
Class B8 Storage and distribution			0.0	23.6	0.0	0.0	No	#VALUE!
Class C1 Hotels and Hostels			0.0	70.9	0.0	0.0	No	#VALUE!
Class C2 Residential institutions			0.0	68.5	0.0	0.0	No	#VALUE!
Class C3 Dwellinghouses	46100	4828222	**379.0**	26.2	**1207.8**	-828.8	No	#VALUE!
D1 (a) Non residential institutions			0	43.0	0.0	0.0	No	#VALUE!
D1 (b) Non residential institutions			0	75.0	0.0	0.0	No	#VALUE!
Class D1 (c -h) Non residential institutions			0	31.0	0.0	0.0	No	#VALUE!
Class D2 (a-d) Assembly and leisure			0	90.3	0.0	0.0	No	#VALUE!
Class D2 Assembly and leisure			0	284.0	0.0	0.0	No	#VALUE!
TOTAL			380.204453		1264.8	-884.6	No	#VALUE!

Air Quality Neutral Assessment for Transport

Zone Code:	3

Key	
CAZ	1
Inner	2
Outer	3

To determine whether benchmarks have been exceeded, enter the number which represents the appropriate zone code and fill in all yellow boxes.

						NOx emissions							PM_{10} emissions						
Land use category	Gross Floor Area (m^2)	Number of dwellings	Development trip rate per day	Development trip rate per year	Average distance travelled per trip (km)	NOx emission factors (g/vehicle-km)	NOx emission (kg/year)	NOx emission benchmark (g/m^2/annum)	NOx emission benchmark (g/dwelling/ annum)	NOx emission benchmark (kg/annum)	NOx Transport emission minus benchmark (kg/annum)	Is the benchmark exceeded?	PM_{10} emission factors (g/vehicle-km)	PM_{10} emission (kg/year)	PM_{10} emission benchmark (g/m^2/annum)	PM10 emission benchmark (g/dwelling/ annum)	PM10 emission benchmark (kg/annum)	PM10 Transport emission minus benchmark (kg/annum)	Is the benchmark exceeded?
Classes A1-5 Retail	0		0	0	5.4	0.3530	0.0000	249		0.00	0.00	No	0.0606	0.0000	42.9		0.00	0.00	No
B1 Commercial	**1607**		3	1095	10.8	0.3530	4.17	68.50		**110.08**	-105.90	No	0.0606	0.7167	11.80		18.96	-18.25	No
C3 and C4 Residential		**505**	**106**	38690	11.4	0.3530	155.70		1553	**784**	-628.57	No	0.0606	26.7286		267.0	135	-108.11	No
TOTAL							159.87			894	-734.47	No		27.4			153.80	-126.35	No

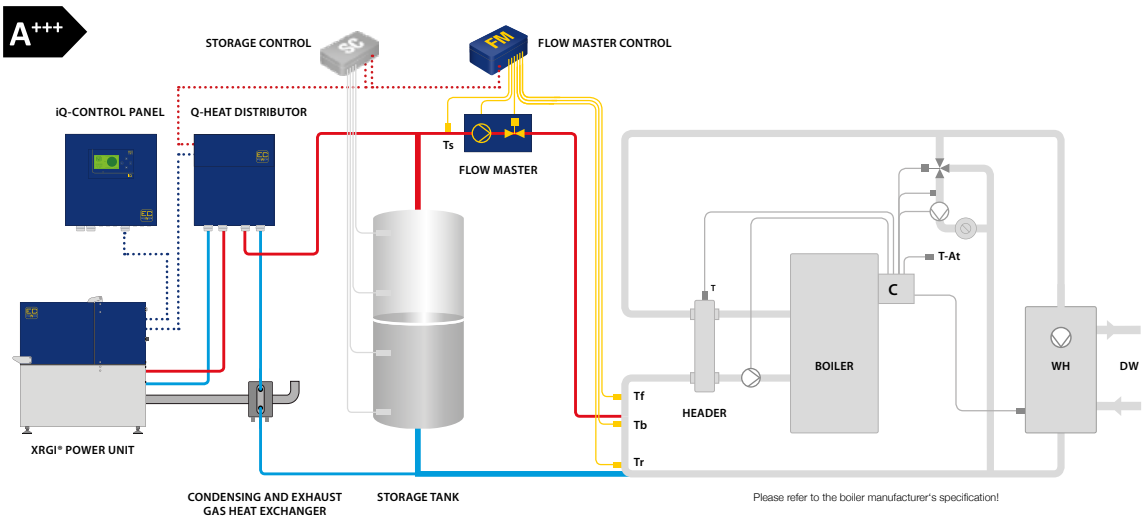
Technical Data R3600SB Series (standard and split system boilers)

Boiler Model		R3600SB	R3601SB	R3602SB	R3603SB	R3604SB	R3605SB
Nominal heat output 80/60°C	kW	142.7-572	183-639	213.1-747	241.5-846	270-945	298.4-1043
Nominal heat output 50/30°C	kW	150-601	192.1-671	223.7-784	253.5-888	283.4-992	313.2-1095
Nominal heat input Gross	kW	162-649.3	207.5-724.8	241.9-848	274.1-960.1	306.3-1072.2	338.5-1183.2
Nominal heat input Net	kW	146-585	187-653	218-764	247-865	276-966	305-1066
Max flow temperature	°C	90	90	90	90	90	90
Water content	litres	78	102	97	104	110	117
Design temperature rise (Δt)	°C	20	20	20	20	20	20
Nominal water flow @ Δt 20K	l/s	6.86	7.66	8.94	10.13	11.33	12.5
Hydraulic resistance at nominal water flow (std blr)	kPa	48	56	38	45	53	60
Nominal residual pump head (std blr)	kPa	34	22	29	12	18	20
Hydraulic resistance at nominal water flow – Hot return (split system blr)	kPa	40	44	30	30	41	41
Hydraulic resistance at nominal water flow – Cold return (split system blr)	kPa	48	56	38	45	53	60
Minimum flow at cold return (split system blr) at all times	l/s	0.343	0.383	0.447	0.506	0.566	0.625
Min/Max operating pressure @ 90°C	bar	1.5 / 8.0	1.5 / 8.0	1.5 / 8.0	1.5 / 8.0	1.5 / 8.0	1.5 / 8.0
Gas consumption Nat Gas (G20) @ max load	m^3/h	53.7	59.9	70.1	79.4	88.6	97.8
Gas consumption LPG (G31) @ max load	m^3/h	45.7	51.0	59.7	67.6	75.5	83.3
Gas inlet press nom. Nat Gas (G20)	mbar	17/25	17/25	17/25	17/25	17/25	17/25
Gas inlet press min/max LPG (G31)	mbar	30/50	30/50	30/50	30/50	30/50	30/50
Approx flue gas volume max @ max load	m^3/hr	969	1076	1258	1424	1590	1756
NOx level @ 0% O_2 @ max load	mg/kWh	32.3	11.5	11.5	11.5	11.5	11.5
Approx flue gas temperature @ 80/60°C system operation	°C	80	80	80	80	80	80
Maximum flue system resistance	Pa	100	150	150	150	150	150
Gas connection	-	RP2"	RP2"	RP2"	RP2"	DN65 PN6	DN65 PN6
Flow/return connections	-	DN65 PN6	DN65 PN6	DN80 PN6	DN80 PN6	DN80 PN6	DN80 PN6
Air supply connection (optional)	mm	250	250	300	300	355	355
Flue connection	mm	300	300	350	350	400	400
Condensate waste connection	mm	40	40	40	40	40	40
Nominal weight (dry) +/- 5%	kg	810	890	1040	1150	1280	1410
Electrical supply (50Hz)	V	415	415	415	415	415	415
Mains connection fuse rating	A	10	10	10	10	10	10
Power consumption boiler	kW	0.73	0.90	0.90	1.27	1.27	1.27
Power consumption pump (std blr)	kW	1.15	1.15	1.15	1.15	1.50	1.50

Appliance Categories B23, C53, C33, C63

HYDRAULIC INTEGRATION

Principle circuit diagram: Series circuit with injection – boiler with header



More principle circuit diagrams and information can be found in the EC POWER „Hydraulic Solutions“.

NOTE:
If products from other companies are used in the system in addition to EC Power products, EC POWER assumes no liability for the accuracy of the energy efficiency class calculation for the entire system.

XRGI® system		XRGI® 20 without condensing technology[1]	XRGI® 20 with condensing technology[1]
Flow temperature, constant	°C	~ 85	~ 85
Return temperature, variable	°C	5-75	5-75

FUELS

Natural gas (all qualities), propane, butane	yes	yes

EXHAUST GAS

Power modulation			50 %	75 %	100 %	50 %	75 %	100 %
Max. exhaust gas temperature		°C	-	-	120	-	-	90
Condensate		kg/h	-	-	-	3.1	3.5	3.7
Emissions (test data)	CO < 50	mg/Nm³	-	-	15	-	-	26
	NOx < 100	mg/Nm³	-	-	18	-	-	10

SOUND

Sound pressure level at a distance of up to 1 m (based on surroundings)	dB(A)	49

POWER CONNECTION

Voltage, 3 phases + N + Earth	V	400
Frequency	Hz	50

SERVICE

Service interval (operating hours)	Hours	6,000

DIMENSIONS AND WEIGHT

		XRGI® 20 Power Unit	Q80-Heat Distributor	iQ20-Control Panel
Dimensions, W x H x D	mm	750 x 1,170 x 1,250	550 x 600 x 295	600 x 600 x 210
Footprint	m²	0.93	wall mounted	wall mounted
Weight	kg	750	44	40

All values are net and have been certified by an independent inspection body. Tolerance ±5 %.
Specifications subject to change without notice.

APPENDIX C
Below Ground Drainage Strategy Addendum

ADDENDUM – DRAINAGE STRATEGY REPORT

Ramboll
240 Blackfriars Road
London SE1 8NW
United Kingdom

T +44 (0)20 7631 5291
F +44 (0)20 7323 4645
www.ramboll.co.uk

Ref: **RUK-61033510**
Project **Hale Wharf**

Subject **PROPOSED DRAINAGE STRATEGY AMENDMENTS FOLLOWING COMMENTS FROM GREATER LONDON AUTHORITY**

Date **24 Jan 2017**
Rev **1**

1. INTRODUCTION

It has been identified that a portion of the proposed Hale Wharf Development resided within the green belt boundary. As a result, to remove any ambiguity it is proposed to remove Block G from the site proposals. In order to retain the number of proposed units, other proposed blocks are to be adjusted within the maximum parameters.

An updated layout was received from Landscape Projects on 23rd January 2017 which identified the changes to the northern end of the site and which informed the subsequent amendments to the drainage strategy.

The purpose of this Addendum is to demonstrate those changes to the below ground drainage strategy as a result of the removal of Block G. As such, this addendum should be read in conjunction with the original "Below Ground Drainage Strategy Report" dated 16th May 2016 and submitted with the Hybrid Planning Application for the proposed Hale Wharf Development on 27th May 2016.

2. FURTHER CONSULTATIONS

Prior to submission of the Hybrid planning application, RUK was in consultation with Haringey Officers, Thames Water and the Canals and Rivers Trust. In addition to the agreements provided in Section 4 of the "Below Ground Drainage Strategy Report" (2016), Haringey Council have confirmed via email dated 3rd October 2016 their acceptance of the concept design and associated calculations for surface water discharge and attenuation volume. Evidence of this is included in Appendix A of this Addendum. In addition, Haringey Council require the following two factors be addressed at the detailed design stage:

- Full calculations for the design of the tanks, including buoyancy must be included, due to the tanks being situated below the ground water table

- The drainage system is proposed to discharge against a potentially surcharged system, details on how the development will be protected are to be submitted.

3. CHANGES TO PROPOSED SURFACE WATER STRATEGY

The removal of Block G from the original plan and the introduction of a soft landscaping area reduces the proposed site impermeable area. The original proposed surface water discharge rate of 64l/s is unchanged, refer to “Hale Wharf Below Ground Drainage Strategy” report (2016). This is due to the hydraulically modelled existing discharge rate being derived from the existing undeveloped site impermeable area.

The reduction in building footprint and therefore the impermeable area has resulted in lower flood volumes during high intensity storms. Please refer to the new hydraulic modelling results obtained from XP Solutions Windes Hydraulic Modelling software in Appendix B. Proposed surface water attenuation remains unchanged, refer to “Hale Wharf Below Ground Drainage Strategy” report (2016), as at this stage of the design it is the intent to maximise the use of open spaces. The required actual attenuation may reduce as a result of the removal of Block G.

4. CHANGES TO PROPOSED FOUL WATER STRATEGY

Proposed peak and average foul water flows are unchanged, refer to “Hale Wharf Below Ground Drainage Strategy” report (2016), as the number of proposed homes and residential mix remains the same. The spur locations and relevant main drainage runs for Block G have been removed from the main road running through the site, and are reflected on the updated Below Ground Drainage Plans. Refer to Appendix C.

5. CONCLUDING REMARKS

The changes to the proposed scheme have had no adverse impact on the proposed below ground drainage strategy. The proposed discharge rates and attenuation strategy previously agreed with the relevant authorities are not impacted by these changes to the proposed scheme.

With the exception of the points raised in this addendum, all matters raised in the “Hale Wharf Below Ground Drainage Strategy” document dated 16th May 2016 remain valid. The original hydraulic model and rates agreed with Haringey Council remain the same and the overall conclusions of the strategy are still valid for the new proposed scheme.

APPENDIX A HARINGEY CONSULTATION

Alexander Livingston

From: Littler Adam [mailto:Adam.Littler@haringey.gov.uk]
Sent: 03 October 2016 14:20
To: Daniel Scarfe
Cc: McNaugher Robbie
Subject: Concept and Calculations - Hale Wharf - Surface Water Drainage

Dear Daniel,

Having reviewed the supplied information to date, I can confirm we are happy with the concept design and associated calculations for flow and volume.

I do not see any reason this should not now be taken to detailed design stage. The following two factors, others aside, will need to be taken into account and addressed during the detailed design stage, as previously noted:

- The critical element in all of this is the design of the tanks. It looks like it will be below ground water table. Therefore we still need to see full calculations including buoyancy.

- We also need to know if it is proposed to discharge against a potentially surcharged system – It is noted as pending but needs to be confirmed.

When the detailed plans have been drawn up it may be prudent to meet again and discuss these including the delivery of the scheme from a drainage perspective.

If I can be of further assistance please do not hesitate to contact me.

Kind Regards,

Adam.

APPENDIX B XP SOLUTIONS WINDES HYDRAULIC MODELLING RESULTS

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D2 (1km) 0.253 Cv (Summer) 0.950
Site Location GB 535450 189700 TQ 35450 89700 D3 (1km) 0.253 Cv (Winter) 0.950
C (1km) -0.027 E (1km) 0.332
D1 (1km) 0.320 F (1km) 2.475

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	15 Summer	1	0%	100/15 Summer	100/120 Summer			5
S7.001	60 Summer	1	0%	100/15 Summer	100/120 Summer			5
S7.002	30 Summer	1	0%					
S7.003	30 Summer	1	0%	30/15 Summer	100/120 Winter			1
S7.004	30 Summer	1	0%	1/15 Summer	100/30 Summer			7
S8.000	15 Summer	1	0%	30/15 Summer	100/15 Summer			15
S8.001	15 Summer	1	0%	30/15 Summer	100/15 Summer			15
S8.002	60 Summer	1	0%	30/15 Summer	100/15 Summer			12
S8.003	60 Summer	1	0%					
S8.004	30 Summer	1	0%	30/15 Summer	100/30 Summer			8
S7.005	30 Summer	1	0%	1/15 Summer	100/30 Summer			6
S7.006	30 Summer	1	0%	1/15 Summer	100/30 Summer			6
S9.000	180 Summer	1	0%	100/15 Summer	100/30 Summer			4
S10.000	120 Winter	1	0%	100/15 Summer	100/30 Summer			3
S9.001	15 Summer	1	0%	30/15 Summer	100/30 Summer			3
S11.000	60 Summer	1	0%	30/15 Winter	100/15 Summer			7
S11.001	60 Summer	1	0%	30/15 Summer	100/15 Summer			7
S12.000	15 Summer	1	0%	30/15 Summer	100/15 Summer			6
S11.002	30 Summer	1	0%	30/15 Summer	100/15 Summer			4
S13.000	60 Summer	1	0%	100/15 Summer				
S7.007	30 Summer	1	0%	1/15 Summer				
S7.008	30 Summer	1	0%	1/15 Summer				
S14.000	30 Summer	1	0%	100/15 Summer	100/15 Summer			10
S14.001	30 Summer	1	0%	100/15 Summer	100/15 Summer			10
S15.000	120 Summer	1	0%	100/15 Summer	100/15 Summer			12
S15.001	120 Summer	1	0%	100/15 Summer	100/30 Summer			9
S15.002	15 Summer	1	0%	30/15 Summer	100/15 Summer			11
S15.003	30 Summer	1	0%	30/15 Summer	100/15 Summer			11
S15.004	30 Summer	1	0%	30/15 Summer	100/15 Summer			11
S15.005	30 Summer	1	0%	30/15 Summer	100/15 Summer			11
S16.000	15 Summer	1	0%	100/15 Summer	100/30 Summer			9
S16.001	480 Summer	1	0%	100/15 Summer	100/30 Summer			9
S17.000	15 Summer	1	0%	30/15 Summer	100/15 Summer			11
S15.006	120 Summer	1	0%	30/15 Summer	100/15 Summer			8
S14.002	120 Summer	1	0%	30/15 Summer	100/15 Summer			8
S14.003	180 Summer	1	0%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	8.456	-0.169	0.000	0.14	0.0	3.1	OK
S7.001	S52	8.428	-0.153	0.000	0.05	0.0	1.7	OK
S7.002	S4	8.392	-0.130	0.000	0.05	0.0	1.7	OK*
S7.003	S53	8.392	-0.071	0.000	0.07	0.0	2.7	OK
S7.004	S54	8.391	0.069	0.000	0.18	0.0	4.6	SURCHARGED
S8.000	S41	8.489	-0.136	0.000	0.16	0.0	3.8	OK
S8.001	S42	8.483	-0.118	0.000	0.46	0.0	12.1	OK
S8.002	S41	8.470	-0.077	0.000	0.14	0.0	3.8	OK
S8.003	S10	8.467	-0.029	0.000	0.12	0.0	3.7	OK*
S8.004	S41	8.392	-0.053	0.000	0.21	0.0	5.7	OK
S7.005	S55	8.387	0.099	0.000	0.24	0.0	10.6	SURCHARGED
S7.006	S56	8.384	0.115	0.000	0.20	0.0	10.9	SURCHARGED
S9.000	S57	8.409	-0.216	0.000	0.01	0.0	0.2	OK
S10.000	S14	8.400	-0.225	0.000	0.00	0.0	0.0	OK
S9.001	S58	8.403	-0.123	0.000	0.42	0.0	12.5	OK
S11.000	S15	8.435	-0.190	0.000	0.00	0.0	0.1	OK
S11.001	S47	8.440	-0.162	0.000	0.17	0.0	5.5	OK
S12.000	S50	8.453	-0.172	0.000	0.12	0.0	3.5	OK
S11.002	S45	8.288	-0.125	0.000	0.28	0.0	9.5	OK
S13.000	S20	8.432	-0.193	0.000	0.05	0.0	1.3	OK
S7.007	S57	8.270	0.186	0.000	0.77	0.0	23.0	SURCHARGED
S7.008	S19	8.242	0.400	0.000	0.76	0.0	22.9	SURCHARGED
S14.000	S23	8.465	-0.160	0.000	0.14	0.0	3.4	OK
S14.001	S20	8.451	-0.146	0.000	0.27	0.0	7.3	OK
S15.000	S21	8.441	-0.184	0.000	0.08	0.0	2.3	OK
S15.001	S24	8.389	-0.190	0.000	0.06	0.0	2.3	OK
S15.002	S22	8.322	-0.126	0.000	0.40	0.0	7.8	OK

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	8.245	-0.185	0.000	0.31	0.0	8.3	OK
S15.004	S24	8.210	-0.212	0.000	0.19	0.0	12.0	OK
S15.005	S25	8.108	-0.214	0.000	0.18	0.0	13.2	OK
S16.000	S31	8.459	-0.166	0.000	0.15	0.0	3.7	OK
S16.001	S26	8.407	-0.189	0.000	0.06	0.0	0.8	OK
S17.000	S32	8.522	-0.103	0.000	0.56	0.0	13.1	OK
S15.006	S26	7.920	-0.206	0.000	0.17	0.0	13.2	OK
S14.002	S21	7.885	-0.131	0.000	0.12	0.0	18.1	OK
S14.003	S34	7.879	0.237	0.000	0.11	0.0	17.5	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D2 (1km) 0.253 Cv (Summer) 0.950
Site Location GB 535450 189700 TQ 35450 89700 D3 (1km) 0.253 Cv (Winter) 0.950
C (1km) -0.027 E (1km) 0.332
D1 (1km) 0.320 F (1km) 2.475

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	120 Summer	30	0%	100/15 Summer	100/120 Summer			5
S7.001	120 Summer	30	0%	100/15 Summer	100/120 Summer			5
S7.002	30 Winter	30	0%					
S7.003	60 Winter	30	0%	30/15 Summer	100/120 Winter			1
S7.004	60 Winter	30	0%	1/15 Summer	100/30 Summer			7
S8.000	15 Summer	30	0%	30/15 Summer	100/15 Summer			15
S8.001	15 Summer	30	0%	30/15 Summer	100/15 Summer			15
S8.002	60 Winter	30	0%	30/15 Summer	100/15 Summer			12
S8.003	120 Winter	30	0%					
S8.004	60 Winter	30	0%	30/15 Summer	100/30 Summer			8
S7.005	60 Winter	30	0%	1/15 Summer	100/30 Summer			6
S7.006	30 Winter	30	0%	1/15 Summer	100/30 Summer			6
S9.000	30 Summer	30	0%	100/15 Summer	100/30 Summer			4
S10.000	15 Summer	30	0%	100/15 Summer	100/30 Summer			3
S9.001	15 Summer	30	0%	30/15 Summer	100/30 Summer			3
S11.000	15 Winter	30	0%	30/15 Winter	100/15 Summer			7
S11.001	15 Winter	30	0%	30/15 Summer	100/15 Summer			7
S12.000	15 Summer	30	0%	30/15 Summer	100/15 Summer			6
S11.002	15 Summer	30	0%	30/15 Summer	100/15 Summer			4
S13.000	30 Summer	30	0%	100/15 Summer				
S7.007	15 Summer	30	0%	1/15 Summer				
S7.008	15 Summer	30	0%	1/15 Summer				
S14.000	15 Summer	30	0%	100/15 Summer	100/15 Summer			10
S14.001	15 Summer	30	0%	100/15 Summer	100/15 Summer			10
S15.000	60 Summer	30	0%	100/15 Summer	100/15 Summer			12
S15.001	60 Summer	30	0%	100/15 Summer	100/30 Summer			9
S15.002	60 Summer	30	0%	30/15 Summer	100/15 Summer			11
S15.003	60 Summer	30	0%	30/15 Summer	100/15 Summer			11
S15.004	60 Summer	30	0%	30/15 Summer	100/15 Summer			11
S15.005	60 Summer	30	0%	30/15 Summer	100/15 Summer			11
S16.000	15 Summer	30	0%	100/15 Summer	100/30 Summer			9
S16.001	60 Winter	30	0%	100/15 Summer	100/30 Summer			9
S17.000	15 Summer	30	0%	30/15 Summer	100/15 Summer			11
S15.006	60 Summer	30	0%	30/15 Summer	100/15 Summer			8
S14.002	60 Summer	30	0%	30/15 Summer	100/15 Summer			8
S14.003	60 Summer	30	0%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	8.567	-0.058	0.000	0.17	0.0	3.7	OK
S7.001	S52	8.567	-0.014	0.000	0.14	0.0	4.4	OK
S7.002	S4	8.522	0.000	0.000	0.03	0.0	0.9	SURCHARGED*
S7.003	S53	8.598	0.135	0.000	0.05	0.0	1.9	SURCHARGED
S7.004	S54	8.603	0.281	0.000	0.58	0.0	14.5	SURCHARGED
S8.000	S41	8.738	0.113	0.000	0.67	0.0	16.0	FLOOD RISK
S8.001	S42	8.724	0.123	0.000	1.80	0.0	47.7	FLOOD RISK
S8.002	S41	8.661	0.114	0.000	0.20	0.0	5.2	SURCHARGED
S8.003	S10	8.496	0.000	0.000	0.19	0.0	5.8	SURCHARGED*
S8.004	S41	8.612	0.167	0.000	0.28	0.0	7.8	SURCHARGED
S7.005	S55	8.602	0.314	0.000	0.33	0.0	14.8	SURCHARGED
S7.006	S56	8.670	0.401	0.000	0.17	0.0	9.3	SURCHARGED
S9.000	S57	8.518	-0.107	0.000	0.14	0.0	3.7	OK
S10.000	S14	8.515	-0.110	0.000	0.09	0.0	2.2	OK
S9.001	S58	8.673	0.147	0.000	1.12	0.0	33.1	SURCHARGED
S11.000	S15	8.627	0.002	0.000	0.06	0.0	1.5	SURCHARGED
S11.001	S47	8.630	0.028	0.000	0.46	0.0	14.5	SURCHARGED
S12.000	S50	8.670	0.045	0.000	0.44	0.0	12.7	SURCHARGED
S11.002	S45	8.657	0.244	0.000	0.59	0.0	19.8	SURCHARGED
S13.000	S20	8.561	-0.064	0.000	0.20	0.0	5.0	OK
S7.007	S57	8.611	0.527	0.000	1.00	0.0	30.1	SURCHARGED
S7.008	S19	8.570	0.728	0.000	0.96	0.0	28.8	SURCHARGED
S14.000	S23	8.604	-0.021	0.000	0.74	0.0	17.9	OK
S14.001	S20	8.587	-0.010	0.000	1.00	0.0	27.4	OK
S15.000	S21	8.531	-0.094	0.000	0.41	0.0	12.4	OK
S15.001	S24	8.536	-0.043	0.000	0.31	0.0	12.3	OK
S15.002	S22	8.549	0.101	0.000	1.26	0.0	25.0	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	8.547	0.117	0.000	1.00	0.0	26.8	SURCHARGED
S15.004	S24	8.544	0.123	0.000	0.59	0.0	37.4	SURCHARGED
S15.005	S25	8.537	0.216	0.000	0.59	0.0	43.1	SURCHARGED
S16.000	S31	8.517	-0.108	0.000	0.52	0.0	12.7	OK
S16.001	S26	8.474	-0.122	0.000	0.40	0.0	5.1	OK
S17.000	S32	8.714	0.089	0.000	2.09	0.0	49.2	FLOOD RISK
S15.006	S26	8.525	0.399	0.000	0.30	0.0	23.4	SURCHARGED
S14.002	S21	8.506	0.490	0.000	0.18	0.0	28.1	SURCHARGED
S14.003	S34	8.491	0.849	0.000	0.17	0.0	26.9	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D2 (1km) 0.253 Cv (Summer) 0.950
Site Location GB 535450 189700 TQ 35450 89700 D3 (1km) 0.253 Cv (Winter) 0.950
C (1km) -0.027 E (1km) 0.332
D1 (1km) 0.320 F (1km) 2.475

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	180 Winter	100	+30%	100/15 Summer	100/120 Summer			5
S7.001	120 Winter	100	+30%	100/15 Summer	100/120 Summer			5
S7.002	120 Winter	100	+30%					
S7.003	120 Winter	100	+30%	30/15 Summer	100/120 Winter			1
S7.004	60 Winter	100	+30%	1/15 Summer	100/30 Summer			7
S8.000	120 Summer	100	+30%	30/15 Summer	100/15 Summer			15
S8.001	120 Summer	100	+30%	30/15 Summer	100/15 Summer			15
S8.002	120 Summer	100	+30%	30/15 Summer	100/15 Summer			12
S8.003	120 Winter	100	+30%					
S8.004	60 Winter	100	+30%	30/15 Summer	100/30 Summer			8
S7.005	60 Winter	100	+30%	1/15 Summer	100/30 Summer			6
S7.006	60 Winter	100	+30%	1/15 Summer	100/30 Summer			6
S9.000	30 Winter	100	+30%	100/15 Summer	100/30 Summer			4
S10.000	30 Winter	100	+30%	100/15 Summer	100/30 Summer			3
S9.001	60 Winter	100	+30%	30/15 Summer	100/30 Summer			3
S11.000	30 Summer	100	+30%	30/15 Winter	100/15 Summer			7
S11.001	30 Summer	100	+30%	30/15 Summer	100/15 Summer			7
S12.000	15 Summer	100	+30%	30/15 Summer	100/15 Summer			6
S11.002	15 Summer	100	+30%	30/15 Summer	100/15 Summer			4
S13.000	15 Summer	100	+30%	100/15 Summer				
S7.007	30 Winter	100	+30%	1/15 Summer				
S7.008	60 Winter	100	+30%	1/15 Summer				
S14.000	30 Winter	100	+30%	100/15 Summer	100/15 Summer			10
S14.001	30 Summer	100	+30%	100/15 Summer	100/15 Summer			10
S15.000	120 Summer	100	+30%	100/15 Summer	100/15 Summer			12
S15.001	120 Summer	100	+30%	100/15 Summer	100/30 Summer			9
S15.002	120 Summer	100	+30%	30/15 Summer	100/15 Summer			11
S15.003	120 Summer	100	+30%	30/15 Summer	100/15 Summer			11
S15.004	15 Winter	100	+30%	30/15 Summer	100/15 Summer			11
S15.005	15 Summer	100	+30%	30/15 Summer	100/15 Summer			11
S16.000	120 Winter	100	+30%	100/15 Summer	100/30 Summer			9
S16.001	120 Winter	100	+30%	100/15 Summer	100/30 Summer			9
S17.000	15 Summer	100	+30%	30/15 Summer	100/15 Summer			11
S15.006	60 Winter	100	+30%	30/15 Summer	100/15 Summer			8
S14.002	15 Winter	100	+30%	30/15 Summer	100/15 Summer			8
S14.003	30 Summer	100	+30%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	9.001	0.376	0.969	0.13	0.0	3.0	FLOOD
S7.001	S52	9.001	0.420	1.206	0.10	0.0	3.1	FLOOD
S7.002	S4	8.522	0.000	0.000	0.09	0.0	3.1	SURCHARGED*
S7.003	S53	9.000	0.537	0.126	0.08	0.0	3.2	FLOOD
S7.004	S54	9.003	0.681	3.250	1.06	0.0	26.5	FLOOD
S8.000	S41	9.012	0.387	12.198	0.39	0.0	9.2	FLOOD
S8.001	S42	9.014	0.413	13.723	1.18	0.0	31.4	FLOOD
S8.002	S41	9.013	0.466	13.235	0.41	0.0	10.9	FLOOD
S8.003	S10	8.496	0.000	0.000	0.31	0.0	9.2	SURCHARGED*
S8.004	S41	9.006	0.561	6.431	0.48	0.0	13.2	FLOOD
S7.005	S55	9.003	0.715	3.003	0.28	0.0	12.4	FLOOD
S7.006	S56	9.001	0.732	0.896	0.21	0.0	11.7	FLOOD
S9.000	S57	9.000	0.375	0.350	0.17	0.0	4.5	FLOOD
S10.000	S14	9.000	0.375	0.019	0.15	0.0	3.8	FLOOD
S9.001	S58	9.000	0.474	0.213	0.68	0.0	20.0	FLOOD
S11.000	S15	9.004	0.379	4.432	0.89	0.0	21.0	FLOOD
S11.001	S47	9.014	0.412	14.062	0.69	0.0	22.0	FLOOD
S12.000	S50	9.002	0.377	2.488	0.73	0.0	21.0	FLOOD
S11.002	S45	9.000	0.587	0.311	1.28	0.0	42.9	FLOOD
S13.000	S20	8.990	0.365	0.000	0.62	0.0	15.5	FLOOD RISK
S7.007	S57	8.973	0.889	0.000	1.08	0.0	32.4	FLOOD RISK
S7.008	S19	8.920	1.078	0.000	1.07	0.0	32.2	FLOOD RISK
S14.000	S23	9.009	0.384	9.150	0.82	0.0	20.0	FLOOD
S14.001	S20	9.006	0.409	6.109	1.36	0.0	37.3	FLOOD
S15.000	S21	9.010	0.385	9.703	0.78	0.0	23.4	FLOOD
S15.001	S24	9.008	0.429	8.321	0.59	0.0	23.6	FLOOD
S15.002	S22	9.007	0.559	7.112	1.41	0.0	27.9	FLOOD

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	9.005	0.576	5.428	0.94	0.0	25.2	FLOOD
S15.004	S24	9.007	0.585	6.559	1.44	0.0	92.0	FLOOD
S15.005	S25	9.005	0.683	4.902	0.83	0.0	60.0	FLOOD
S16.000	S31	9.003	0.378	2.774	0.32	0.0	7.7	FLOOD
S16.001	S26	9.002	0.406	2.137	1.12	0.0	14.4	FLOOD
S17.000	S32	9.011	0.386	10.666	3.77	0.0	88.6	FLOOD
S15.006	S26	9.001	0.875	0.654	0.37	0.0	29.4	FLOOD
S14.002	S21	9.004	0.988	4.233	0.25	0.0	38.5	FLOOD
S14.003	S34	9.000	1.358	0.136	0.21	0.0	32.4	FLOOD

1 year Return Period Summary of Critical Results by Maximum Level (Rank 2) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D2 (1km) 0.253 Cv (Summer) 0.950
Site Location GB 535450 189700 TQ 35450 89700 D3 (1km) 0.253 Cv (Winter) 0.950
C (1km) -0.027 E (1km) 0.332
D1 (1km) 0.320 F (1km) 2.475

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	15 Winter	1	0%	100/15 Summer	100/120 Summer			5
S7.001	60 Winter	1	0%	100/15 Summer	100/120 Summer			5
S7.002	60 Summer	1	0%					
S7.003	60 Summer	1	0%	30/15 Summer	100/120 Winter			1
S7.004	30 Winter	1	0%	1/15 Summer	100/30 Summer			7
S8.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			15
S8.001	15 Winter	1	0%	30/15 Summer	100/15 Summer			15
S8.002	60 Winter	1	0%	30/15 Summer	100/15 Summer			12
S8.003	60 Winter	1	0%					
S8.004	60 Summer	1	0%	30/15 Summer	100/30 Summer			8
S7.005	30 Winter	1	0%	1/15 Summer	100/30 Summer			6
S7.006	120 Winter	1	0%	1/15 Summer	100/30 Summer			6
S9.000	120 Summer	1	0%	100/15 Summer	100/30 Summer			4
S10.000	180 Winter	1	0%	100/15 Summer	100/30 Summer			3
S9.001	15 Winter	1	0%	30/15 Summer	100/30 Summer			3
S11.000	60 Winter	1	0%	30/15 Winter	100/15 Summer			7
S11.001	30 Summer	1	0%	30/15 Summer	100/15 Summer			7
S12.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			6
S11.002	60 Summer	1	0%	30/15 Summer	100/15 Summer			4
S13.000	30 Summer	1	0%	100/15 Summer				
S7.007	15 Summer	1	0%	1/15 Summer				
S7.008	15 Summer	1	0%	1/15 Summer				
S14.000	15 Summer	1	0%	100/15 Summer	100/15 Summer			10
S14.001	15 Summer	1	0%	100/15 Summer	100/15 Summer			10
S15.000	180 Summer	1	0%	100/15 Summer	100/15 Summer			12
S15.001	180 Summer	1	0%	100/15 Summer	100/30 Summer			9
S15.002	15 Winter	1	0%	30/15 Summer	100/15 Summer			11
S15.003	15 Summer	1	0%	30/15 Summer	100/15 Summer			11
S15.004	15 Summer	1	0%	30/15 Summer	100/15 Summer			11
S15.005	60 Summer	1	0%	30/15 Summer	100/15 Summer			11
S16.000	15 Winter	1	0%	100/15 Summer	100/30 Summer			9
S16.001	600 Summer	1	0%	100/15 Summer	100/30 Summer			9
S17.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			11
S15.006	60 Summer	1	0%	30/15 Summer	100/15 Summer			8
S14.002	60 Summer	1	0%	30/15 Summer	100/15 Summer			8
S14.003	120 Summer	1	0%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	8.454	-0.171	0.000	0.13	0.0	2.9	OK
S7.001	S52	8.425	-0.156	0.000	0.05	0.0	1.6	OK
S7.002	S4	8.386	-0.136	0.000	0.05	0.0	1.8	OK*
S7.003	S53	8.386	-0.077	0.000	0.07	0.0	2.5	OK
S7.004	S54	8.384	0.062	0.000	0.18	0.0	4.5	SURCHARGED
S8.000	S41	8.486	-0.139	0.000	0.14	0.0	3.4	OK
S8.001	S42	8.480	-0.121	0.000	0.44	0.0	11.7	OK
S8.002	S41	8.470	-0.077	0.000	0.15	0.0	3.8	OK
S8.003	S10	8.467	-0.029	0.000	0.13	0.0	3.8	OK*
S8.004	S41	8.386	-0.059	0.000	0.17	0.0	4.8	OK
S7.005	S55	8.380	0.092	0.000	0.23	0.0	10.6	SURCHARGED
S7.006	S56	8.384	0.115	0.000	0.18	0.0	10.2	SURCHARGED
S9.000	S57	8.409	-0.216	0.000	0.01	0.0	0.2	OK
S10.000	S14	8.400	-0.225	0.000	0.00	0.0	0.0	OK
S9.001	S58	8.400	-0.126	0.000	0.40	0.0	11.8	OK
S11.000	S15	8.433	-0.192	0.000	0.00	0.0	0.1	OK
S11.001	S47	8.439	-0.163	0.000	0.17	0.0	5.4	OK
S12.000	S50	8.451	-0.174	0.000	0.11	0.0	3.3	OK
S11.002	S45	8.278	-0.135	0.000	0.28	0.0	9.2	OK
S13.000	S20	8.432	-0.193	0.000	0.05	0.0	1.3	OK
S7.007	S57	8.259	0.175	0.000	0.76	0.0	22.8	SURCHARGED
S7.008	S19	8.231	0.389	0.000	0.76	0.0	22.7	SURCHARGED
S14.000	S23	8.464	-0.161	0.000	0.13	0.0	3.1	OK
S14.001	S20	8.450	-0.147	0.000	0.26	0.0	7.1	OK
S15.000	S21	8.440	-0.185	0.000	0.07	0.0	2.2	OK
S15.001	S24	8.389	-0.191	0.000	0.06	0.0	2.2	OK
S15.002	S22	8.319	-0.129	0.000	0.38	0.0	7.5	OK

1 year Return Period Summary of Critical Results by Maximum Level (Rank 2) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	8.242	-0.187	0.000	0.29	0.0	7.9	OK
S15.004	S24	8.207	-0.214	0.000	0.18	0.0	11.5	OK
S15.005	S25	8.107	-0.215	0.000	0.18	0.0	13.0	OK
S16.000	S31	8.457	-0.168	0.000	0.14	0.0	3.5	OK
S16.001	S26	8.407	-0.189	0.000	0.06	0.0	0.8	OK
S17.000	S32	8.517	-0.108	0.000	0.52	0.0	12.3	OK
S15.006	S26	7.918	-0.207	0.000	0.17	0.0	13.2	OK
S14.002	S21	7.880	-0.136	0.000	0.12	0.0	17.7	OK
S14.003	S34	7.876	0.234	0.000	0.11	0.0	17.8	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 2) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D2 (1km) 0.253 Cv (Summer) 0.950
Site Location GB 535450 189700 TQ 35450 89700 D3 (1km) 0.253 Cv (Winter) 0.950
C (1km) -0.027 E (1km) 0.332
D1 (1km) 0.320 F (1km) 2.475

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	120 Winter	30	0%	100/15 Summer	100/120 Summer			5
S7.001	120 Winter	30	0%	100/15 Summer	100/120 Summer			5
S7.002	15 Winter	30	0%					
S7.003	60 Summer	30	0%	30/15 Summer	100/120 Winter			1
S7.004	60 Summer	30	0%	1/15 Summer	100/30 Summer			7
S8.000	15 Winter	30	0%	30/15 Summer	100/15 Summer			15
S8.001	15 Winter	30	0%	30/15 Summer	100/15 Summer			15
S8.002	60 Summer	30	0%	30/15 Summer	100/15 Summer			12
S8.003	180 Winter	30	0%					
S8.004	60 Summer	30	0%	30/15 Summer	100/30 Summer			8
S7.005	60 Summer	30	0%	1/15 Summer	100/30 Summer			6
S7.006	60 Winter	30	0%	1/15 Summer	100/30 Summer			6
S9.000	30 Winter	30	0%	100/15 Summer	100/30 Summer			4
S10.000	30 Summer	30	0%	100/15 Summer	100/30 Summer			3
S9.001	15 Winter	30	0%	30/15 Summer	100/30 Summer			3
S11.000	30 Summer	30	0%	30/15 Winter	100/15 Summer			7
S11.001	15 Summer	30	0%	30/15 Summer	100/15 Summer			7
S12.000	15 Winter	30	0%	30/15 Summer	100/15 Summer			6
S11.002	15 Winter	30	0%	30/15 Summer	100/15 Summer			4
S13.000	15 Winter	30	0%	100/15 Summer				
S7.007	15 Winter	30	0%	1/15 Summer				
S7.008	30 Summer	30	0%	1/15 Summer				
S14.000	15 Winter	30	0%	100/15 Summer	100/15 Summer			10
S14.001	15 Winter	30	0%	100/15 Summer	100/15 Summer			10
S15.000	60 Winter	30	0%	100/15 Summer	100/15 Summer			12
S15.001	60 Winter	30	0%	100/15 Summer	100/30 Summer			9
S15.002	60 Winter	30	0%	30/15 Summer	100/15 Summer			11
S15.003	60 Winter	30	0%	30/15 Summer	100/15 Summer			11
S15.004	60 Winter	30	0%	30/15 Summer	100/15 Summer			11
S15.005	60 Winter	30	0%	30/15 Summer	100/15 Summer			11
S16.000	15 Winter	30	0%	100/15 Summer	100/30 Summer			9
S16.001	60 Summer	30	0%	100/15 Summer	100/30 Summer			9
S17.000	15 Winter	30	0%	30/15 Summer	100/15 Summer			11
S15.006	60 Winter	30	0%	30/15 Summer	100/15 Summer			8
S14.002	60 Winter	30	0%	30/15 Summer	100/15 Summer			8
S14.003	60 Winter	30	0%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	8.566	-0.059	0.000	0.11	0.0	2.5	OK
S7.001	S52	8.566	-0.015	0.000	0.14	0.0	4.4	OK
S7.002	S4	8.522	0.000	0.000	0.01	0.0	0.4	SURCHARGED*
S7.003	S53	8.595	0.133	0.000	0.06	0.0	2.2	SURCHARGED
S7.004	S54	8.601	0.279	0.000	0.81	0.0	20.3	SURCHARGED
S8.000	S41	8.712	0.087	0.000	0.59	0.0	13.9	FLOOD RISK
S8.001	S42	8.699	0.098	0.000	1.68	0.0	44.6	SURCHARGED
S8.002	S41	8.659	0.112	0.000	0.20	0.0	5.2	SURCHARGED
S8.003	S10	8.496	0.000	0.000	0.19	0.0	5.7	SURCHARGED*
S8.004	S41	8.610	0.165	0.000	0.35	0.0	9.7	SURCHARGED
S7.005	S55	8.600	0.312	0.000	0.34	0.0	15.4	SURCHARGED
S7.006	S56	8.644	0.375	0.000	0.24	0.0	13.3	SURCHARGED
S9.000	S57	8.516	-0.109	0.000	0.13	0.0	3.5	OK
S10.000	S14	8.513	-0.112	0.000	0.09	0.0	2.2	OK
S9.001	S58	8.659	0.133	0.000	1.05	0.0	31.1	SURCHARGED
S11.000	S15	8.627	0.002	0.000	0.06	0.0	1.3	SURCHARGED
S11.001	S47	8.629	0.027	0.000	0.45	0.0	14.3	SURCHARGED
S12.000	S50	8.656	0.031	0.000	0.39	0.0	11.1	SURCHARGED
S11.002	S45	8.644	0.231	0.000	0.55	0.0	18.4	SURCHARGED
S13.000	S20	8.559	-0.066	0.000	0.26	0.0	6.6	OK
S7.007	S57	8.599	0.515	0.000	0.97	0.0	29.3	SURCHARGED
S7.008	S19	8.558	0.716	0.000	0.95	0.0	28.6	SURCHARGED
S14.000	S23	8.593	-0.032	0.000	0.72	0.0	17.6	OK
S14.001	S20	8.577	-0.020	0.000	1.00	0.0	27.4	OK
S15.000	S21	8.528	-0.097	0.000	0.37	0.0	11.2	OK
S15.001	S24	8.535	-0.044	0.000	0.28	0.0	11.1	OK
S15.002	S22	8.549	0.101	0.000	1.00	0.0	19.8	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 2) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	8.547	0.117	0.000	0.87	0.0	23.4	SURCHARGED
S15.004	S24	8.544	0.122	0.000	0.49	0.0	31.4	SURCHARGED
S15.005	S25	8.537	0.215	0.000	0.50	0.0	36.4	SURCHARGED
S16.000	S31	8.512	-0.113	0.000	0.49	0.0	11.9	OK
S16.001	S26	8.474	-0.122	0.000	0.40	0.0	5.1	OK
S17.000	S32	8.700	0.075	0.000	1.96	0.0	46.1	SURCHARGED
S15.006	S26	8.524	0.398	0.000	0.30	0.0	23.4	SURCHARGED
S14.002	S21	8.503	0.487	0.000	0.18	0.0	27.2	SURCHARGED
S14.003	S34	8.488	0.846	0.000	0.17	0.0	26.9	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 2) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D2 (1km) 0.253 Cv (Summer) 0.950
Site Location GB 535450 189700 TQ 35450 89700 D3 (1km) 0.253 Cv (Winter) 0.950
C (1km) -0.027 E (1km) 0.332
D1 (1km) 0.320 F (1km) 2.475

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	120 Winter	100	+30%	100/15 Summer	100/120 Summer			5
S7.001	120 Summer	100	+30%	100/15 Summer	100/120 Summer			5
S7.002	180 Winter	100	+30%					
S7.003	120 Summer	100	+30%	30/15 Summer	100/120 Winter			1
S7.004	30 Winter	100	+30%	1/15 Summer	100/30 Summer			7
S8.000	180 Summer	100	+30%	30/15 Summer	100/15 Summer			15
S8.001	120 Winter	100	+30%	30/15 Summer	100/15 Summer			15
S8.002	120 Winter	100	+30%	30/15 Summer	100/15 Summer			12
S8.003	180 Winter	100	+30%					
S8.004	60 Summer	100	+30%	30/15 Summer	100/30 Summer			8
S7.005	60 Summer	100	+30%	1/15 Summer	100/30 Summer			6
S7.006	30 Winter	100	+30%	1/15 Summer	100/30 Summer			6
S9.000	60 Winter	100	+30%	100/15 Summer	100/30 Summer			4
S10.000	60 Winter	100	+30%	100/15 Summer	100/30 Summer			3
S9.001	30 Winter	100	+30%	30/15 Summer	100/30 Summer			3
S11.000	30 Winter	100	+30%	30/15 Winter	100/15 Summer			7
S11.001	30 Winter	100	+30%	30/15 Summer	100/15 Summer			7
S12.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			6
S11.002	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
S13.000	30 Winter	100	+30%	100/15 Summer				
S7.007	60 Winter	100	+30%	1/15 Summer				
S7.008	30 Winter	100	+30%	1/15 Summer				
S14.000	30 Summer	100	+30%	100/15 Summer	100/15 Summer			10
S14.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			10
S15.000	120 Winter	100	+30%	100/15 Summer	100/15 Summer			12
S15.001	120 Winter	100	+30%	100/15 Summer	100/30 Summer			9
S15.002	120 Winter	100	+30%	30/15 Summer	100/15 Summer			11
S15.003	120 Winter	100	+30%	30/15 Summer	100/15 Summer			11
S15.004	30 Summer	100	+30%	30/15 Summer	100/15 Summer			11
S15.005	15 Winter	100	+30%	30/15 Summer	100/15 Summer			11
S16.000	120 Summer	100	+30%	100/15 Summer	100/30 Summer			9
S16.001	60 Winter	100	+30%	100/15 Summer	100/30 Summer			9
S17.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			11
S15.006	60 Summer	100	+30%	30/15 Summer	100/15 Summer			8
S14.002	15 Summer	100	+30%	30/15 Summer	100/15 Summer			8
S14.003	15 Summer	100	+30%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	9.001	0.376	0.859	0.18	0.0	4.0	FLOOD
S7.001	S52	9.001	0.420	1.070	0.10	0.0	3.1	FLOOD
S7.002	S4	8.522	0.000	0.000	0.11	0.0	3.7	SURCHARGED*
S7.003	S53	8.999	0.536	0.000	0.08	0.0	3.2	FLOOD RISK
S7.004	S54	9.003	0.681	2.961	1.79	0.0	44.9	FLOOD
S8.000	S41	9.012	0.387	11.933	0.38	0.0	9.1	FLOOD
S8.001	S42	9.013	0.412	13.462	0.83	0.0	22.2	FLOOD
S8.002	S41	9.013	0.466	12.937	0.39	0.0	10.4	FLOOD
S8.003	S10	8.496	0.000	0.000	0.30	0.0	9.1	SURCHARGED*
S8.004	S41	9.006	0.561	6.167	0.46	0.0	12.9	FLOOD
S7.005	S55	9.002	0.715	2.446	0.29	0.0	12.9	FLOOD
S7.006	S56	9.001	0.732	0.540	0.16	0.0	9.1	FLOOD
S9.000	S57	9.000	0.375	0.335	0.21	0.0	5.6	FLOOD
S10.000	S14	9.000	0.375	0.018	0.15	0.0	3.7	FLOOD
S9.001	S58	9.000	0.474	0.160	0.86	0.0	25.6	FLOOD
S11.000	S15	9.004	0.379	4.181	0.89	0.0	20.9	FLOOD
S11.001	S47	9.014	0.412	14.029	0.69	0.0	21.9	FLOOD
S12.000	S50	9.002	0.377	2.137	0.68	0.0	19.5	FLOOD
S11.002	S45	9.000	0.587	0.164	1.27	0.0	42.5	FLOOD
S13.000	S20	8.979	0.354	0.000	0.37	0.0	9.3	FLOOD RISK
S7.007	S57	8.972	0.888	0.000	1.08	0.0	32.4	FLOOD RISK
S7.008	S19	8.920	1.078	0.000	1.07	0.0	32.2	FLOOD RISK
S14.000	S23	9.009	0.384	9.108	0.79	0.0	19.1	FLOOD
S14.001	S20	9.006	0.409	6.151	1.57	0.0	42.9	FLOOD
S15.000	S21	9.009	0.384	9.070	0.78	0.0	23.4	FLOOD
S15.001	S24	9.008	0.428	7.859	0.59	0.0	23.5	FLOOD
S15.002	S22	9.007	0.559	7.011	1.29	0.0	25.6	FLOOD

100 year Return Period Summary of Critical Results by Maximum Level (Rank 2) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	9.005	0.576	5.405	0.98	0.0	26.2	FLOOD
S15.004	S24	9.007	0.585	6.556	1.11	0.0	70.7	FLOOD
S15.005	S25	9.004	0.682	4.175	0.79	0.0	57.1	FLOOD
S16.000	S31	9.003	0.378	2.574	0.31	0.0	7.7	FLOOD
S16.001	S26	9.002	0.406	2.088	1.12	0.0	14.4	FLOOD
S17.000	S32	9.010	0.385	10.052	3.62	0.0	85.2	FLOOD
S15.006	S26	9.001	0.875	0.692	0.37	0.0	29.5	FLOOD
S14.002	S21	9.004	0.988	4.000	0.25	0.0	38.3	FLOOD
S14.003	S34	9.000	1.358	0.124	0.21	0.0	32.4	FLOOD

1 year Return Period Summary of Critical Results by Maximum Level (Rank 3) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D2 (1km) 0.253 Cv (Summer) 0.950
Site Location GB 535450 189700 TQ 35450 89700 D3 (1km) 0.253 Cv (Winter) 0.950
C (1km) -0.027 E (1km) 0.332
D1 (1km) 0.320 F (1km) 2.475

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	30 Summer	1	0%	100/15 Summer	100/120 Summer			5
S7.001	30 Summer	1	0%	100/15 Summer	100/120 Summer			5
S7.002	30 Winter	1	0%					
S7.003	30 Winter	1	0%	30/15 Summer	100/120 Winter			1
S7.004	60 Summer	1	0%	1/15 Summer	100/30 Summer			7
S8.000	30 Summer	1	0%	30/15 Summer	100/15 Summer			15
S8.001	30 Summer	1	0%	30/15 Summer	100/15 Summer			15
S8.002	120 Summer	1	0%	30/15 Summer	100/15 Summer			12
S8.003	120 Summer	1	0%					
S8.004	30 Winter	1	0%	30/15 Summer	100/30 Summer			8
S7.005	60 Summer	1	0%	1/15 Summer	100/30 Summer			6
S7.006	30 Winter	1	0%	1/15 Summer	100/30 Summer			6
S9.000	240 Summer	1	0%	100/15 Summer	100/30 Summer			4
S10.000	240 Winter	1	0%	100/15 Summer	100/30 Summer			3
S9.001	30 Summer	1	0%	30/15 Summer	100/30 Summer			3
S11.000	120 Summer	1	0%	30/15 Winter	100/15 Summer			7
S11.001	30 Winter	1	0%	30/15 Summer	100/15 Summer			7
S12.000	30 Summer	1	0%	30/15 Summer	100/15 Summer			6
S11.002	15 Summer	1	0%	30/15 Summer	100/15 Summer			4
S13.000	30 Winter	1	0%	100/15 Summer				
S7.007	15 Winter	1	0%	1/15 Summer				
S7.008	15 Winter	1	0%	1/15 Summer				
S14.000	15 Winter	1	0%	100/15 Summer	100/15 Summer			10
S14.001	15 Winter	1	0%	100/15 Summer	100/15 Summer			10
S15.000	240 Summer	1	0%	100/15 Summer	100/15 Summer			12
S15.001	240 Summer	1	0%	100/15 Summer	100/30 Summer			9
S15.002	30 Summer	1	0%	30/15 Summer	100/15 Summer			11
S15.003	15 Winter	1	0%	30/15 Summer	100/15 Summer			11
S15.004	15 Winter	1	0%	30/15 Summer	100/15 Summer			11
S15.005	30 Winter	1	0%	30/15 Summer	100/15 Summer			11
S16.000	30 Summer	1	0%	100/15 Summer	100/30 Summer			9
S16.001	720 Summer	1	0%	100/15 Summer	100/30 Summer			9
S17.000	30 Summer	1	0%	30/15 Summer	100/15 Summer			11
S15.006	60 Winter	1	0%	30/15 Summer	100/15 Summer			8
S14.002	180 Summer	1	0%	30/15 Summer	100/15 Summer			8
S14.003	60 Summer	1	0%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	8.453	-0.172	0.000	0.12	0.0	2.7	OK
S7.001	S52	8.425	-0.156	0.000	0.05	0.0	1.6	OK
S7.002	S4	8.386	-0.136	0.000	0.05	0.0	1.7	OK*
S7.003	S53	8.386	-0.077	0.000	0.07	0.0	2.6	OK
S7.004	S54	8.384	0.062	0.000	0.18	0.0	4.4	SURCHARGED
S8.000	S41	8.484	-0.141	0.000	0.14	0.0	3.3	OK
S8.001	S42	8.479	-0.122	0.000	0.42	0.0	11.2	OK
S8.002	S41	8.469	-0.078	0.000	0.14	0.0	3.7	OK
S8.003	S10	8.466	-0.030	0.000	0.12	0.0	3.5	OK*
S8.004	S41	8.385	-0.060	0.000	0.19	0.0	5.1	OK
S7.005	S55	8.380	0.092	0.000	0.22	0.0	9.8	SURCHARGED
S7.006	S56	8.377	0.108	0.000	0.20	0.0	10.8	SURCHARGED
S9.000	S57	8.409	-0.216	0.000	0.01	0.0	0.2	OK
S10.000	S14	8.400	-0.225	0.000	0.00	0.0	0.0	OK
S9.001	S58	8.398	-0.128	0.000	0.38	0.0	11.4	OK
S11.000	S15	8.433	-0.192	0.000	0.00	0.0	0.1	OK
S11.001	S47	8.438	-0.164	0.000	0.16	0.0	5.2	OK
S12.000	S50	8.449	-0.176	0.000	0.11	0.0	3.1	OK
S11.002	S45	8.278	-0.135	0.000	0.28	0.0	9.3	OK
S13.000	S20	8.431	-0.194	0.000	0.05	0.0	1.2	OK
S7.007	S57	8.254	0.170	0.000	0.76	0.0	22.7	SURCHARGED
S7.008	S19	8.226	0.384	0.000	0.75	0.0	22.6	SURCHARGED
S14.000	S23	8.463	-0.162	0.000	0.13	0.0	3.1	OK
S14.001	S20	8.449	-0.148	0.000	0.25	0.0	6.9	OK
S15.000	S21	8.439	-0.186	0.000	0.07	0.0	2.2	OK
S15.001	S24	8.388	-0.191	0.000	0.05	0.0	2.2	OK
S15.002	S22	8.317	-0.131	0.000	0.36	0.0	7.2	OK

1 year Return Period Summary of Critical Results by Maximum Level (Rank 3) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	8.242	-0.188	0.000	0.29	0.0	7.8	OK
S15.004	S24	8.207	-0.214	0.000	0.18	0.0	11.4	OK
S15.005	S25	8.106	-0.216	0.000	0.17	0.0	12.7	OK
S16.000	S31	8.455	-0.170	0.000	0.13	0.0	3.3	OK
S16.001	S26	8.406	-0.190	0.000	0.06	0.0	0.8	OK
S17.000	S32	8.512	-0.113	0.000	0.50	0.0	11.7	OK
S15.006	S26	7.914	-0.212	0.000	0.16	0.0	12.9	OK
S14.002	S21	7.873	-0.143	0.000	0.12	0.0	17.8	OK
S14.003	S34	7.870	0.228	0.000	0.11	0.0	17.7	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 3) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D2 (1km) 0.253 Cv (Summer) 0.950
Site Location GB 535450 189700 TQ 35450 89700 D3 (1km) 0.253 Cv (Winter) 0.950
C (1km) -0.027 E (1km) 0.332
D1 (1km) 0.320 F (1km) 2.475

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	180 Summer	30	0%	100/15 Summer	100/120 Summer			5
S7.001	180 Summer	30	0%	100/15 Summer	100/120 Summer			5
S7.002	240 Winter	30	0%					
S7.003	30 Winter	30	0%	30/15 Summer	100/120 Winter			1
S7.004	30 Winter	30	0%	1/15 Summer	100/30 Summer			7
S8.000	30 Summer	30	0%	30/15 Summer	100/15 Summer			15
S8.001	60 Winter	30	0%	30/15 Summer	100/15 Summer			15
S8.002	120 Winter	30	0%	30/15 Summer	100/15 Summer			12
S8.003	60 Winter	30	0%					
S8.004	30 Winter	30	0%	30/15 Summer	100/30 Summer			8
S7.005	30 Winter	30	0%	1/15 Summer	100/30 Summer			6
S7.006	60 Summer	30	0%	1/15 Summer	100/30 Summer			6
S9.000	60 Summer	30	0%	100/15 Summer	100/30 Summer			4
S10.000	15 Winter	30	0%	100/15 Summer	100/30 Summer			3
S9.001	30 Summer	30	0%	30/15 Summer	100/30 Summer			3
S11.000	15 Summer	30	0%	30/15 Winter	100/15 Summer			7
S11.001	30 Summer	30	0%	30/15 Summer	100/15 Summer			7
S12.000	30 Summer	30	0%	30/15 Summer	100/15 Summer			6
S11.002	30 Summer	30	0%	30/15 Summer	100/15 Summer			4
S13.000	30 Winter	30	0%	100/15 Summer				
S7.007	30 Summer	30	0%	1/15 Summer				
S7.008	15 Winter	30	0%	1/15 Summer				
S14.000	30 Summer	30	0%	100/15 Summer	100/15 Summer			10
S14.001	30 Summer	30	0%	100/15 Summer	100/15 Summer			10
S15.000	30 Summer	30	0%	100/15 Summer	100/15 Summer			12
S15.001	30 Winter	30	0%	100/15 Summer	100/30 Summer			9
S15.002	30 Winter	30	0%	30/15 Summer	100/15 Summer			11
S15.003	30 Winter	30	0%	30/15 Summer	100/15 Summer			11
S15.004	30 Winter	30	0%	30/15 Summer	100/15 Summer			11
S15.005	30 Winter	30	0%	30/15 Summer	100/15 Summer			11
S16.000	30 Summer	30	0%	100/15 Summer	100/30 Summer			9
S16.001	120 Summer	30	0%	100/15 Summer	100/30 Summer			9
S17.000	30 Summer	30	0%	30/15 Summer	100/15 Summer			11
S15.006	30 Winter	30	0%	30/15 Summer	100/15 Summer			8
S14.002	30 Winter	30	0%	30/15 Summer	100/15 Summer			8
S14.003	30 Winter	30	0%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	8.562	-0.063	0.000	0.13	0.0	2.8	OK
S7.001	S52	8.561	-0.020	0.000	0.14	0.0	4.4	OK
S7.002	S4	8.522	0.000	0.000	0.13	0.0	4.4	SURCHARGED*
S7.003	S53	8.593	0.130	0.000	0.06	0.0	2.4	SURCHARGED
S7.004	S54	8.600	0.278	0.000	0.92	0.0	23.2	SURCHARGED
S8.000	S41	8.674	0.049	0.000	0.48	0.0	11.5	SURCHARGED
S8.001	S42	8.666	0.065	0.000	0.69	0.0	18.3	SURCHARGED
S8.002	S41	8.656	0.109	0.000	0.22	0.0	5.7	SURCHARGED
S8.003	S10	8.496	0.000	0.000	0.17	0.0	5.2	SURCHARGED*
S8.004	S41	8.606	0.161	0.000	0.37	0.0	10.4	SURCHARGED
S7.005	S55	8.599	0.311	0.000	0.25	0.0	11.2	SURCHARGED
S7.006	S56	8.643	0.374	0.000	0.24	0.0	13.3	SURCHARGED
S9.000	S57	8.512	-0.113	0.000	0.13	0.0	3.6	OK
S10.000	S14	8.507	-0.118	0.000	0.08	0.0	2.1	OK
S9.001	S58	8.645	0.119	0.000	0.90	0.0	26.7	SURCHARGED
S11.000	S15	8.624	-0.001	0.000	0.06	0.0	1.4	OK
S11.001	S47	8.628	0.026	0.000	0.41	0.0	13.0	SURCHARGED
S12.000	S50	8.639	0.014	0.000	0.32	0.0	9.3	SURCHARGED
S11.002	S45	8.631	0.218	0.000	0.54	0.0	18.0	SURCHARGED
S13.000	S20	8.559	-0.066	0.000	0.20	0.0	5.0	OK
S7.007	S57	8.598	0.514	0.000	0.97	0.0	29.2	SURCHARGED
S7.008	S19	8.554	0.712	0.000	0.95	0.0	28.6	SURCHARGED
S14.000	S23	8.579	-0.046	0.000	0.68	0.0	16.6	OK
S14.001	S20	8.564	-0.033	0.000	1.00	0.0	27.4	OK
S15.000	S21	8.523	-0.102	0.000	0.45	0.0	13.4	OK
S15.001	S24	8.530	-0.049	0.000	0.32	0.0	12.6	OK
S15.002	S22	8.540	0.093	0.000	1.34	0.0	26.5	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 3) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	8.538	0.108	0.000	1.00	0.0	26.8	SURCHARGED
S15.004	S24	8.535	0.114	0.000	0.63	0.0	40.6	SURCHARGED
S15.005	S25	8.528	0.207	0.000	0.68	0.0	49.3	SURCHARGED
S16.000	S31	8.504	-0.121	0.000	0.43	0.0	10.6	OK
S16.001	S26	8.472	-0.124	0.000	0.36	0.0	4.6	OK
S17.000	S32	8.673	0.048	0.000	1.70	0.0	40.1	SURCHARGED
S15.006	S26	8.516	0.390	0.000	0.29	0.0	23.1	SURCHARGED
S14.002	S21	8.499	0.483	0.000	0.18	0.0	27.6	SURCHARGED
S14.003	S34	8.485	0.843	0.000	0.17	0.0	26.8	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 3) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D2 (1km) 0.253 Cv (Summer) 0.950
Site Location GB 535450 189700 TQ 35450 89700 D3 (1km) 0.253 Cv (Winter) 0.950
C (1km) -0.027 E (1km) 0.332
D1 (1km) 0.320 F (1km) 2.475

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	120 Summer	100	+30%	100/15 Summer	100/120 Summer			5
S7.001	180 Winter	100	+30%	100/15 Summer	100/120 Summer			5
S7.002	60 Winter	100	+30%					
S7.003	30 Winter	100	+30%	30/15 Summer	100/120 Winter			1
S7.004	60 Summer	100	+30%	1/15 Summer	100/30 Summer			7
S8.000	120 Winter	100	+30%	30/15 Summer	100/15 Summer			15
S8.001	180 Summer	100	+30%	30/15 Summer	100/15 Summer			15
S8.002	60 Summer	100	+30%	30/15 Summer	100/15 Summer			12
S8.003	240 Winter	100	+30%					
S8.004	120 Summer	100	+30%	30/15 Summer	100/30 Summer			8
S7.005	30 Winter	100	+30%	1/15 Summer	100/30 Summer			6
S7.006	60 Summer	100	+30%	1/15 Summer	100/30 Summer			6
S9.000	30 Summer	100	+30%	100/15 Summer	100/30 Summer			4
S10.000	30 Summer	100	+30%	100/15 Summer	100/30 Summer			3
S9.001	30 Summer	100	+30%	30/15 Summer	100/30 Summer			3
S11.000	60 Summer	100	+30%	30/15 Winter	100/15 Summer			7
S11.001	15 Winter	100	+30%	30/15 Summer	100/15 Summer			7
S12.000	30 Summer	100	+30%	30/15 Summer	100/15 Summer			6
S11.002	30 Summer	100	+30%	30/15 Summer	100/15 Summer			4
S13.000	60 Winter	100	+30%	100/15 Summer				
S7.007	30 Summer	100	+30%	1/15 Summer				
S7.008	30 Summer	100	+30%	1/15 Summer				
S14.000	60 Summer	100	+30%	100/15 Summer	100/15 Summer			10
S14.001	15 Summer	100	+30%	100/15 Summer	100/15 Summer			10
S15.000	60 Winter	100	+30%	100/15 Summer	100/15 Summer			12
S15.001	60 Winter	100	+30%	100/15 Summer	100/30 Summer			9
S15.002	60 Winter	100	+30%	30/15 Summer	100/15 Summer			11
S15.003	60 Summer	100	+30%	30/15 Summer	100/15 Summer			11
S15.004	15 Summer	100	+30%	30/15 Summer	100/15 Summer			11
S15.005	30 Summer	100	+30%	30/15 Summer	100/15 Summer			11
S16.000	60 Winter	100	+30%	100/15 Summer	100/30 Summer			9
S16.001	120 Summer	100	+30%	100/15 Summer	100/30 Summer			9
S17.000	30 Summer	100	+30%	30/15 Summer	100/15 Summer			11
S15.006	30 Summer	100	+30%	30/15 Summer	100/15 Summer			8
S14.002	30 Summer	100	+30%	30/15 Summer	100/15 Summer			8
S14.003	15 Winter	100	+30%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	9.001	0.376	0.809	0.27	0.0	6.0	FLOOD
S7.001	S52	9.000	0.419	0.394	0.12	0.0	3.6	FLOOD
S7.002	S4	8.522	0.000	0.000	0.04	0.0	1.2	SURCHARGED*
S7.003	S53	8.991	0.529	0.000	0.08	0.0	3.1	FLOOD RISK
S7.004	S54	9.003	0.681	2.614	1.51	0.0	37.9	FLOOD
S8.000	S41	9.012	0.387	11.909	0.39	0.0	9.2	FLOOD
S8.001	S42	9.012	0.411	11.828	0.92	0.0	24.3	FLOOD
S8.002	S41	9.011	0.464	10.845	0.35	0.0	9.2	FLOOD
S8.003	S10	8.496	0.000	0.000	0.30	0.0	9.0	SURCHARGED*
S8.004	S41	9.005	0.560	5.335	0.40	0.0	11.0	FLOOD
S7.005	S55	9.002	0.714	2.229	0.20	0.0	9.2	FLOOD
S7.006	S56	9.000	0.732	0.404	0.21	0.0	11.6	FLOOD
S9.000	S57	9.000	0.375	0.125	0.17	0.0	4.6	FLOOD
S10.000	S14	9.000	0.375	0.000	0.15	0.0	3.8	FLOOD
S9.001	S58	9.000	0.474	0.016	0.96	0.0	28.3	FLOOD
S11.000	S15	9.003	0.378	3.468	0.83	0.0	19.4	FLOOD
S11.001	S47	9.013	0.411	13.411	0.74	0.0	23.4	FLOOD
S12.000	S50	9.001	0.376	1.098	0.54	0.0	15.6	FLOOD
S11.002	S45	9.000	0.587	0.002	1.27	0.0	42.7	FLOOD
S13.000	S20	8.978	0.353	0.000	0.23	0.0	5.8	FLOOD RISK
S7.007	S57	8.969	0.885	0.000	1.08	0.0	32.3	FLOOD RISK
S7.008	S19	8.917	1.075	0.000	1.07	0.0	32.2	FLOOD RISK
S14.000	S23	9.008	0.383	8.351	0.59	0.0	14.4	FLOOD
S14.001	S20	9.006	0.409	5.941	1.62	0.0	44.3	FLOOD
S15.000	S21	9.008	0.383	8.013	0.75	0.0	22.5	FLOOD
S15.001	S24	9.007	0.427	6.632	0.57	0.0	22.8	FLOOD
S15.002	S22	9.006	0.558	6.072	1.55	0.0	30.8	FLOOD

100 year Return Period Summary of Critical Results by Maximum Level (Rank 3) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	9.005	0.575	5.146	1.03	0.0	27.5	FLOOD
S15.004	S24	9.006	0.585	6.427	1.53	0.0	97.5	FLOOD
S15.005	S25	9.003	0.681	3.043	0.75	0.0	54.5	FLOOD
S16.000	S31	9.002	0.377	2.371	0.57	0.0	13.8	FLOOD
S16.001	S26	9.002	0.406	1.814	1.12	0.0	14.4	FLOOD
S17.000	S32	9.009	0.384	9.205	2.88	0.0	67.7	FLOOD
S15.006	S26	9.000	0.875	0.657	0.35	0.0	27.9	FLOOD
S14.002	S21	9.003	0.987	3.388	0.25	0.0	38.1	FLOOD
S14.003	S34	9.000	1.358	0.156	0.21	0.0	32.4	FLOOD

1 year Return Period Summary of Critical Results by Maximum Level (Rank 4) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D2 (1km) 0.253 Cv (Summer) 0.950
Site Location GB 535450 189700 TQ 35450 89700 D3 (1km) 0.253 Cv (Winter) 0.950
C (1km) -0.027 E (1km) 0.332
D1 (1km) 0.320 F (1km) 2.475

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	30 Winter	1	0%	100/15 Summer	100/120 Summer			5
S7.001	30 Winter	1	0%	100/15 Summer	100/120 Summer			5
S7.002	15 Summer	1	0%					
S7.003	15 Summer	1	0%	30/15 Summer	100/120 Winter			1
S7.004	15 Summer	1	0%	1/15 Summer	100/30 Summer			7
S8.000	30 Winter	1	0%	30/15 Summer	100/15 Summer			15
S8.001	30 Winter	1	0%	30/15 Summer	100/15 Summer			15
S8.002	120 Winter	1	0%	30/15 Summer	100/15 Summer			12
S8.003	120 Winter	1	0%					
S8.004	15 Summer	1	0%	30/15 Summer	100/30 Summer			8
S7.005	15 Summer	1	0%	1/15 Summer	100/30 Summer			6
S7.006	60 Summer	1	0%	1/15 Summer	100/30 Summer			6
S9.000	120 Winter	1	0%	100/15 Summer	100/30 Summer			4
S10.000	15 Winter	1	0%	100/15 Summer	100/30 Summer			3
S9.001	30 Winter	1	0%	30/15 Summer	100/30 Summer			3
S11.000	30 Summer	1	0%	30/15 Winter	100/15 Summer			7
S11.001	60 Winter	1	0%	30/15 Summer	100/15 Summer			7
S12.000	30 Winter	1	0%	30/15 Summer	100/15 Summer			6
S11.002	30 Winter	1	0%	30/15 Summer	100/15 Summer			4
S13.000	60 Winter	1	0%	100/15 Summer				
S7.007	60 Summer	1	0%	1/15 Summer				
S7.008	60 Summer	1	0%	1/15 Summer				
S14.000	60 Summer	1	0%	100/15 Summer	100/15 Summer			10
S14.001	30 Winter	1	0%	100/15 Summer	100/15 Summer			10
S15.000	60 Summer	1	0%	100/15 Summer	100/15 Summer			12
S15.001	60 Summer	1	0%	100/15 Summer	100/30 Summer			9
S15.002	30 Winter	1	0%	30/15 Summer	100/15 Summer			11
S15.003	60 Summer	1	0%	30/15 Summer	100/15 Summer			11
S15.004	30 Winter	1	0%	30/15 Summer	100/15 Summer			11
S15.005	15 Summer	1	0%	30/15 Summer	100/15 Summer			11
S16.000	30 Winter	1	0%	100/15 Summer	100/30 Summer			9
S16.001	360 Summer	1	0%	100/15 Summer	100/30 Summer			9
S17.000	30 Winter	1	0%	30/15 Summer	100/15 Summer			11
S15.006	180 Summer	1	0%	30/15 Summer	100/15 Summer			8
S14.002	60 Winter	1	0%	30/15 Summer	100/15 Summer			8
S14.003	60 Winter	1	0%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	8.449	-0.176	0.000	0.10	0.0	2.2	OK
S7.001	S52	8.425	-0.156	0.000	0.05	0.0	1.6	OK
S7.002	S4	8.384	-0.138	0.000	0.05	0.0	1.6	OK*
S7.003	S53	8.383	-0.080	0.000	0.06	0.0	2.5	OK
S7.004	S54	8.382	0.060	0.000	0.23	0.0	5.9	SURCHARGED
S8.000	S41	8.477	-0.148	0.000	0.12	0.0	2.7	OK
S8.001	S42	8.473	-0.128	0.000	0.36	0.0	9.7	OK
S8.002	S41	8.466	-0.081	0.000	0.16	0.0	4.3	OK
S8.003	S10	8.463	-0.033	0.000	0.12	0.0	3.7	OK*
S8.004	S41	8.383	-0.062	0.000	0.23	0.0	6.4	OK
S7.005	S55	8.378	0.090	0.000	0.23	0.0	10.5	SURCHARGED
S7.006	S56	8.377	0.108	0.000	0.18	0.0	10.2	SURCHARGED
S9.000	S57	8.408	-0.217	0.000	0.01	0.0	0.2	OK
S10.000	S14	8.400	-0.225	0.000	0.00	0.0	0.0	OK
S9.001	S58	8.390	-0.136	0.000	0.33	0.0	9.8	OK
S11.000	S15	8.433	-0.192	0.000	0.00	0.0	0.1	OK
S11.001	S47	8.436	-0.166	0.000	0.15	0.0	4.9	OK
S12.000	S50	8.444	-0.181	0.000	0.09	0.0	2.5	OK
S11.002	S45	8.276	-0.137	0.000	0.26	0.0	8.9	OK
S13.000	S20	8.430	-0.195	0.000	0.04	0.0	1.1	OK
S7.007	S57	8.253	0.169	0.000	0.75	0.0	22.7	SURCHARGED
S7.008	S19	8.226	0.384	0.000	0.75	0.0	22.6	SURCHARGED
S14.000	S23	8.462	-0.163	0.000	0.13	0.0	3.2	OK
S14.001	S20	8.447	-0.150	0.000	0.24	0.0	6.7	OK
S15.000	S21	8.439	-0.186	0.000	0.07	0.0	2.1	OK
S15.001	S24	8.388	-0.192	0.000	0.05	0.0	2.1	OK
S15.002	S22	8.310	-0.138	0.000	0.32	0.0	6.3	OK

1 year Return Period Summary of Critical Results by Maximum Level (Rank 4) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	8.241	-0.189	0.000	0.29	0.0	7.7	OK
S15.004	S24	8.206	-0.216	0.000	0.17	0.0	11.1	OK
S15.005	S25	8.104	-0.218	0.000	0.17	0.0	12.1	OK
S16.000	S31	8.450	-0.175	0.000	0.11	0.0	2.7	OK
S16.001	S26	8.406	-0.190	0.000	0.06	0.0	0.8	OK
S17.000	S32	8.500	-0.125	0.000	0.41	0.0	9.7	OK
S15.006	S26	7.913	-0.213	0.000	0.16	0.0	12.7	OK
S14.002	S21	7.871	-0.145	0.000	0.11	0.0	17.6	OK
S14.003	S34	7.865	0.223	0.000	0.11	0.0	17.5	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 4) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D2 (1km) 0.253 Cv (Summer) 0.950
Site Location GB 535450 189700 TQ 35450 89700 D3 (1km) 0.253 Cv (Winter) 0.950
C (1km) -0.027 E (1km) 0.332
D1 (1km) 0.320 F (1km) 2.475

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	180 Winter	30	0%	100/15 Summer	100/120 Summer			5
S7.001	180 Winter	30	0%	100/15 Summer	100/120 Summer			5
S7.002	180 Winter	30	0%					
S7.003	30 Summer	30	0%	30/15 Summer	100/120 Winter			1
S7.004	30 Summer	30	0%	1/15 Summer	100/30 Summer			7
S8.000	60 Winter	30	0%	30/15 Summer	100/15 Summer			15
S8.001	60 Summer	30	0%	30/15 Summer	100/15 Summer			15
S8.002	120 Summer	30	0%	30/15 Summer	100/15 Summer			12
S8.003	15 Winter	30	0%					
S8.004	30 Summer	30	0%	30/15 Summer	100/30 Summer			8
S7.005	30 Summer	30	0%	1/15 Summer	100/30 Summer			6
S7.006	120 Summer	30	0%	1/15 Summer	100/30 Summer			6
S9.000	15 Summer	30	0%	100/15 Summer	100/30 Summer			4
S10.000	30 Winter	30	0%	100/15 Summer	100/30 Summer			3
S9.001	30 Winter	30	0%	30/15 Summer	100/30 Summer			3
S11.000	30 Winter	30	0%	30/15 Winter	100/15 Summer			7
S11.001	30 Winter	30	0%	30/15 Summer	100/15 Summer			7
S12.000	30 Winter	30	0%	30/15 Summer	100/15 Summer			6
S11.002	30 Winter	30	0%	30/15 Summer	100/15 Summer			4
S13.000	15 Summer	30	0%	100/15 Summer				
S7.007	30 Winter	30	0%	1/15 Summer				
S7.008	30 Winter	30	0%	1/15 Summer				
S14.000	30 Winter	30	0%	100/15 Summer	100/15 Summer			10
S14.001	30 Winter	30	0%	100/15 Summer	100/15 Summer			10
S15.000	30 Winter	30	0%	100/15 Summer	100/15 Summer			12
S15.001	30 Summer	30	0%	100/15 Summer	100/30 Summer			9
S15.002	30 Summer	30	0%	30/15 Summer	100/15 Summer			11
S15.003	30 Summer	30	0%	30/15 Summer	100/15 Summer			11
S15.004	30 Summer	30	0%	30/15 Summer	100/15 Summer			11
S15.005	30 Summer	30	0%	30/15 Summer	100/15 Summer			11
S16.000	30 Winter	30	0%	100/15 Summer	100/30 Summer			9
S16.001	120 Winter	30	0%	100/15 Summer	100/30 Summer			9
S17.000	30 Winter	30	0%	30/15 Summer	100/15 Summer			11
S15.006	30 Summer	30	0%	30/15 Summer	100/15 Summer			8
S14.002	30 Summer	30	0%	30/15 Summer	100/15 Summer			8
S14.003	30 Summer	30	0%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	8.559	-0.066	0.000	0.08	0.0	1.8	OK
S7.001	S52	8.559	-0.022	0.000	0.14	0.0	4.4	OK
S7.002	S4	8.522	0.000	0.000	0.13	0.0	4.4	SURCHARGED*
S7.003	S53	8.590	0.128	0.000	0.06	0.0	2.4	SURCHARGED
S7.004	S54	8.597	0.275	0.000	1.15	0.0	28.9	SURCHARGED
S8.000	S41	8.667	0.042	0.000	0.19	0.0	4.5	SURCHARGED
S8.001	S42	8.664	0.063	0.000	0.95	0.0	25.3	SURCHARGED
S8.002	S41	8.655	0.108	0.000	0.21	0.0	5.7	SURCHARGED
S8.003	S10	8.496	0.000	0.000	0.13	0.0	3.8	SURCHARGED*
S8.004	S41	8.604	0.159	0.000	0.45	0.0	12.4	SURCHARGED
S7.005	S55	8.596	0.308	0.000	0.23	0.0	10.1	SURCHARGED
S7.006	S56	8.639	0.370	0.000	0.25	0.0	13.6	SURCHARGED
S9.000	S57	8.510	-0.115	0.000	0.13	0.0	3.6	OK
S10.000	S14	8.506	-0.119	0.000	0.08	0.0	2.1	OK
S9.001	S58	8.598	0.072	0.000	0.80	0.0	23.7	SURCHARGED
S11.000	S15	8.622	-0.003	0.000	0.06	0.0	1.4	OK
S11.001	S47	8.624	0.022	0.000	0.41	0.0	12.9	SURCHARGED
S12.000	S50	8.603	-0.022	0.000	0.23	0.0	6.6	OK
S11.002	S45	8.596	0.183	0.000	0.53	0.0	17.6	SURCHARGED
S13.000	S20	8.557	-0.068	0.000	0.25	0.0	6.2	OK
S7.007	S57	8.560	0.476	0.000	0.94	0.0	28.1	SURCHARGED
S7.008	S19	8.520	0.678	0.000	0.93	0.0	28.1	SURCHARGED
S14.000	S23	8.559	-0.066	0.000	0.59	0.0	14.3	OK
S14.001	S20	8.544	-0.053	0.000	0.93	0.0	25.5	OK
S15.000	S21	8.521	-0.104	0.000	0.42	0.0	12.7	OK
S15.001	S24	8.527	-0.052	0.000	0.34	0.0	13.5	OK
S15.002	S22	8.534	0.086	0.000	1.50	0.0	29.7	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 4) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	8.532	0.102	0.000	1.11	0.0	29.8	SURCHARGED
S15.004	S24	8.529	0.108	0.000	0.71	0.0	45.4	SURCHARGED
S15.005	S25	8.522	0.201	0.000	0.72	0.0	52.6	SURCHARGED
S16.000	S31	8.493	-0.132	0.000	0.36	0.0	8.8	OK
S16.001	S26	8.467	-0.129	0.000	0.34	0.0	4.3	OK
S17.000	S32	8.644	0.019	0.000	1.38	0.0	32.5	SURCHARGED
S15.006	S26	8.510	0.385	0.000	0.29	0.0	23.1	SURCHARGED
S14.002	S21	8.497	0.481	0.000	0.18	0.0	27.9	SURCHARGED
S14.003	S34	8.482	0.840	0.000	0.17	0.0	26.7	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 4) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D2 (1km) 0.253 Cv (Summer) 0.950
Site Location GB 535450 189700 TQ 35450 89700 D3 (1km) 0.253 Cv (Winter) 0.950
C (1km) -0.027 E (1km) 0.332
D1 (1km) 0.320 F (1km) 2.475

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	180 Summer	100	+30%	100/15 Summer	100/120 Summer			5
S7.001	180 Summer	100	+30%	100/15 Summer	100/120 Summer			5
S7.002	15 Winter	100	+30%					
S7.003	60 Summer	100	+30%	30/15 Summer	100/120 Winter			1
S7.004	30 Summer	100	+30%	1/15 Summer	100/30 Summer			7
S8.000	180 Winter	100	+30%	30/15 Summer	100/15 Summer			15
S8.001	180 Winter	100	+30%	30/15 Summer	100/15 Summer			15
S8.002	60 Winter	100	+30%	30/15 Summer	100/15 Summer			12
S8.003	15 Winter	100	+30%					
S8.004	120 Winter	100	+30%	30/15 Summer	100/30 Summer			8
S7.005	30 Summer	100	+30%	1/15 Summer	100/30 Summer			6
S7.006	30 Summer	100	+30%	1/15 Summer	100/30 Summer			6
S9.000	60 Summer	100	+30%	100/15 Summer	100/30 Summer			4
S10.000	60 Summer	100	+30%	100/15 Summer	100/30 Summer			3
S9.001	60 Summer	100	+30%	30/15 Summer	100/30 Summer			3
S11.000	15 Summer	100	+30%	30/15 Winter	100/15 Summer			7
S11.001	15 Summer	100	+30%	30/15 Summer	100/15 Summer			7
S12.000	30 Winter	100	+30%	30/15 Summer	100/15 Summer			6
S11.002	30 Winter	100	+30%	30/15 Summer	100/15 Summer			4
S13.000	30 Summer	100	+30%	100/15 Summer				
S7.007	60 Summer	100	+30%	1/15 Summer				
S7.008	60 Summer	100	+30%	1/15 Summer				
S14.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			10
S14.001	30 Winter	100	+30%	100/15 Summer	100/15 Summer			10
S15.000	180 Summer	100	+30%	100/15 Summer	100/15 Summer			12
S15.001	60 Summer	100	+30%	100/15 Summer	100/30 Summer			9
S15.002	60 Summer	100	+30%	30/15 Summer	100/15 Summer			11
S15.003	60 Winter	100	+30%	30/15 Summer	100/15 Summer			11
S15.004	30 Winter	100	+30%	30/15 Summer	100/15 Summer			11
S15.005	60 Winter	100	+30%	30/15 Summer	100/15 Summer			11
S16.000	60 Summer	100	+30%	100/15 Summer	100/30 Summer			9
S16.001	60 Summer	100	+30%	100/15 Summer	100/30 Summer			9
S17.000	30 Winter	100	+30%	30/15 Summer	100/15 Summer			11
S15.006	30 Winter	100	+30%	30/15 Summer	100/15 Summer			8
S14.002	30 Winter	100	+30%	30/15 Summer	100/15 Summer			8
S14.003	30 Winter	100	+30%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	9.000	0.375	0.471	0.20	0.0	4.4	FLOOD
S7.001	S52	9.000	0.419	0.091	0.12	0.0	3.6	FLOOD
S7.002	S4	8.522	0.000	0.000	0.01	0.0	0.2	SURCHARGED*
S7.003	S53	8.990	0.527	0.000	0.06	0.0	2.2	FLOOD RISK
S7.004	S54	9.002	0.680	2.179	2.29	0.0	57.3	FLOOD
S8.000	S41	9.012	0.387	11.521	0.38	0.0	8.9	FLOOD
S8.001	S42	9.012	0.411	11.784	0.61	0.0	16.2	FLOOD
S8.002	S41	9.011	0.464	10.757	0.35	0.0	9.3	FLOOD
S8.003	S10	8.496	0.000	0.000	0.25	0.0	7.5	SURCHARGED*
S8.004	S41	9.005	0.560	4.924	0.39	0.0	10.9	FLOOD
S7.005	S55	9.002	0.714	1.977	0.22	0.0	9.7	FLOOD
S7.006	S56	9.000	0.731	0.350	0.16	0.0	9.0	FLOOD
S9.000	S57	9.000	0.375	0.044	0.21	0.0	5.6	FLOOD
S10.000	S14	8.999	0.374	0.000	0.15	0.0	3.7	FLOOD RISK
S9.001	S58	9.000	0.474	0.000	0.77	0.0	22.8	FLOOD RISK
S11.000	S15	9.003	0.378	3.045	0.94	0.0	22.2	FLOOD
S11.001	S47	9.013	0.411	13.382	0.74	0.0	23.4	FLOOD
S12.000	S50	9.001	0.376	0.853	0.44	0.0	12.8	FLOOD
S11.002	S45	9.000	0.587	0.002	1.24	0.0	41.6	FLOOD
S13.000	S20	8.974	0.349	0.000	0.46	0.0	11.6	FLOOD RISK
S7.007	S57	8.969	0.885	0.000	1.08	0.0	32.3	FLOOD RISK
S7.008	S19	8.916	1.074	0.000	1.07	0.0	32.1	FLOOD RISK
S14.000	S23	9.008	0.383	7.955	1.14	0.0	27.6	FLOOD
S14.001	S20	9.005	0.408	5.435	1.22	0.0	33.4	FLOOD
S15.000	S21	9.008	0.383	7.880	0.48	0.0	14.5	FLOOD
S15.001	S24	9.006	0.427	6.349	0.57	0.0	22.7	FLOOD
S15.002	S22	9.006	0.558	6.029	1.74	0.0	34.5	FLOOD

100 year Return Period Summary of Critical Results by Maximum Level (Rank 4) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	9.005	0.575	4.981	1.03	0.0	27.6	FLOOD
S15.004	S24	9.006	0.584	6.060	0.93	0.0	59.6	FLOOD
S15.005	S25	9.003	0.681	2.800	0.56	0.0	40.6	FLOOD
S16.000	S31	9.002	0.377	2.015	0.56	0.0	13.6	FLOOD
S16.001	S26	9.002	0.406	1.585	1.12	0.0	14.4	FLOOD
S17.000	S32	9.008	0.383	7.643	2.37	0.0	55.8	FLOOD
S15.006	S26	9.000	0.875	0.381	0.36	0.0	28.0	FLOOD
S14.002	S21	9.001	0.985	1.113	0.24	0.0	36.4	FLOOD
S14.003	S34	9.000	1.358	0.037	0.21	0.0	32.3	FLOOD

1 year Return Period Summary of Critical Results by Maximum Level (Rank 5) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D2 (1km) 0.253 Cv (Summer) 0.950
Site Location GB 535450 189700 TQ 35450 89700 D3 (1km) 0.253 Cv (Winter) 0.950
C (1km) -0.027 E (1km) 0.332
D1 (1km) 0.320 F (1km) 2.475

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	60 Summer	1	0%	100/15 Summer	100/120 Summer			5
S7.001	120 Summer	1	0%	100/15 Summer	100/120 Summer			5
S7.002	15 Winter	1	0%					
S7.003	15 Winter	1	0%	30/15 Summer	100/120 Winter			1
S7.004	15 Winter	1	0%	1/15 Summer	100/30 Summer			7
S8.000	60 Summer	1	0%	30/15 Summer	100/15 Summer			15
S8.001	60 Summer	1	0%	30/15 Summer	100/15 Summer			15
S8.002	180 Summer	1	0%	30/15 Summer	100/15 Summer			12
S8.003	180 Summer	1	0%					
S8.004	15 Winter	1	0%	30/15 Summer	100/30 Summer			8
S7.005	15 Winter	1	0%	1/15 Summer	100/30 Summer			6
S7.006	15 Summer	1	0%	1/15 Summer	100/30 Summer			6
S9.000	60 Summer	1	0%	100/15 Summer	100/30 Summer			4
S10.000	30 Winter	1	0%	100/15 Summer	100/30 Summer			3
S9.001	60 Summer	1	0%	30/15 Summer	100/30 Summer			3
S11.000	30 Winter	1	0%	30/15 Winter	100/15 Summer			7
S11.001	15 Summer	1	0%	30/15 Summer	100/15 Summer			7
S12.000	60 Summer	1	0%	30/15 Summer	100/15 Summer			6
S11.002	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
S13.000	120 Summer	1	0%	100/15 Summer				
S7.007	30 Winter	1	0%	1/15 Summer				
S7.008	30 Winter	1	0%	1/15 Summer				
S14.000	30 Winter	1	0%	100/15 Summer	100/15 Summer			10
S14.001	60 Summer	1	0%	100/15 Summer	100/15 Summer			10
S15.000	120 Winter	1	0%	100/15 Summer	100/15 Summer			12
S15.001	120 Winter	1	0%	100/15 Summer	100/30 Summer			9
S15.002	60 Summer	1	0%	30/15 Summer	100/15 Summer			11
S15.003	30 Winter	1	0%	30/15 Summer	100/15 Summer			11
S15.004	60 Summer	1	0%	30/15 Summer	100/15 Summer			11
S15.005	15 Winter	1	0%	30/15 Summer	100/15 Summer			11
S16.000	60 Summer	1	0%	100/15 Summer	100/30 Summer			9
S16.001	360 Winter	1	0%	100/15 Summer	100/30 Summer			9
S17.000	60 Summer	1	0%	30/15 Summer	100/15 Summer			11
S15.006	30 Summer	1	0%	30/15 Summer	100/15 Summer			8
S14.002	120 Winter	1	0%	30/15 Summer	100/15 Summer			8
S14.003	120 Winter	1	0%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	8.448	-0.177	0.000	0.09	0.0	2.0	OK
S7.001	S52	8.424	-0.157	0.000	0.05	0.0	1.6	OK
S7.002	S4	8.381	-0.141	0.000	0.05	0.0	1.6	OK*
S7.003	S53	8.381	-0.082	0.000	0.06	0.0	2.4	OK
S7.004	S54	8.380	0.058	0.000	0.24	0.0	6.1	SURCHARGED
S8.000	S41	8.475	-0.150	0.000	0.11	0.0	2.5	OK
S8.001	S42	8.472	-0.129	0.000	0.33	0.0	8.8	OK
S8.002	S41	8.466	-0.081	0.000	0.17	0.0	4.5	OK
S8.003	S10	8.463	-0.033	0.000	0.12	0.0	3.5	OK*
S8.004	S41	8.380	-0.065	0.000	0.22	0.0	6.1	OK
S7.005	S55	8.376	0.088	0.000	0.23	0.0	10.5	SURCHARGED
S7.006	S56	8.375	0.106	0.000	0.19	0.0	10.7	SURCHARGED
S9.000	S57	8.408	-0.217	0.000	0.01	0.0	0.2	OK
S10.000	S14	8.400	-0.225	0.000	0.00	0.0	0.0	OK
S9.001	S58	8.386	-0.140	0.000	0.31	0.0	9.1	OK
S11.000	S15	8.433	-0.192	0.000	0.00	0.0	0.1	OK
S11.001	S47	8.436	-0.166	0.000	0.15	0.0	4.8	OK
S12.000	S50	8.442	-0.183	0.000	0.08	0.0	2.3	OK
S11.002	S45	8.275	-0.138	0.000	0.27	0.0	9.0	OK
S13.000	S20	8.430	-0.195	0.000	0.04	0.0	1.1	OK
S7.007	S57	8.251	0.167	0.000	0.75	0.0	22.6	SURCHARGED
S7.008	S19	8.223	0.381	0.000	0.75	0.0	22.6	SURCHARGED
S14.000	S23	8.462	-0.163	0.000	0.13	0.0	3.2	OK
S14.001	S20	8.447	-0.150	0.000	0.24	0.0	6.6	OK
S15.000	S21	8.439	-0.186	0.000	0.07	0.0	2.1	OK
S15.001	S24	8.388	-0.192	0.000	0.05	0.0	2.1	OK
S15.002	S22	8.310	-0.138	0.000	0.32	0.0	6.3	OK

1 year Return Period Summary of Critical Results by Maximum Level (Rank 5) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	8.241	-0.189	0.000	0.29	0.0	7.7	OK
S15.004	S24	8.205	-0.216	0.000	0.17	0.0	11.0	OK
S15.005	S25	8.103	-0.218	0.000	0.16	0.0	12.0	OK
S16.000	S31	8.448	-0.177	0.000	0.10	0.0	2.5	OK
S16.001	S26	8.405	-0.191	0.000	0.06	0.0	0.7	OK
S17.000	S32	8.496	-0.129	0.000	0.38	0.0	8.9	OK
S15.006	S26	7.907	-0.219	0.000	0.16	0.0	12.6	OK
S14.002	S21	7.851	-0.165	0.000	0.11	0.0	17.3	OK
S14.003	S34	7.842	0.200	0.000	0.11	0.0	17.1	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 5) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D2 (1km) 0.253 Cv (Summer) 0.950
Site Location GB 535450 189700 TQ 35450 89700 D3 (1km) 0.253 Cv (Winter) 0.950
C (1km) -0.027 E (1km) 0.332
D1 (1km) 0.320 F (1km) 2.475

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	240 Summer	30	0%	100/15 Summer	100/120 Summer			5
S7.001	240 Summer	30	0%	100/15 Summer	100/120 Summer			5
S7.002	120 Winter	30	0%					
S7.003	120 Summer	30	0%	30/15 Summer	100/120 Winter			1
S7.004	120 Summer	30	0%	1/15 Summer	100/30 Summer			7
S8.000	60 Summer	30	0%	30/15 Summer	100/15 Summer			15
S8.001	30 Summer	30	0%	30/15 Summer	100/15 Summer			15
S8.002	180 Summer	30	0%	30/15 Summer	100/15 Summer			12
S8.003	30 Winter	30	0%					
S8.004	120 Summer	30	0%	30/15 Summer	100/30 Summer			8
S7.005	120 Summer	30	0%	1/15 Summer	100/30 Summer			6
S7.006	120 Winter	30	0%	1/15 Summer	100/30 Summer			6
S9.000	60 Winter	30	0%	100/15 Summer	100/30 Summer			4
S10.000	60 Summer	30	0%	100/15 Summer	100/30 Summer			3
S9.001	60 Summer	30	0%	30/15 Summer	100/30 Summer			3
S11.000	60 Summer	30	0%	30/15 Winter	100/15 Summer			7
S11.001	60 Summer	30	0%	30/15 Summer	100/15 Summer			7
S12.000	60 Summer	30	0%	30/15 Summer	100/15 Summer			6
S11.002	60 Summer	30	0%	30/15 Summer	100/15 Summer			4
S13.000	60 Summer	30	0%	100/15 Summer				
S7.007	60 Summer	30	0%	1/15 Summer				
S7.008	60 Summer	30	0%	1/15 Summer				
S14.000	60 Summer	30	0%	100/15 Summer	100/15 Summer			10
S14.001	60 Summer	30	0%	100/15 Summer	100/15 Summer			10
S15.000	120 Summer	30	0%	100/15 Summer	100/15 Summer			12
S15.001	120 Summer	30	0%	100/15 Summer	100/30 Summer			9
S15.002	120 Summer	30	0%	30/15 Summer	100/15 Summer			11
S15.003	120 Summer	30	0%	30/15 Summer	100/15 Summer			11
S15.004	120 Summer	30	0%	30/15 Summer	100/15 Summer			11
S15.005	120 Summer	30	0%	30/15 Summer	100/15 Summer			11
S16.000	60 Summer	30	0%	100/15 Summer	100/30 Summer			9
S16.001	180 Summer	30	0%	100/15 Summer	100/30 Summer			9
S17.000	60 Summer	30	0%	30/15 Summer	100/15 Summer			11
S15.006	120 Summer	30	0%	30/15 Summer	100/15 Summer			8
S14.002	120 Summer	30	0%	30/15 Summer	100/15 Summer			8
S14.003	120 Summer	30	0%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	8.557	-0.068	0.000	0.10	0.0	2.3	OK
S7.001	S52	8.556	-0.025	0.000	0.14	0.0	4.4	OK
S7.002	S4	8.522	0.000	0.000	0.13	0.0	4.5	SURCHARGED*
S7.003	S53	8.585	0.122	0.000	0.13	0.0	5.0	SURCHARGED
S7.004	S54	8.590	0.268	0.000	0.51	0.0	12.7	SURCHARGED
S8.000	S41	8.665	0.040	0.000	0.28	0.0	6.6	SURCHARGED
S8.001	S42	8.663	0.062	0.000	1.49	0.0	39.5	SURCHARGED
S8.002	S41	8.644	0.097	0.000	0.21	0.0	5.7	SURCHARGED
S8.003	S10	8.496	0.000	0.000	0.11	0.0	3.3	SURCHARGED*
S8.004	S41	8.599	0.154	0.000	0.29	0.0	8.2	SURCHARGED
S7.005	S55	8.589	0.301	0.000	0.35	0.0	15.6	SURCHARGED
S7.006	S56	8.636	0.367	0.000	0.25	0.0	13.7	SURCHARGED
S9.000	S57	8.509	-0.116	0.000	0.13	0.0	3.5	OK
S10.000	S14	8.505	-0.120	0.000	0.09	0.0	2.2	OK
S9.001	S58	8.569	0.043	0.000	0.62	0.0	18.5	SURCHARGED
S11.000	S15	8.606	-0.019	0.000	0.04	0.0	1.0	OK
S11.001	S47	8.607	0.005	0.000	0.38	0.0	12.1	SURCHARGED
S12.000	S50	8.581	-0.044	0.000	0.20	0.0	5.7	OK
S11.002	S45	8.578	0.165	0.000	0.50	0.0	16.8	SURCHARGED
S13.000	S20	8.545	-0.080	0.000	0.17	0.0	4.3	OK
S7.007	S57	8.541	0.457	0.000	0.92	0.0	27.8	SURCHARGED
S7.008	S19	8.502	0.660	0.000	0.92	0.0	27.7	SURCHARGED
S14.000	S23	8.543	-0.082	0.000	0.52	0.0	12.6	OK
S14.001	S20	8.530	-0.067	0.000	0.83	0.0	22.8	OK
S15.000	S21	8.519	-0.106	0.000	0.35	0.0	10.4	OK
S15.001	S24	8.521	-0.058	0.000	0.26	0.0	10.3	OK
S15.002	S22	8.528	0.080	0.000	0.96	0.0	19.0	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 5) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	8.525	0.096	0.000	0.81	0.0	21.8	SURCHARGED
S15.004	S24	8.523	0.101	0.000	0.45	0.0	29.0	SURCHARGED
S15.005	S25	8.515	0.194	0.000	0.44	0.0	32.2	SURCHARGED
S16.000	S31	8.486	-0.139	0.000	0.31	0.0	7.6	OK
S16.001	S26	8.463	-0.133	0.000	0.32	0.0	4.2	OK
S17.000	S32	8.627	0.002	0.000	1.17	0.0	27.5	SURCHARGED
S15.006	S26	8.502	0.377	0.000	0.29	0.0	22.8	SURCHARGED
S14.002	S21	8.482	0.466	0.000	0.18	0.0	27.0	SURCHARGED
S14.003	S34	8.468	0.826	0.000	0.17	0.0	26.6	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 5) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D2 (1km) 0.253 Cv (Summer) 0.950
Site Location GB 535450 189700 TQ 35450 89700 D3 (1km) 0.253 Cv (Winter) 0.950
C (1km) -0.027 E (1km) 0.332
D1 (1km) 0.320 F (1km) 2.475

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	240 Winter	100	+30%	100/15 Summer	100/120 Summer			5
S7.001	240 Winter	100	+30%	100/15 Summer	100/120 Summer			5
S7.002	30 Winter	100	+30%					
S7.003	60 Winter	100	+30%	30/15 Summer	100/120 Winter			1
S7.004	120 Summer	100	+30%	1/15 Summer	100/30 Summer			7
S8.000	60 Summer	100	+30%	30/15 Summer	100/15 Summer			15
S8.001	60 Winter	100	+30%	30/15 Summer	100/15 Summer			15
S8.002	180 Summer	100	+30%	30/15 Summer	100/15 Summer			12
S8.003	30 Winter	100	+30%					
S8.004	30 Winter	100	+30%	30/15 Summer	100/30 Summer			8
S7.005	120 Summer	100	+30%	1/15 Summer	100/30 Summer			6
S7.006	120 Winter	100	+30%	1/15 Summer	100/30 Summer			6
S9.000	120 Summer	100	+30%	100/15 Summer	100/30 Summer			4
S10.000	15 Summer	100	+30%	100/15 Summer	100/30 Summer			3
S9.001	120 Summer	100	+30%	30/15 Summer	100/30 Summer			3
S11.000	60 Winter	100	+30%	30/15 Winter	100/15 Summer			7
S11.001	60 Summer	100	+30%	30/15 Summer	100/15 Summer			7
S12.000	60 Winter	100	+30%	30/15 Summer	100/15 Summer			6
S11.002	60 Winter	100	+30%	30/15 Summer	100/15 Summer			4
S13.000	60 Summer	100	+30%	100/15 Summer				
S7.007	15 Summer	100	+30%	1/15 Summer				
S7.008	15 Summer	100	+30%	1/15 Summer				
S14.000	15 Summer	100	+30%	100/15 Summer	100/15 Summer			10
S14.001	60 Summer	100	+30%	100/15 Summer	100/15 Summer			10
S15.000	60 Summer	100	+30%	100/15 Summer	100/15 Summer			12
S15.001	180 Summer	100	+30%	100/15 Summer	100/30 Summer			9
S15.002	180 Summer	100	+30%	30/15 Summer	100/15 Summer			11
S15.003	180 Summer	100	+30%	30/15 Summer	100/15 Summer			11
S15.004	60 Summer	100	+30%	30/15 Summer	100/15 Summer			11
S15.005	60 Summer	100	+30%	30/15 Summer	100/15 Summer			11
S16.000	180 Summer	100	+30%	100/15 Summer	100/30 Summer			9
S16.001	180 Summer	100	+30%	100/15 Summer	100/30 Summer			9
S17.000	60 Summer	100	+30%	30/15 Summer	100/15 Summer			11
S15.006	120 Summer	100	+30%	30/15 Summer	100/15 Summer			8
S14.002	60 Summer	100	+30%	30/15 Summer	100/15 Summer			8
S14.003	60 Summer	100	+30%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	9.000	0.375	0.136	0.10	0.0	2.3	FLOOD
S7.001	S52	9.000	0.419	0.001	0.15	0.0	4.7	FLOOD
S7.002	S4	8.522	0.000	0.000	0.02	0.0	0.6	SURCHARGED*
S7.003	S53	8.990	0.527	0.000	0.05	0.0	1.9	FLOOD RISK
S7.004	S54	9.002	0.680	1.688	0.91	0.0	22.9	FLOOD
S8.000	S41	9.010	0.385	9.526	0.50	0.0	11.8	FLOOD
S8.001	S42	9.012	0.411	11.639	1.39	0.0	36.9	FLOOD
S8.002	S41	9.009	0.462	9.182	0.38	0.0	10.0	FLOOD
S8.003	S10	8.496	0.000	0.000	0.24	0.0	7.3	SURCHARGED*
S8.004	S41	9.004	0.559	3.586	0.51	0.0	14.1	FLOOD
S7.005	S55	9.002	0.714	1.512	0.37	0.0	16.8	FLOOD
S7.006	S56	9.000	0.731	0.026	0.28	0.0	15.5	FLOOD
S9.000	S57	8.977	0.352	0.000	0.20	0.0	5.4	FLOOD RISK
S10.000	S14	8.975	0.350	0.000	0.15	0.0	3.9	FLOOD RISK
S9.001	S58	8.974	0.448	0.000	0.58	0.0	17.2	FLOOD RISK
S11.000	S15	9.003	0.378	2.971	0.83	0.0	19.6	FLOOD
S11.001	S47	9.010	0.408	9.880	0.62	0.0	19.5	FLOOD
S12.000	S50	9.000	0.375	0.247	0.30	0.0	8.7	FLOOD
S11.002	S45	8.998	0.585	0.000	1.15	0.0	38.5	FLOOD RISK
S13.000	S20	8.974	0.349	0.000	0.22	0.0	5.6	FLOOD RISK
S7.007	S57	8.961	0.877	0.000	1.10	0.0	33.0	FLOOD RISK
S7.008	S19	8.915	1.073	0.000	1.06	0.0	31.8	FLOOD RISK
S14.000	S23	9.008	0.383	7.896	1.25	0.0	30.3	FLOOD
S14.001	S20	9.004	0.407	4.198	0.99	0.0	27.0	FLOOD
S15.000	S21	9.007	0.382	7.495	0.75	0.0	22.6	FLOOD
S15.001	S24	9.006	0.427	6.095	0.37	0.0	14.7	FLOOD
S15.002	S22	9.005	0.558	5.269	1.00	0.0	19.8	FLOOD

100 year Return Period Summary of Critical Results by Maximum Level (Rank 5) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	9.004	0.574	3.700	0.76	0.0	20.4	FLOOD
S15.004	S24	9.005	0.583	4.752	0.74	0.0	47.5	FLOOD
S15.005	S25	9.003	0.681	2.686	0.58	0.0	42.2	FLOOD
S16.000	S31	9.002	0.377	1.881	0.28	0.0	6.9	FLOOD
S16.001	S26	9.001	0.405	1.157	1.12	0.0	14.4	FLOOD
S17.000	S32	9.005	0.380	5.310	1.78	0.0	41.8	FLOOD
S15.006	S26	9.000	0.875	0.377	0.37	0.0	28.9	FLOOD
S14.002	S21	9.001	0.985	0.768	0.23	0.0	35.5	FLOOD
S14.003	S34	9.000	1.358	0.022	0.21	0.0	32.3	FLOOD

1 year Return Period Summary of Critical Results by Maximum Level (Rank 6) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Manhole Headloss Coeff (Global)	0.500	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Foul Sewage per hectare (l/s)	0.000	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Additional Flow - % of Total Flow	0.000	Flow per Person per Day (l/per/day)	0.000

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	5	Number of Storage Structures	28	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FEH	D2 (1km)	0.253	Cv (Summer) 0.950
Site Location	GB 535450 189700 TQ 35450 89700	D3 (1km)	0.253	Cv (Winter)	0.950
C (1km)	-0.027	E (1km)	0.332		
D1 (1km)	0.320	F (1km)	2.475		

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	2.5 Second Increment (Extended)	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	60 Winter	1	0%	100/15 Summer	100/120 Summer			5
S7.001	15 Summer	1	0%	100/15 Summer	100/120 Summer			5
S7.002	60 Winter	1	0%					
S7.003	60 Winter	1	0%	30/15 Summer	100/120 Winter			1
S7.004	60 Winter	1	0%	1/15 Summer	100/30 Summer			7
S8.000	60 Winter	1	0%	30/15 Summer	100/15 Summer			15
S8.001	60 Winter	1	0%	30/15 Summer	100/15 Summer			15
S8.002	30 Winter	1	0%	30/15 Summer	100/15 Summer			12
S8.003	30 Winter	1	0%					
S8.004	60 Winter	1	0%	30/15 Summer	100/30 Summer			8
S7.005	60 Winter	1	0%	1/15 Summer	100/30 Summer			6
S7.006	15 Winter	1	0%	1/15 Summer	100/30 Summer			6
S9.000	360 Summer	1	0%	100/15 Summer	100/30 Summer			4
S10.000	60 Winter	1	0%	100/15 Summer	100/30 Summer			3
S9.001	60 Winter	1	0%	30/15 Summer	100/30 Summer			3
S11.000	180 Summer	1	0%	30/15 Winter	100/15 Summer			7
S11.001	120 Summer	1	0%	30/15 Summer	100/15 Summer			7
S12.000	60 Winter	1	0%	30/15 Summer	100/15 Summer			6
S11.002	60 Winter	1	0%	30/15 Summer	100/15 Summer			4
S13.000	15 Winter	1	0%	100/15 Summer				
S7.007	60 Winter	1	0%	1/15 Summer				
S7.008	60 Winter	1	0%	1/15 Summer				
S14.000	60 Winter	1	0%	100/15 Summer	100/15 Summer			10
S14.001	60 Winter	1	0%	100/15 Summer	100/15 Summer			10
S15.000	60 Winter	1	0%	100/15 Summer	100/15 Summer			12
S15.001	60 Winter	1	0%	100/15 Summer	100/30 Summer			9
S15.002	120 Summer	1	0%	30/15 Summer	100/15 Summer			11
S15.003	60 Winter	1	0%	30/15 Summer	100/15 Summer			11
S15.004	60 Winter	1	0%	30/15 Summer	100/15 Summer			11
S15.005	60 Winter	1	0%	30/15 Summer	100/15 Summer			11
S16.000	60 Winter	1	0%	100/15 Summer	100/30 Summer			9
S16.001	480 Winter	1	0%	100/15 Summer	100/30 Summer			9
S17.000	60 Winter	1	0%	30/15 Summer	100/15 Summer			11
S15.006	30 Winter	1	0%	30/15 Summer	100/15 Summer			8
S14.002	30 Winter	1	0%	30/15 Summer	100/15 Summer			8
S14.003	30 Winter	1	0%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	8.443	-0.182	0.000	0.07	0.0	1.5	OK
S7.001	S52	8.420	-0.161	0.000	0.04	0.0	1.4	OK
S7.002	S4	8.368	-0.154	0.000	0.05	0.0	1.7	OK*
S7.003	S53	8.367	-0.096	0.000	0.06	0.0	2.4	OK
S7.004	S54	8.365	0.043	0.000	0.17	0.0	4.3	SURCHARGED
S8.000	S41	8.472	-0.153	0.000	0.08	0.0	1.9	OK
S8.001	S42	8.472	-0.129	0.000	0.25	0.0	6.7	OK
S8.002	S41	8.464	-0.083	0.000	0.14	0.0	3.7	OK
S8.003	S10	8.462	-0.034	0.000	0.12	0.0	3.5	OK*
S8.004	S41	8.367	-0.078	0.000	0.16	0.0	4.3	OK
S7.005	S55	8.361	0.073	0.000	0.22	0.0	10.0	SURCHARGED
S7.006	S56	8.373	0.104	0.000	0.19	0.0	10.6	SURCHARGED
S9.000	S57	8.408	-0.217	0.000	0.01	0.0	0.2	OK
S10.000	S14	8.400	-0.225	0.000	0.00	0.0	0.0	OK
S9.001	S58	8.375	-0.151	0.000	0.24	0.0	7.0	OK
S11.000	S15	8.430	-0.195	0.000	0.00	0.0	0.0	OK
S11.001	S47	8.435	-0.167	0.000	0.15	0.0	4.8	OK
S12.000	S50	8.435	-0.190	0.000	0.06	0.0	1.7	OK
S11.002	S45	8.262	-0.151	0.000	0.24	0.0	8.0	OK
S13.000	S20	8.430	-0.195	0.000	0.04	0.0	1.1	OK
S7.007	S57	8.203	0.119	0.000	0.72	0.0	21.6	SURCHARGED
S7.008	S19	8.176	0.334	0.000	0.72	0.0	21.6	SURCHARGED
S14.000	S23	8.456	-0.169	0.000	0.11	0.0	2.7	OK
S14.001	S20	8.440	-0.157	0.000	0.20	0.0	5.4	OK
S15.000	S21	8.439	-0.186	0.000	0.07	0.0	2.1	OK
S15.001	S24	8.387	-0.192	0.000	0.05	0.0	2.1	OK
S15.002	S22	8.301	-0.147	0.000	0.26	0.0	5.2	OK

1 year Return Period Summary of Critical Results by Maximum Level (Rank 6) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	8.231	-0.198	0.000	0.24	0.0	6.5	OK
S15.004	S24	8.197	-0.225	0.000	0.14	0.0	9.1	OK
S15.005	S25	8.100	-0.221	0.000	0.16	0.0	11.3	OK
S16.000	S31	8.440	-0.185	0.000	0.07	0.0	1.8	OK
S16.001	S26	8.405	-0.191	0.000	0.06	0.0	0.7	OK
S17.000	S32	8.481	-0.144	0.000	0.28	0.0	6.6	OK
S15.006	S26	7.907	-0.219	0.000	0.16	0.0	12.5	OK
S14.002	S21	7.849	-0.167	0.000	0.11	0.0	17.1	OK
S14.003	S34	7.839	0.197	0.000	0.11	0.0	17.1	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 6) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D2 (1km) 0.253 Cv (Summer) 0.950
Site Location GB 535450 189700 TQ 35450 89700 D3 (1km) 0.253 Cv (Winter) 0.950
C (1km) -0.027 E (1km) 0.332
D1 (1km) 0.320 F (1km) 2.475

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	60 Summer	30	0%	100/15 Summer	100/120 Summer			5
S7.001	60 Summer	30	0%	100/15 Summer	100/120 Summer			5
S7.002	60 Winter	30	0%					
S7.003	120 Winter	30	0%	30/15 Summer	100/120 Winter			1
S7.004	120 Winter	30	0%	1/15 Summer	100/30 Summer			7
S8.000	120 Winter	30	0%	30/15 Summer	100/15 Summer			15
S8.001	120 Winter	30	0%	30/15 Summer	100/15 Summer			15
S8.002	180 Winter	30	0%	30/15 Summer	100/15 Summer			12
S8.003	600 Winter	30	0%					
S8.004	120 Winter	30	0%	30/15 Summer	100/30 Summer			8
S7.005	120 Winter	30	0%	1/15 Summer	100/30 Summer			6
S7.006	180 Summer	30	0%	1/15 Summer	100/30 Summer			6
S9.000	15 Winter	30	0%	100/15 Summer	100/30 Summer			4
S10.000	60 Winter	30	0%	100/15 Summer	100/30 Summer			3
S9.001	60 Winter	30	0%	30/15 Summer	100/30 Summer			3
S11.000	60 Winter	30	0%	30/15 Winter	100/15 Summer			7
S11.001	60 Winter	30	0%	30/15 Summer	100/15 Summer			7
S12.000	60 Winter	30	0%	30/15 Summer	100/15 Summer			6
S11.002	60 Winter	30	0%	30/15 Summer	100/15 Summer			4
S13.000	60 Winter	30	0%	100/15 Summer				
S7.007	60 Winter	30	0%	1/15 Summer				
S7.008	60 Winter	30	0%	1/15 Summer				
S14.000	60 Winter	30	0%	100/15 Summer	100/15 Summer			10
S14.001	60 Winter	30	0%	100/15 Summer	100/15 Summer			10
S15.000	120 Winter	30	0%	100/15 Summer	100/15 Summer			12
S15.001	120 Winter	30	0%	100/15 Summer	100/30 Summer			9
S15.002	120 Winter	30	0%	30/15 Summer	100/15 Summer			11
S15.003	120 Winter	30	0%	30/15 Summer	100/15 Summer			11
S15.004	120 Winter	30	0%	30/15 Summer	100/15 Summer			11
S15.005	120 Winter	30	0%	30/15 Summer	100/15 Summer			11
S16.000	60 Winter	30	0%	100/15 Summer	100/30 Summer			9
S16.001	30 Summer	30	0%	100/15 Summer	100/30 Summer			9
S17.000	60 Winter	30	0%	30/15 Summer	100/15 Summer			11
S15.006	120 Winter	30	0%	30/15 Summer	100/15 Summer			8
S14.002	120 Winter	30	0%	30/15 Summer	100/15 Summer			8
S14.003	120 Winter	30	0%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	8.554	-0.071	0.000	0.26	0.0	5.8	OK
S7.001	S52	8.554	-0.027	0.000	0.04	0.0	1.2	OK
S7.002	S4	8.522	0.000	0.000	0.03	0.0	1.0	SURCHARGED*
S7.003	S53	8.584	0.122	0.000	0.13	0.0	4.9	SURCHARGED
S7.004	S54	8.588	0.266	0.000	0.35	0.0	8.7	SURCHARGED
S8.000	S41	8.661	0.036	0.000	0.12	0.0	2.8	SURCHARGED
S8.001	S42	8.660	0.059	0.000	0.42	0.0	11.1	SURCHARGED
S8.002	S41	8.640	0.093	0.000	0.21	0.0	5.7	SURCHARGED
S8.003	S10	8.496	0.000	0.000	0.16	0.0	4.9	SURCHARGED*
S8.004	S41	8.598	0.153	0.000	0.29	0.0	8.1	SURCHARGED
S7.005	S55	8.587	0.299	0.000	0.34	0.0	15.5	SURCHARGED
S7.006	S56	8.626	0.357	0.000	0.24	0.0	13.6	SURCHARGED
S9.000	S57	8.506	-0.119	0.000	0.13	0.0	3.4	OK
S10.000	S14	8.501	-0.124	0.000	0.09	0.0	2.2	OK
S9.001	S58	8.538	0.012	0.000	0.53	0.0	15.8	SURCHARGED
S11.000	S15	8.587	-0.038	0.000	0.04	0.0	1.0	OK
S11.001	S47	8.587	-0.015	0.000	0.35	0.0	11.1	OK
S12.000	S50	8.561	-0.064	0.000	0.14	0.0	4.1	OK
S11.002	S45	8.558	0.145	0.000	0.47	0.0	15.8	SURCHARGED
S13.000	S20	8.527	-0.098	0.000	0.14	0.0	3.5	OK
S7.007	S57	8.524	0.440	0.000	0.92	0.0	27.5	SURCHARGED
S7.008	S19	8.486	0.644	0.000	0.92	0.0	27.5	SURCHARGED
S14.000	S23	8.520	-0.105	0.000	0.40	0.0	9.6	OK
S14.001	S20	8.515	-0.082	0.000	0.67	0.0	18.3	OK
S15.000	S21	8.507	-0.118	0.000	0.29	0.0	8.7	OK
S15.001	S24	8.504	-0.075	0.000	0.22	0.0	8.7	OK
S15.002	S22	8.507	0.059	0.000	0.77	0.0	15.2	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 6) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	8.504	0.074	0.000	0.65	0.0	17.3	SURCHARGED
S15.004	S24	8.501	0.079	0.000	0.35	0.0	22.7	SURCHARGED
S15.005	S25	8.494	0.172	0.000	0.34	0.0	24.9	SURCHARGED
S16.000	S31	8.475	-0.150	0.000	0.23	0.0	5.6	OK
S16.001	S26	8.459	-0.137	0.000	0.31	0.0	3.9	OK
S17.000	S32	8.562	-0.063	0.000	0.86	0.0	20.3	OK
S15.006	S26	8.481	0.355	0.000	0.29	0.0	22.9	SURCHARGED
S14.002	S21	8.461	0.445	0.000	0.17	0.0	26.4	SURCHARGED
S14.003	S34	8.446	0.804	0.000	0.17	0.0	26.3	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 6) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D2 (1km) 0.253 Cv (Summer) 0.950
Site Location GB 535450 189700 TQ 35450 89700 D3 (1km) 0.253 Cv (Winter) 0.950
C (1km) -0.027 E (1km) 0.332
D1 (1km) 0.320 F (1km) 2.475

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S7.000	240 Summer	100	+30%	100/15 Summer	100/120 Summer			5
S7.001	240 Summer	100	+30%	100/15 Summer	100/120 Summer			5
S7.002	240 Winter	100	+30%					
S7.003	30 Summer	100	+30%	30/15 Summer	100/120 Winter			1
S7.004	120 Winter	100	+30%	1/15 Summer	100/30 Summer			7
S8.000	60 Winter	100	+30%	30/15 Summer	100/15 Summer			15
S8.001	60 Summer	100	+30%	30/15 Summer	100/15 Summer			15
S8.002	180 Winter	100	+30%	30/15 Summer	100/15 Summer			12
S8.003	60 Winter	100	+30%					
S8.004	30 Summer	100	+30%	30/15 Summer	100/30 Summer			8
S7.005	120 Winter	100	+30%	1/15 Summer	100/30 Summer			6
S7.006	120 Summer	100	+30%	1/15 Summer	100/30 Summer			6
S9.000	15 Winter	100	+30%	100/15 Summer	100/30 Summer			4
S10.000	120 Summer	100	+30%	100/15 Summer	100/30 Summer			3
S9.001	15 Summer	100	+30%	30/15 Summer	100/30 Summer			3
S11.000	15 Winter	100	+30%	30/15 Winter	100/15 Summer			7
S11.001	60 Winter	100	+30%	30/15 Summer	100/15 Summer			7
S12.000	60 Summer	100	+30%	30/15 Summer	100/15 Summer			6
S11.002	60 Summer	100	+30%	30/15 Summer	100/15 Summer			4
S13.000	15 Winter	100	+30%	100/15 Summer				
S7.007	15 Winter	100	+30%	1/15 Summer				
S7.008	120 Summer	100	+30%	1/15 Summer				
S14.000	60 Winter	100	+30%	100/15 Summer	100/15 Summer			10
S14.001	60 Winter	100	+30%	100/15 Summer	100/15 Summer			10
S15.000	180 Winter	100	+30%	100/15 Summer	100/15 Summer			12
S15.001	180 Winter	100	+30%	100/15 Summer	100/30 Summer			9
S15.002	180 Winter	100	+30%	30/15 Summer	100/15 Summer			11
S15.003	30 Summer	100	+30%	30/15 Summer	100/15 Summer			11
S15.004	60 Winter	100	+30%	30/15 Summer	100/15 Summer			11
S15.005	120 Winter	100	+30%	30/15 Summer	100/15 Summer			11
S16.000	180 Winter	100	+30%	100/15 Summer	100/30 Summer			9
S16.001	180 Winter	100	+30%	100/15 Summer	100/30 Summer			9
S17.000	60 Winter	100	+30%	30/15 Summer	100/15 Summer			11
S15.006	120 Winter	100	+30%	30/15 Summer	100/15 Summer			8
S14.002	60 Winter	100	+30%	30/15 Summer	100/15 Summer			8
S14.003	60 Winter	100	+30%	1/15 Summer	100/15 Summer			5

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S7.000	S51	8.988	0.363	0.000	0.16	0.0	3.5	FLOOD RISK
S7.001	S52	8.987	0.406	0.000	0.15	0.0	4.7	FLOOD RISK
S7.002	S4	8.522	0.000	0.000	0.14	0.0	4.8	SURCHARGED*
S7.003	S53	8.990	0.527	0.000	0.15	0.0	5.7	FLOOD RISK
S7.004	S54	9.002	0.680	1.592	0.58	0.0	14.5	FLOOD
S8.000	S41	9.009	0.384	9.397	0.40	0.0	9.4	FLOOD
S8.001	S42	9.012	0.411	11.615	1.83	0.0	48.7	FLOOD
S8.002	S41	9.009	0.462	8.916	0.38	0.0	9.9	FLOOD
S8.003	S10	8.496	0.000	0.000	0.26	0.0	7.8	SURCHARGED*
S8.004	S41	9.003	0.558	3.498	0.65	0.0	17.9	FLOOD
S7.005	S55	9.000	0.713	0.525	0.37	0.0	16.7	FLOOD
S7.006	S56	9.000	0.731	0.023	0.28	0.0	15.5	FLOOD
S9.000	S57	8.969	0.344	0.000	0.22	0.0	5.9	FLOOD RISK
S10.000	S14	8.974	0.349	0.000	0.14	0.0	3.5	FLOOD RISK
S9.001	S58	8.972	0.446	0.000	1.28	0.0	37.9	FLOOD RISK
S11.000	S15	9.003	0.378	2.954	0.94	0.0	22.2	FLOOD
S11.001	S47	9.009	0.407	9.003	0.68	0.0	21.4	FLOOD
S12.000	S50	9.000	0.375	0.073	0.38	0.0	10.9	FLOOD
S11.002	S45	8.998	0.585	0.000	1.24	0.0	41.7	FLOOD RISK
S13.000	S20	8.972	0.347	0.000	0.59	0.0	14.9	FLOOD RISK
S7.007	S57	8.952	0.868	0.000	1.08	0.0	32.5	FLOOD RISK
S7.008	S19	8.897	1.055	0.000	1.06	0.0	31.9	FLOOD RISK
S14.000	S23	9.008	0.383	7.513	0.58	0.0	14.1	FLOOD
S14.001	S20	9.002	0.405	2.502	0.94	0.0	25.8	FLOOD
S15.000	S21	9.007	0.382	6.871	0.47	0.0	14.1	FLOOD
S15.001	S24	9.005	0.426	5.150	0.35	0.0	13.9	FLOOD
S15.002	S22	9.004	0.557	4.407	0.91	0.0	18.0	FLOOD

100 year Return Period Summary of Critical Results by Maximum Level (Rank 6) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S15.003	S23	9.003	0.574	3.409	1.66	0.0	44.6	FLOOD
S15.004	S24	9.005	0.583	4.519	0.65	0.0	41.6	FLOOD
S15.005	S25	9.002	0.681	2.429	0.39	0.0	28.6	FLOOD
S16.000	S31	9.002	0.377	1.535	0.27	0.0	6.6	FLOOD
S16.001	S26	9.001	0.405	0.684	1.15	0.0	14.8	FLOOD
S17.000	S32	9.005	0.380	4.586	1.54	0.0	36.3	FLOOD
S15.006	S26	9.000	0.875	0.287	0.37	0.0	29.1	FLOOD
S14.002	S21	9.000	0.984	0.186	0.22	0.0	34.0	FLOOD
S14.003	S34	8.999	1.357	0.007	0.21	0.0	32.3	FLOOD

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2	Foul Sewage (l/s/ha)	0.000
Site Location	GB 535450 189700 TQ 35450 89700	Volumetric Runoff Coeff.	0.750
C (1km)	-0.027	Add Flow / Climate Change (%)	0
D1 (1km)	0.320	Minimum Backdrop Height (m)	0.000
D2 (1km)	0.253	Maximum Backdrop Height (m)	0.000
D3 (1km)	0.253	Min Design Depth for Optimisation (m)	1.200
E (1km)	0.332	Min Vel for Auto Design only (m/s)	0.75
F (1km)	2.475	Min Slope for Optimisation (1:X)	500
Maximum Rainfall (mm/hr)	50		
Maximum Time of Concentration (mins)	30		

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
S7.000	17.633	0.044	400.7	0.020	5.00	0.0	0.600	o	225	
S7.001	11.811	0.059	200.0	0.040	0.00	0.0	0.600	o	225	
S7.002	11.811	0.059	200.0	0.000	0.00	0.0	0.600	o	225	
S7.003	21.155	0.141	150.0	0.015	0.00	0.0	0.600	o	225	
S7.004	10.035	0.034	295.1	0.059	0.00	0.0	0.600	o	225	
S8.000	7.026	0.024	292.8	0.027	5.00	0.0	0.600	o	225	
S8.001	16.019	0.054	296.6	0.071	0.00	0.0	0.600	o	225	
S8.002	15.050	0.051	295.1	0.049	0.00	0.0	0.600	o	225	
S8.003	15.050	0.051	295.1	0.000	0.00	0.0	0.600	o	225	
S8.004	24.473	0.083	294.9	0.054	0.00	0.0	0.600	o	225	
S7.005	5.714	0.019	300.7	0.049	0.00	0.0	0.600	o	300	
S7.006	20.153	0.067	300.8	0.000	0.00	0.0	0.600	o	300	
S9.000	32.004	0.099	323.3	0.009	5.00	0.0	0.600	o	225	
S10.000	11.334	0.038	300.0	0.000	5.00	0.0	0.600	o	225	
S9.001	21.735	0.086	252.7	0.093	0.00	0.0	0.600	o	225	
S11.000	6.657	0.023	289.4	0.000	5.00	0.0	0.600	o	225	
S11.001	45.973	0.189	243.2	0.096	0.00	0.0	0.600	o	225	
S12.000	7.183	0.036	200.0	0.022	5.00	0.0	0.600	o	225	
S11.002	22.751	0.114	200.0	0.034	0.00	0.0	0.600	o	225	
S13.000	9.979	0.034	293.5	0.022	5.00	0.0	0.600	o	225	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S7.000	50.00	5.45	8.400	0.020	0.0	0.0	0.0	0.65	25.7	2.7
S7.001	50.00	5.67	8.356	0.060	0.0	0.0	0.0	0.92	36.6	8.1
S7.002	50.00	5.88	8.297	0.060	0.0	0.0	0.0	0.92	36.6	8.1
S7.003	50.00	6.21	8.238	0.075	0.0	0.0	0.0	1.07	42.3	10.2
S7.004	50.00	6.43	8.097	0.134	0.0	0.0	0.0	0.76	30.1	18.2
S8.000	50.00	5.15	8.400	0.027	0.0	0.0	0.0	0.76	30.2	3.7
S8.001	50.00	5.51	8.376	0.098	0.0	0.0	0.0	0.75	30.0	13.3
S8.002	50.00	5.84	8.322	0.148	0.0	0.0	0.0	0.76	30.1	20.0
S8.003	50.00	6.17	8.271	0.148	0.0	0.0	0.0	0.76	30.1	20.0
S8.004	50.00	6.71	8.220	0.201	0.0	0.0	0.0	0.76	30.1	27.3
S7.005	50.00	6.82	7.988	0.385	0.0	0.0	0.0	0.90	63.7	52.1
S7.006	50.00	7.19	7.969	0.385	0.0	0.0	0.0	0.90	63.7	52.1
S9.000	50.00	5.74	8.400	0.009	0.0	0.0	0.0	0.72	28.7	1.2
S10.000	50.00	5.25	8.400	0.000	0.0	0.0	0.0	0.75	29.8	0.0
S9.001	50.00	6.18	8.301	0.102	0.0	0.0	0.0	0.82	32.5	13.8
S11.000	50.00	5.15	8.400	0.000	0.0	0.0	0.0	0.76	30.4	0.0
S11.001	50.00	6.06	8.377	0.096	0.0	0.0	0.0	0.83	33.2	13.0
S12.000	50.00	5.13	8.400	0.022	0.0	0.0	0.0	0.92	36.6	2.9
S11.002	50.00	6.48	8.188	0.151	0.0	0.0	0.0	0.92	36.6	20.4
S13.000	50.00	5.22	8.400	0.022	0.0	0.0	0.0	0.76	30.1	3.0

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
S7.007	9.078	0.045	200.0	0.000	0.00	0.0	0.600	o	225	
S7.008	9.078	0.045	200.0	0.000	0.00	0.0	0.600	o	225	
S14.000	8.237	0.028	294.2	0.044	5.00	0.0	0.600	o	225	
S14.001	21.604	0.073	295.9	0.041	0.00	0.0	0.600	o	225	
S15.000	5.980	0.046	131.4	0.080	5.00	0.0	0.600	o	225	
S15.001	17.964	0.132	136.3	0.000	0.00	0.0	0.600	o	225	
S15.002	7.081	0.018	393.4	0.055	0.00	0.0	0.600	o	225	
S15.003	11.407	0.008	1425.9	0.022	0.00	0.0	0.600	o	300	
S15.004	23.644	0.100	236.4	0.043	0.00	0.0	0.600	o	300	
S15.005	39.203	0.196	200.0	0.045	0.00	0.0	0.600	o	300	
S16.000	8.570	0.029	295.5	0.024	5.00	0.0	0.600	o	225	
S16.001	12.177	0.021	594.0	0.045	0.00	0.0	0.600	o	225	
S17.000	7.174	0.024	298.9	0.087	5.00	0.0	0.600	o	225	
S15.006	32.452	0.195	166.4	0.041	0.00	0.0	0.600	o	300	
S14.002	7.907	0.374	21.1	0.075	0.00	0.0	0.600	o	300	
S14.003	7.861	0.393	20.0	0.000	0.00	0.0	0.600	o	300	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S7.007	50.00	7.35	7.859	0.660	0.0	0.0	0.0	0.92	36.6«	89.3
S7.008	50.00	7.52	7.617	0.660	0.0	0.0	0.0	0.92	36.6«	89.3
S14.000	50.00	5.18	8.400	0.044	0.0	0.0	0.0	0.76	30.1	6.0
S14.001	50.00	5.66	8.372	0.085	0.0	0.0	0.0	0.75	30.0	11.6
S15.000	50.00	5.09	8.400	0.080	0.0	0.0	0.0	1.14	45.3	10.8
S15.001	50.00	5.36	8.355	0.080	0.0	0.0	0.0	1.12	44.5	10.8
S15.002	50.00	5.54	8.223	0.134	0.0	0.0	0.0	0.65	26.0	18.2
S15.003	50.00	6.00	8.130	0.157	0.0	0.0	0.0	0.41	28.8	21.2
S15.004	50.00	6.39	8.122	0.200	0.0	0.0	0.0	1.02	72.0	27.0
S15.005	50.00	6.98	8.022	0.244	0.0	0.0	0.0	1.11	78.3	33.1
S16.000	50.00	5.19	8.400	0.024	0.0	0.0	0.0	0.76	30.0	3.3
S16.001	50.00	5.57	8.371	0.069	0.0	0.0	0.0	0.53	21.1	9.4
S17.000	50.00	5.16	8.400	0.087	0.0	0.0	0.0	0.75	29.9	11.8
S15.006	50.00	7.42	7.826	0.441	0.0	0.0	0.0	1.22	86.0	59.8
S14.002	50.00	7.46	7.716	0.602	0.0	0.0	0.0	3.44	242.9	81.5
S14.003	50.00	7.50	7.342	0.602	0.0	0.0	0.0	3.53	249.6	81.5

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S7.008	S	8.500	7.572	7.600	225	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S14.003	S	9.000	6.949	6.940	300	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Manhole Headloss Coeff (Global)	0.500	Inlet Coeffiecient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	0.000	Run Time (mins)	60
Hot Start Level (mm)	0	MADD Factor * 10m³/ha Storage	2.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 28 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH	E (1km)	0.332
Return Period (years)	100	F (1km)	2.475
Site Location	GB 535450 189700 TQ 35450 89700	Summer Storms	No
C (1km)	-0.027	Winter Storms	Yes
D1 (1km)	0.320	Cv (Summer)	0.750
D2 (1km)	0.253	Cv (Winter)	0.840
D3 (1km)	0.253	Storm Duration (mins)	30

Online Controls for Storm

Orifice Manhole: S52, DS/PN: S7.001, Volume (m³): 1.4

Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.356

Orifice Manhole: S10, DS/PN: S8.003, Volume (m³): 0.6

Diameter (m) 0.100 Discharge Coefficient 0.600 Invert Level (m) 8.271

Orifice Manhole: S56, DS/PN: S7.006, Volume (m³): 1.5

Diameter (m) 0.100 Discharge Coefficient 0.600 Invert Level (m) 7.969

Orifice Manhole: S19, DS/PN: S7.008, Volume (m³): 1.9

Diameter (m) 0.121 Discharge Coefficient 0.600 Invert Level (m) 7.617

Orifice Manhole: S34, DS/PN: S14.003, Volume (m³): 2.3

Diameter (m) 0.111 Discharge Coefficient 0.600 Invert Level (m) 7.342

Storage Structures for Storm

Filter Drain Manhole: S51, DS/PN: S7.000

Infiltration Coefficient Base (m/hr)	0.00000	Invert Level (m)	8.400	Pipe Depth above Invert (m)	0.000
Infiltration Coefficient Side (m/hr)	0.00000	Trench Width (m)	0.5	Slope (1:X)	375.0
Safety Factor	2.0	Trench Length (m)	37.5	Cap Volume Depth (m)	0.480
Porosity	0.30	Pipe Diameter (m)	0.150	Cap Infiltration Depth (m)	0.000

Complex Manhole: S52, DS/PN: S7.001

Cellular Storage

Invert Level (m)	8.400	Infiltration Coefficient Side (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	147.0	0.0	0.300	147.0	0.0	0.301	0.0	0.0

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	500.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.700	Depression Storage (mm)	5
Max Percolation (l/s)	40.8	Width (m)	10.5	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	14.0	Cap Volume Depth (m)	0.170

Filter Drain Manhole: S53, DS/PN: S7.003

Infiltration Coefficient Base (m/hr)	0.00000	Invert Level (m)	8.286	Pipe Depth above Invert (m)	0.000
Infiltration Coefficient Side (m/hr)	0.00000	Trench Width (m)	0.3	Slope (1:X)	315.0
Safety Factor	2.0	Trench Length (m)	31.5	Cap Volume Depth (m)	0.480
Porosity	0.30	Pipe Diameter (m)	0.150	Cap Infiltration Depth (m)	0.000

Filter Drain Manhole: S54, DS/PN: S7.004

Infiltration Coefficient Base (m/hr)	0.00000	Invert Level (m)	8.145	Pipe Depth above Invert (m)	0.000
Infiltration Coefficient Side (m/hr)	0.00000	Trench Width (m)	0.3	Slope (1:X)	150.0
Safety Factor	2.0	Trench Length (m)	15.0	Cap Volume Depth (m)	0.000
Porosity	0.30	Pipe Diameter (m)	0.150	Cap Infiltration Depth (m)	0.000

Filter Drain Manhole: S41, DS/PN: S8.000

Infiltration Coefficient Base (m/hr)	0.00000	Invert Level (m)	8.400	Pipe Depth above Invert (m)	0.000
Infiltration Coefficient Side (m/hr)	0.00000	Trench Width (m)	0.3	Slope (1:X)	500.0
Safety Factor	2.0	Trench Length (m)	50.0	Cap Volume Depth (m)	0.000
Porosity	0.30	Pipe Diameter (m)	0.150	Cap Infiltration Depth (m)	0.000

Filter Drain Manhole: S42, DS/PN: S8.001

Infiltration Coefficient Base (m/hr)	0.00000	Invert Level (m)	8.376	Pipe Depth above Invert (m)	0.000
Infiltration Coefficient Side (m/hr)	0.00000	Trench Width (m)	0.5	Slope (1:X)	500.0
Safety Factor	2.0	Trench Length (m)	50.0	Cap Volume Depth (m)	0.480
Porosity	0.30	Pipe Diameter (m)	0.150	Cap Infiltration Depth (m)	0.000

Complex Manhole: S41, DS/PN: S8.002

Cellular Storage

Invert Level (m)	8.400	Infiltration Coefficient Side (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	147.0	0.0	0.300	147.0	0.0	0.301	0.0	0.0

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	500.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.700	Depression Storage (mm)	5
Max Percolation (l/s)	40.8	Width (m)	10.5	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	14.0	Cap Volume Depth (m)	0.170

Filter Drain Manhole: S41, DS/PN: S8.004

Infiltration Coefficient Base (m/hr)	0.00000	Invert Level (m)	8.220	Pipe Depth above Invert (m)	0.000
Infiltration Coefficient Side (m/hr)	0.00000	Trench Width (m)	0.5	Slope (1:X)	500.0
Safety Factor	2.0	Trench Length (m)	306.0	Cap Volume Depth (m)	0.480
Porosity	0.30	Pipe Diameter (m)	0.150	Cap Infiltration Depth (m)	0.000

Complex Manhole: S55, DS/PN: S7.005

Cellular Storage

Invert Level (m)	8.400	Infiltration Coefficient Side (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0		

Cellular Storage

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	147.0	0.0	0.300	147.0	0.0	0.301	0.0	0.0

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	500.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.700	Depression Storage (mm)	5
Max Percolation (l/s)	40.8	Width (m)	10.5	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	14.0	Cap Volume Depth (m)	0.170

Complex Manhole: S57, DS/PN: S9.000

Cellular Storage

Invert Level (m)	8.400	Infiltration Coefficient Side (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Base (m/hr)	0.00000			Safety Factor	2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	60.0	0.0	0.300	60.0	0.0	0.301	0.0	0.0

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	500.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.700	Depression Storage (mm)	5
Max Percolation (l/s)	16.7	Width (m)	6.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	10.0	Cap Volume Depth (m)	0.170

Complex Manhole: S14, DS/PN: S10.000

Cellular Storage

Invert Level (m)	8.400	Infiltration Coefficient Side (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Base (m/hr)	0.00000			Safety Factor	2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	34.0	0.0	0.300	34.0	0.0	0.301	0.0	0.0

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	500.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.700	Depression Storage (mm)	5
Max Percolation (l/s)	9.4	Width (m)	2.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	17.0	Cap Volume Depth (m)	0.170

Filter Drain Manhole: S58, DS/PN: S9.001

Infiltration Coefficient Base (m/hr)	0.00000	Invert Level (m)	8.301	Pipe Depth above Invert (m)	0.000
Infiltration Coefficient Side (m/hr)	0.00000	Trench Width (m)	0.3	Slope (1:X)	240.0
Safety Factor	2.0	Trench Length (m)	24.0	Cap Volume Depth (m)	0.480
Porosity	0.30	Pipe Diameter (m)	0.150	Cap Infiltration Depth (m)	0.000

Filter Drain Manhole: S15, DS/PN: S11.000

Infiltration Coefficient Base (m/hr)	0.00000	Invert Level (m)	8.400	Pipe Depth above Invert (m)	0.000
Infiltration Coefficient Side (m/hr)	0.00000	Trench Width (m)	0.3	Slope (1:X)	543.0
Safety Factor	2.0	Trench Length (m)	54.3	Cap Volume Depth (m)	0.480
Porosity	0.30	Pipe Diameter (m)	0.150	Cap Infiltration Depth (m)	0.000

Complex Manhole: S47, DS/PN: S11.001

Cellular Storage

Invert Level (m)	8.377	Infiltration Coefficient Side (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Base (m/hr)	0.00000			Safety Factor	2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	76.0	0.0	0.300	76.0	0.0	0.301	0.0	0.0

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	500.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.677	Depression Storage (mm)	5
Max Percolation (l/s)	21.1	Width (m)	2.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	38.0	Cap Volume Depth (m)	0.170

Filter Drain Manhole: S50, DS/PN: S12.000

Infiltration Coefficient Base (m/hr)	0.00000	Invert Level (m)	8.400	Pipe Depth above Invert (m)	0.000
Infiltration Coefficient Side (m/hr)	0.00000	Trench Width (m)	0.3	Slope (1:X)	200.0
Safety Factor	2.0	Trench Length (m)	20.0	Cap Volume Depth (m)	0.480
Porosity	0.30	Pipe Diameter (m)	0.150	Cap Infiltration Depth (m)	0.000

Filter Drain Manhole: S45, DS/PN: S11.002

Infiltration Coefficient Base (m/hr)	0.00000	Invert Level (m)	8.188	Pipe Depth above Invert (m)	0.000
Infiltration Coefficient Side (m/hr)	0.00000	Trench Width (m)	0.3	Slope (1:X)	500.0
Safety Factor	2.0	Trench Length (m)	39.0	Cap Volume Depth (m)	0.480
Porosity	0.30	Pipe Diameter (m)	0.150	Cap Infiltration Depth (m)	0.000

Complex Manhole: S20, DS/PN: S13.000

Cellular Storage

Invert Level (m)	8.400	Infiltration Coefficient Side (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	34.0	0.0	0.300	34.0	0.0	0.301	0.0	0.0

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	500.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.700	Depression Storage (mm)	5
Max Percolation (l/s)	9.4	Width (m)	2.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	17.0	Cap Volume Depth (m)	0.170

Complex Manhole: S23, DS/PN: S14.000

Cellular Storage

Invert Level (m)	8.400	Infiltration Coefficient Side (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	33.5	0.0	0.300	33.5	0.0	0.301	0.0	0.0

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	500.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.700	Depression Storage (mm)	5
Max Percolation (l/s)	9.3	Width (m)	2.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	16.8	Cap Volume Depth (m)	0.170

Filter Drain Manhole: S20, DS/PN: S14.001

Infiltration Coefficient Base (m/hr)	0.00000	Invert Level (m)	8.400	Pipe Depth above Invert (m)	0.000
Infiltration Coefficient Side (m/hr)	0.00000	Trench Width (m)	0.3	Slope (1:X)	337.0
Safety Factor	2.0	Trench Length (m)	47.9	Cap Volume Depth (m)	0.480
Porosity	0.30	Pipe Diameter (m)	0.150	Cap Infiltration Depth (m)	0.000

Complex Manhole: S21, DS/PN: S15.000

Cellular Storage

Invert Level (m)	8.400	Infiltration Coefficient Side (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	147.0	0.0	0.300	147.0	0.0	0.301	0.0	0.0

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	500.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.700	Depression Storage (mm)	5
Max Percolation (l/s)	40.8	Width (m)	10.5	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	14.0	Cap Volume Depth (m)	0.170

Filter Drain Manhole: S22, DS/PN: S15.002

Infiltration Coefficient Base (m/hr)	0.00000	Invert Level (m)	8.309	Pipe Depth above Invert (m)	0.000
Infiltration Coefficient Side (m/hr)	0.00000	Trench Width (m)	0.3	Slope (1:X)	398.0
Safety Factor	2.0	Trench Length (m)	39.8	Cap Volume Depth (m)	0.480
Porosity	0.30	Pipe Diameter (m)	0.150	Cap Infiltration Depth (m)	0.000

Complex Manhole: S23, DS/PN: S15.003

Cellular Storage

Invert Level (m)	8.130	Infiltration Coefficient Side (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	24.0	0.0	0.300	24.0	0.0	0.301	0.0	0.0

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	500.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.430	Depression Storage (mm)	5
Max Percolation (l/s)	6.7	Width (m)	2.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	12.0	Cap Volume Depth (m)	0.170

Filter Drain Manhole: S24, DS/PN: S15.004

Infiltration Coefficient Base (m/hr)	0.00000	Invert Level (m)	8.283	Pipe Depth above Invert (m)	0.000
Infiltration Coefficient Side (m/hr)	0.00000	Trench Width (m)	0.3	Slope (1:X)	362.0
Safety Factor	2.0	Trench Length (m)	36.2	Cap Volume Depth (m)	0.480
Porosity	0.30	Pipe Diameter (m)	0.150	Cap Infiltration Depth (m)	0.000

Complex Manhole: S25, DS/PN: S15.005

Cellular Storage

Invert Level (m)	8.022	Infiltration Coefficient Side (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	50.0	0.0	0.300	50.0	0.0	0.301	0.0	0.0

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.322	Depression Storage (mm)	5
Max Percolation (l/s)	13.9	Width (m)	5.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	10.0	Cap Volume Depth (m)	0.170

Filter Drain Manhole: S31, DS/PN: S16.000

Infiltration Coefficient Base (m/hr)	0.00000	Invert Level (m)	8.400	Pipe Depth above Invert (m)	0.000
Infiltration Coefficient Side (m/hr)	0.00000	Trench Width (m)	0.5	Slope (1:X)	572.0
Safety Factor	2.0	Trench Length (m)	57.2	Cap Volume Depth (m)	0.480
Porosity	0.30	Pipe Diameter (m)	0.150	Cap Infiltration Depth (m)	0.000

Complex Manhole: S26, DS/PN: S16.001

Cellular Storage

Invert Level (m)	8.371	Infiltration Coefficient Side (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	229.7	0.0	0.300	229.7	0.0	0.301	0.0	0.0

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	500.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.671	Depression Storage (mm)	5
Max Percolation (l/s)	64.3	Width (m)	4.6	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	50.3	Cap Volume Depth (m)	0.170

Filter Drain Manhole: S32, DS/PN: S17.000

Infiltration Coefficient Base (m/hr)	0.00000	Invert Level (m)	8.400	Pipe Depth above Invert (m)	0.000
Infiltration Coefficient Side (m/hr)	0.00000	Trench Width (m)	0.3	Slope (1:X)	564.0
Safety Factor	2.0	Trench Length (m)	56.4	Cap Volume Depth (m)	0.480
Porosity	0.30	Pipe Diameter (m)	0.150	Cap Infiltration Depth (m)	0.000

Complex Manhole: S26, DS/PN: S15.006

Cellular Storage

Invert Level (m)	7.826	Infiltration Coefficient Side (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	157.9	0.0	0.300	157.9	0.0	0.301	0.0	0.0

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	500.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.126	Depression Storage (mm)	5
Max Percolation (l/s)	47.0	Width (m)	3.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	56.4	Cap Volume Depth (m)	0.170

APPENDIX C BELOW GROUND DRAINAGE LAYOUTS AND DETAILS

INDICATIVE LOCATION OF EXISTING DECOMMISSIONED ADOPTED THAMES WATER SLUDGE MAIN. AGREED WITH THAMES WATER THAT NO DIVERSION IS REQUIRED DUE TO NO INTENSION TO RE-UTILISE MAINS.

LOCATION OF EXISTING BELOW GROUND SURFACE WATER DRAINAGE TO THE RIVER LEA TO BE RETAINED

INDICATIVE LOCATION OF EXISTING PRIVATE FOUL WATER CESSPIT

EXTENT OF EXISTING ADOPTED THAMES WATER ABOVE GROUND SLUDGE MAIN AND BRIDGE STRUCTURE

INDICATIVE LOCATION OF EXISTING PRIVATE FOUL WATER CESSPIT (18m³ STORAGE)

INDICATIVE LOCATION OF EXISTING PRIVATE FOUL WATER CESSPIT (91m³ STORAGE)

LOCATION OF EXISTING BELOW GROUND SURFACE WATER DRAINAGE TO THE RIVER LEA TO BE RETAINED

FLOOD RELIEF CHANNEL

THE PADDOCK

RIVER LEE NAVIGATION

TOW PATH

PYMMES BROOK

TOTTENHAM LOCK

FERRY LANE

Notes

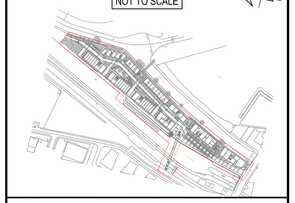
1. THIS DRAWING IS NOT TO BE SCALED.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, STRUCTURAL AND M&E DRAWINGS.
3. THIS IS NOT AN INSTALLATION DRAWING NOR A CO-ORDINATION DRAWING.
3. LOCATION OF EXISTING THAMES WATER SLUDGE MAIN IS SHOWN INDICATIVELY BASED ON THAMES WATER ASSET RECORDS. RAMBOLL UK TAKES NO RESPONSIBILITY FOR THE ACCURACY OF THE INFORMATION SHOWN.
4. EXISTING BELOW GROUND PRIVATE FOUL AND SURFACE DRAINAGE BASED ON LANES FOR DRAINS DRAINAGE SURVEY PJ00174451 RECEIVED 18/12/2014.
5. THIS DRAWING IS BASED ON:
   - LANDSCAPE LAYOUT '435_010' REV PL3, RECEIVED FROM LANDSCAPE PROJECTS ON 23/01/17.
   - ARCHITECTS LAYOUT '535_02_100 REV P11' DRAWING RECEIVED FROM ALLIES & MORRISON ON 04/05/16
5. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH:
   - DRAWINGS 33510-RUK-XX-00-DR-Z 100 SERIES
   - BELOW GROUND DRAINAGE STRATEGY REPORT

P03

KEY:

- ExSW — EXISTING PRIVATE SURFACE WATER SEWER
- ExFW — EXISTING PRIATE FOUL WATER SEWER
- ExFWRM — EXISTING ADOPTED FOUL WATER SLUDGE MAIN (SHOWN INDICATIVELY)
- SITE BOUNDARY

KEY PLAN
NOT TO SCALE



Rev	Description	Date	By / Chk	App
P03	PLANNING ISSUE, UPDATED LANDSCAPING PLAN	23.01. 2017	AL SW	DS
P02	PLANNING ISSUE, UPDATED LANDSCAPING PLAN	12.05. 2016	AL SW	JL
P01	PLANNING ISSUE	19.04. 2016	AL SW	JL

PLANNING

HALE WHARF
MUSE DEVELOPMENTS

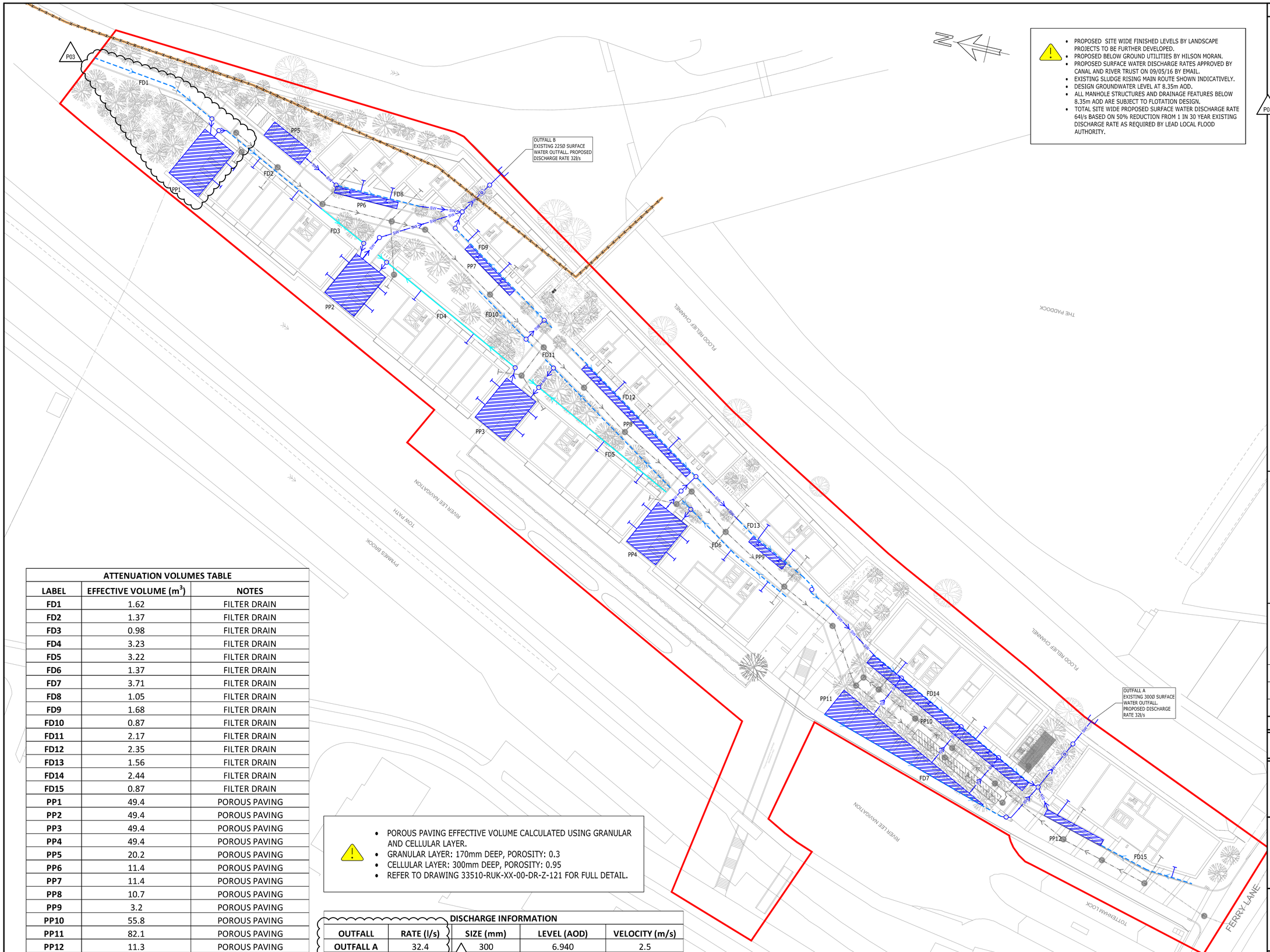
RAMBOLL

tel 020 7631 5291 fax 020 7323 4645 london@ramboll.co.uk
www.ramboll.co.uk

EXISTING FOUL AND SURFACE DRAINAGE CONSTRAINTS PLAN

Scale:	Date:	Drawn:	Checked:
1:500@A1	APRIL 2016	AL	SW

Drawing No.:	Rev:
33510-RAM-XX-00-DR-Z-002	P03



- PROPOSED SITE WIDE FINISHED LEVELS BY LANDSCAPE PROJECTS TO BE FURTHER DEVELOPED.
- PROPOSED BELOW GROUND UTILITIES BY HILSON MORAN.
- PROPOSED SURFACE WATER DISCHARGE RATES APPROVED BY CANAL AND RIVER TRUST ON 09/05/16 BY EMAIL.
- EXISTING SLUDGE RISING MAIN ROUTE SHOWN INDICATIVELY.
- DESIGN GROUNDWATER LEVEL AT 8.35m AOD.
- ALL MANHOLE STRUCTURES AND DRAINAGE FEATURES BELOW 8.35m AOD ARE SUBJECT TO FLOTATION DESIGN.
- TOTAL SITE WIDE PROPOSED SURFACE WATER DISCHARGE RATE 64l/s BASED ON 50% REDUCTION FROM 1 IN 30 YEAR EXISTING DISCHARGE RATE AS REQUIRED BY LEAD LOCAL FLOOD AUTHORITY.

ATTENUATION VOLUMES TABLE

LABEL	EFFECTIVE VOLUME (m^3)	NOTES
FD1	1.62	FILTER DRAIN
FD2	1.37	FILTER DRAIN
FD3	0.98	FILTER DRAIN
FD4	3.23	FILTER DRAIN
FD5	3.22	FILTER DRAIN
FD6	1.37	FILTER DRAIN
FD7	3.71	FILTER DRAIN
FD8	1.05	FILTER DRAIN
FD9	1.68	FILTER DRAIN
FD10	0.87	FILTER DRAIN
FD11	2.17	FILTER DRAIN
FD12	2.35	FILTER DRAIN
FD13	1.56	FILTER DRAIN
FD14	2.44	FILTER DRAIN
FD15	0.87	FILTER DRAIN
PP1	49.4	POROUS PAVING
PP2	49.4	POROUS PAVING
PP3	49.4	POROUS PAVING
PP4	49.4	POROUS PAVING
PP5	20.2	POROUS PAVING
PP6	11.4	POROUS PAVING
PP7	11.4	POROUS PAVING
PP8	10.7	POROUS PAVING
PP9	3.2	POROUS PAVING
PP10	55.8	POROUS PAVING
PP11	82.1	POROUS PAVING
PP12	11.3	POROUS PAVING
TOTAL	**432.2**	

- POROUS PAVING EFFECTIVE VOLUME CALCULATED USING GRANULAR AND CELLULAR LAYER.
- GRANULAR LAYER: 170mm DEEP, POROSITY: 0.3
- CELLULAR LAYER: 300mm DEEP, POROSITY: 0.95
- REFER TO DRAWING 33510-RUK-XX-00-DR-Z-121 FOR FULL DETAIL.

DISCHARGE INFORMATION

OUTFALL	RATE (l/s)	SIZE (mm)	LEVEL (AOD)	VELOCITY (m/s)
OUTFALL A	32.4	300	6.940	2.5
OUTFALL B	32.2	P03 225	7.600	1.0

Notes

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4. THIS DRAWING IS BASED ON:
   - P03 • LANDSCAPE LAYOUT '435_010' REV PL3, RECEIVED FROM LANDSCAPE PROJECTS ON 23/01/17.
   - ARCHITECTS LAYOUT '535_02_100 REV P11' DRAWING RECEIVED FROM ALLIES & MORRISON ON 04/05/16
5. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH:
   - DRAWINGS 33510-RUK-XX-00-DR-Z 100 SERIES
   - BELOW GROUND DRAINAGE STRATEGY REPORT

KEY:

- SURFACE WATER DRAIN
- SURFACE WATER MANHOLE
- POROUS SUB-BASE
- SOFT (GRASSED) BELOW GROUND FILTER TRENCH
- HARD (PAVED) BELOW GROUND FILTER TRENCH
- PETROL INTERCEPTOR
- FOUL WATER DRAIN
- FOUL WATER MANHOLE
- SITE BOUNDARY
- EXISTING TWIN 450mmØ SLUDGE RISING MAIN ROUTE SHOWN INDICATIVELY. TO BE ABANDONED.

KEY PLAN
NOT TO SCALE

Rev	Description	Date	By / Chk	App
P03	PLANNING ISSUE, UPDATED LANDSCAPING PLAN	23.01.2017	AL SW	DS
P02	PLANNING ISSUE, UPDATED LANDSCAPING PLAN	12.05.2016	AL SW	JL
P01	PLANNING ISSUE	19.04.2016	AL SW	JL

PLANNING

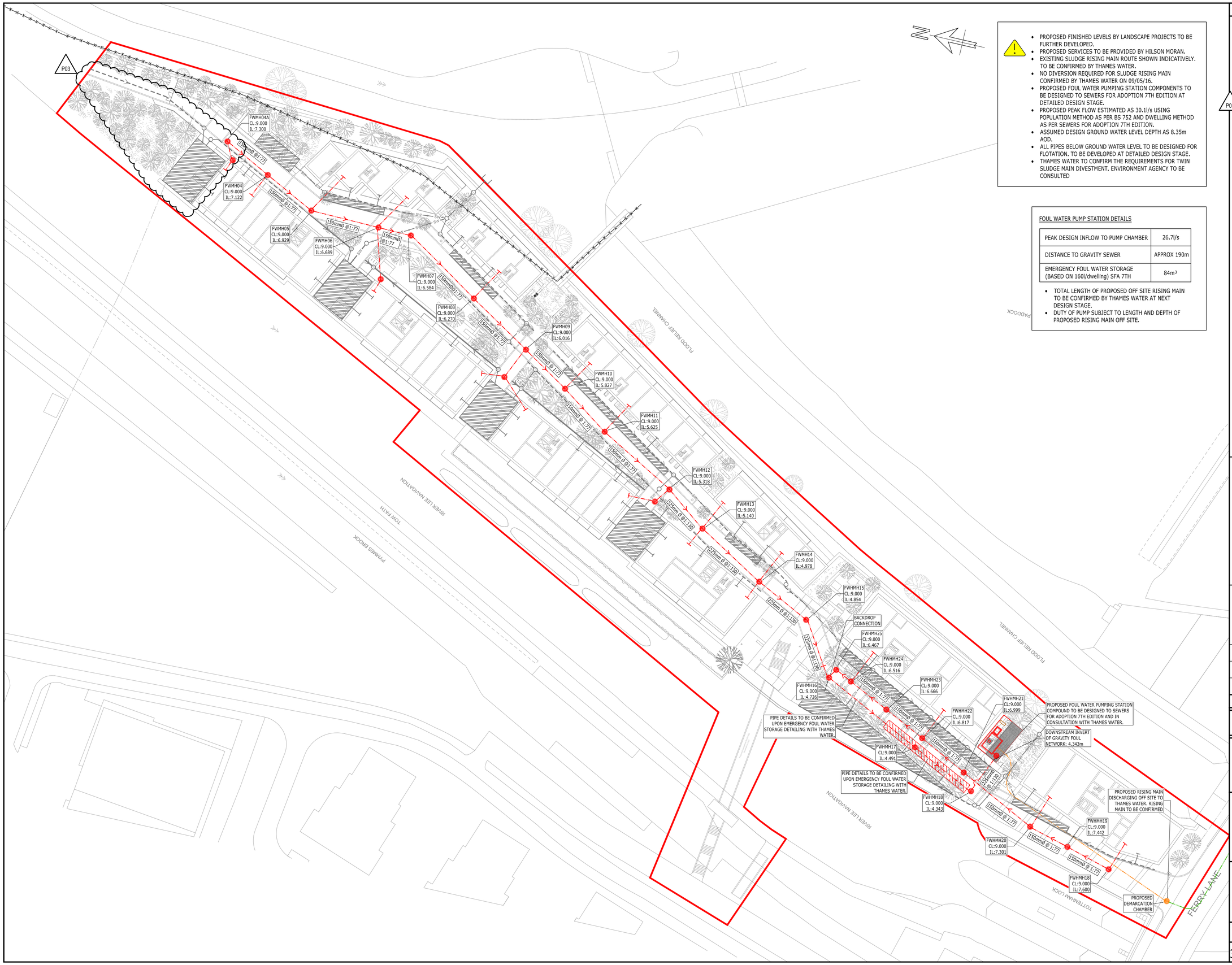
HALE WHARF
MUSE DEVELOPMENTS

RAMBOLL
tel 020 7631 5291 fax 020 7323 4645 london@ramboll.co.uk
www.ramboll.co.uk

PROPOSED BELOW GROUND SURFACE WATER DRAINAGE

Scale:	Date:	Drawn:	Checked:
1:500@A1	MAR 2016	AL	SW

Drawing No.: 33510-RAM-XX-00-DR-Z-101 Rev: P03



- PROPOSED FINISHED LEVELS BY LANDSCAPE PROJECTS TO BE FURTHER DEVELOPED.
- PROPOSED SERVICES TO BE PROVIDED BY HILSON MORAN.
- EXISTING SLUDGE RISING MAIN ROUTE SHOWN INDICATIVELY. TO BE CONFIRMED BY THAMES WATER.
- NO DIVERSION REQUIRED FOR SLUDGE RISING MAIN CONFIRMED BY THAMES WATER ON 09/05/16.
- PROPOSED FOUL WATER PUMPING STATION COMPONENTS TO BE DESIGNED TO SEWERS FOR ADOPTION 7TH EDITION AT DETAILED DESIGN STAGE.
- PROPOSED PEAK FLOW ESTIMATED AS 30.1l/s USING POPULATION METHOD AS PER BS 752 AND DWELLING METHOD AS PER SEWERS FOR ADOPTION 7TH EDITION.
- ASSUMED DESIGN GROUND WATER LEVEL DEPTH AS 8.35m AOD.
- ALL PIPES BELOW GROUND WATER LEVEL TO BE DESIGNED FOR FLOTATION. TO BE DEVELOPED AT DETAILED DESIGN STAGE.
- THAMES WATER TO CONFIRM THE REQUIREMENTS FOR TWIN SLUDGE MAIN DIVESTMENT. ENVIRONMENT AGENCY TO BE CONSULTED

FOUL WATER PUMP STATION DETAILS

PEAK DESIGN INFLOW TO PUMP CHAMBER	26.7l/s
DISTANCE TO GRAVITY SEWER	APPROX 190m
EMERGENCY FOUL WATER STORAGE (BASED ON 160l/dwelling) SFA 7TH	84m³

- TOTAL LENGTH OF PROPOSED OFF SITE RISING MAIN TO BE CONFIRMED BY THAMES WATER AT NEXT DESIGN STAGE.
- DUTY OF PUMP SUBJECT TO LENGTH AND DEPTH OF PROPOSED RISING MAIN OFF SITE.

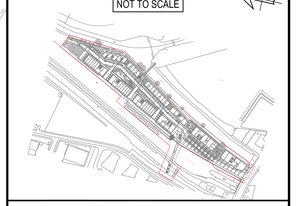
Notes

1. THIS DRAWING IS NOT TO BE SCALED.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, STRUCTURAL AND M&E DRAWINGS.
3. THIS IS NOT AN INSTALLATION DRAWING NOR A CO-ORDINATION DRAWING.
4. THIS DRAWING IS BASED ON:
   - LANDSCAPE LAYOUT '435_010 REV PL3' RECEIVED FROM LANDSCAPE PROJECTS ON 23/01/17. (P03)
   - ARCHITECTS LAYOUT '535_02_100 REV P11' DRAWING RECEIVED FROM ALLIES & MORRISON ON 04/05/16
5. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH:
   - DRAWINGS 33510-RUK-XX-00-DR-Z 100 SERIES
   - BELOW GROUND DRAINAGE STRATEGY REPORT

KEY:

- FOUL WATER DRAIN
- FOUL WATER MANHOLE
- EXISTING TWIN 450mmØ SLUDGE RISING MAIN ROUTE SHOWN INDICATIVELY. TO BE ABANDONED.
- INDICATIVE THAMES WATER RISING MAIN. TO BE DESIGNED AND CONSTRUCTED BY THAMES WATER.
- THAMES WATER RISING MAIN TO BE CONSTRUCTED UNDER SECTION 98 SEWER REQUISITION. DESIGN BY THAMES WATER. DETAILS TO BE CONFIRMED BY THAMES WATER.

KEY PLAN
NOT TO SCALE



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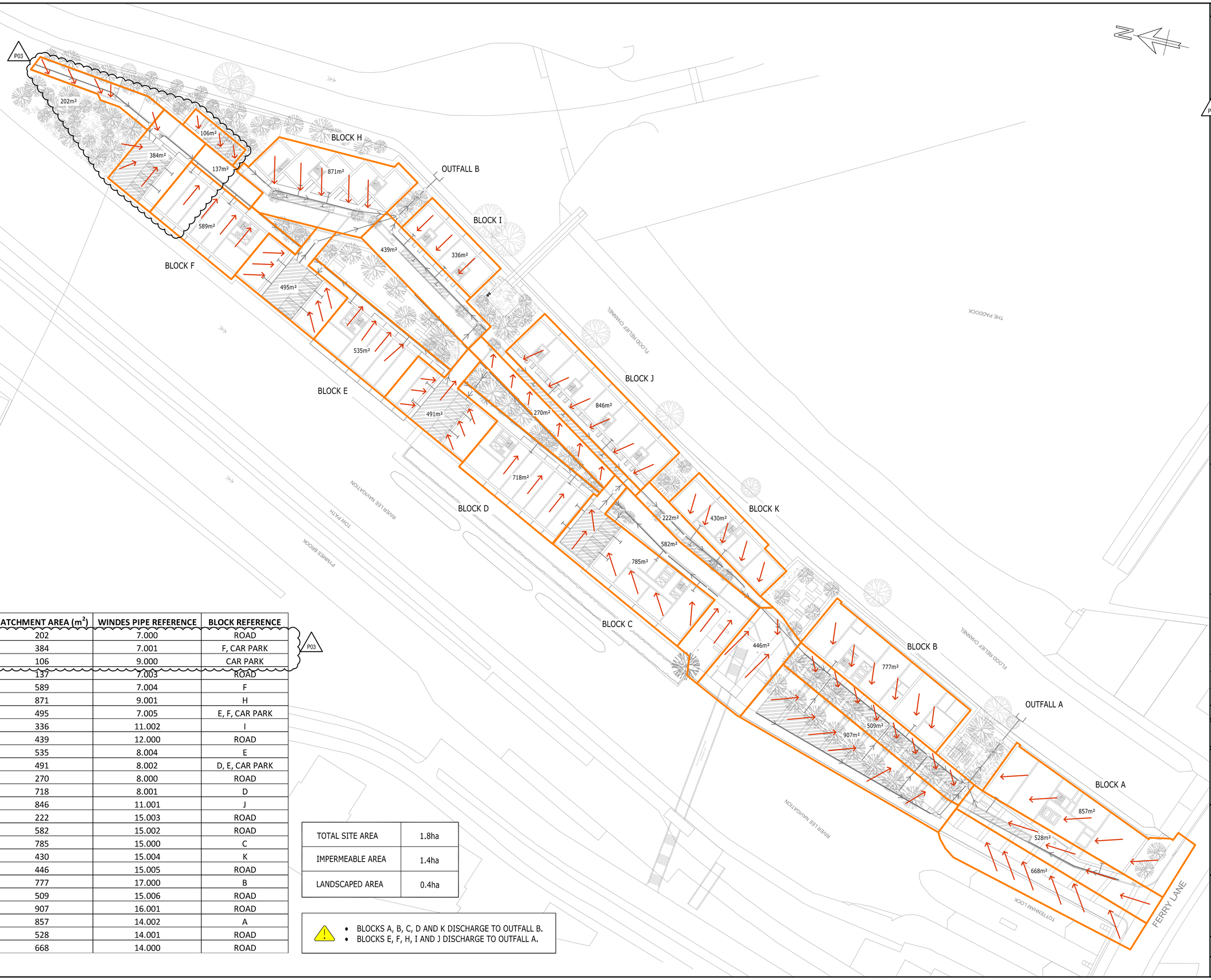
PROPOSED BELOW GROUND FOUL WATER DRAINAGE

Scale:	Date:	Drawn:	Checked:
1:500@A1	APRIL 2016	AL	SW

Drawing No.: 33510-RAM-XX-00-DR-Z-102 Rev: P03



CATCHMENT AREA (m^2)	WINDES PIPE REFERENCE	BLOCK REFERENCE
202	7.000	ROAD
384	7.001	F, CAR PARK
106	9.000	CAR PARK
137	7.003	ROAD
589	7.004	F
871	9.001	H
495	7.005	E, F, CAR PARK
336	11.002	I
439	12.000	ROAD
535	8.004	E
491	8.002	D, E, CAR PARK
270	8.000	ROAD
718	8.001	D
846	11.001	J
222	15.003	ROAD
582	15.002	ROAD
785	15.000	C
430	15.004	K
446	15.005	ROAD
777	17.000	B
509	15.006	ROAD
907	16.001	ROAD
857	14.002	A
528	14.001	ROAD
668	14.000	ROAD

P03

TOTAL SITE AREA	1.8ha
IMPERMEABLE AREA	1.4ha
LANDSCAPED AREA	0.4ha

- BLOCKS A, B, C, D AND K DISCHARGE TO OUTFALL B.
- BLOCKS E, F, H, I AND J DISCHARGE TO OUTFALL A.

Notes

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3. THIS IS NOT AN INSTALLATION DRAWING NOR A CO-ORDINATION DRAWING.
4. THIS DRAWING IS BASED ON:

P03

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- ARCHITECTS LAYOUT '535_02_100 REV P11' DRAWING RECEIVED FROM ALLIES & MORRISON ON 04/05/16

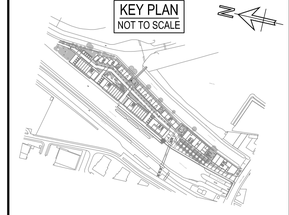
5. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH:
   - DRAWINGS 33510-RUK-XX-00-DR-Z 100 SERIES
   - BELOW GROUND DRAINAGE STRATEGY REPORT

KEY:

CATCHMENT AREA

FLOW DIRECTION

KEY PLAN
NOT TO SCALE



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CATCHMENT AREAS PLAN

Scale:	Date:	Drawn:	Checked:
1:500@A1	APRIL 2016	AL	SW

Drawing No.: 33510-RAM-XX-00-DR-Z-103 Rev: P03