Date Modified: 23/09/2010

Drawn By: ukdid001

KEY

South Cambridgeshire DC
& Cambridge City Council Boundaries

1000 Year + CC Hazard Mapping

Very Low Hazard

Low Hazard

Medium Hazard

High Hazard

NOTE: Taken from the
River Cam Mapping Study (2010)

EAST CAMBRIDGESHIRE DISTRICT

EAST CAMBRIDGESHIRE DISTRICT

ELY

COTTENHAM

WATERBEACH

OAKINGTON

IMPINGTON

MILTON

HISTON

GIRTON

CAMBRIDGE

TRUMPINGTON

FULBOURN

GREAT SHELFORD

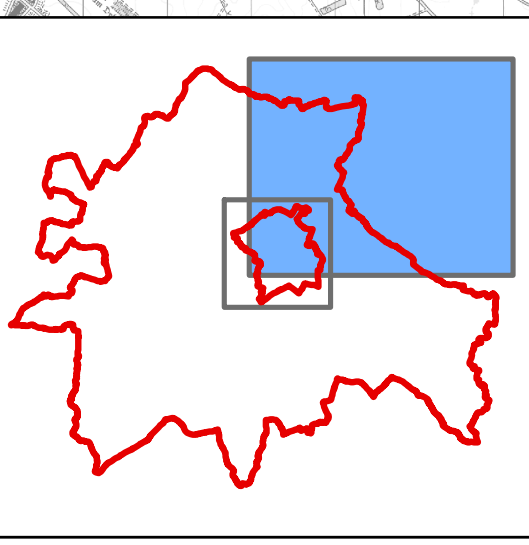
LITTLE SHELFORD

HARSTON

SAWSTON

WHITTLESFORD

GREAT ABINGTON



0 0.9 1.8 2.7 3.6 Kilometres

SCALE: 1:90,000

WSP

TITLE:

SOUTH CAMBRIDGESHIRE DC
AND CAMBRIDGE CITY COUNCIL
LEVEL 1 SFRA

FIGURE No:

HAZARD MAPPING
1000 YEAR + CC
1402 - D - 2.1.4

File: Q:\WSP_UK\WSP_D\Hertford\Cambridge SFRA\Cambridgeshire SFRA 2\DRAWINGS\D2.1.4 Hazard Map.mxd

Date Modified: 23/09/2010

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South Cambridgeshire DC & Cambridge City Council Boundaries

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NOTE: Taken from the River Cam Mapping Study (2010)

OAKINGTON

IMPINGTON

MILTON

HISTON

GIRTON

MADINGLEY

CAMBRIDGE

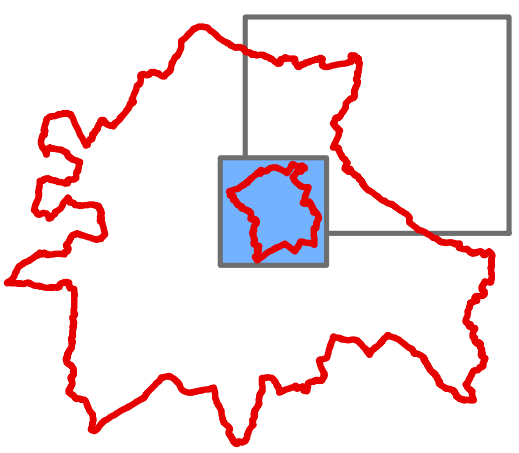
TRUMPINGTON

GREAT SHELFORD

LITTLE SHELFORD

HARSTON

WATERBE



WSP

TITLE:

SOUTH CAMBRIDGESHIRE DC AND CAMBRIDGE CITY COUNCIL LEVEL 1 SFRA

FIGURE No:

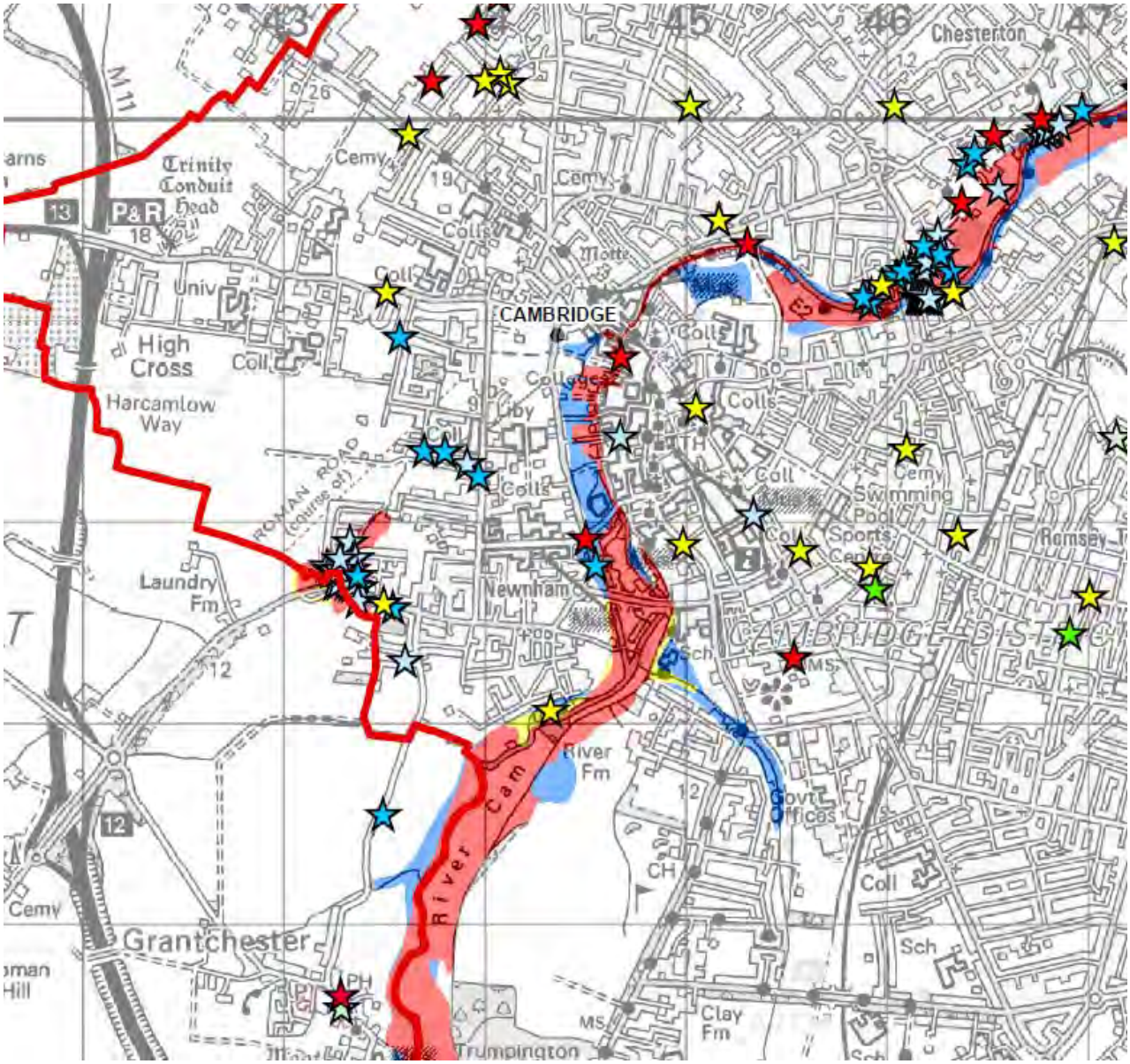
HAZARD MAPPING
1000 YEAR + CC
1402 - D - 2.2.4

0 0.5 1 1.5 2 Kilometres

SCALE: 1:45,000

File: Q:\WSP_UK\WSP_D\Hertford\Cambridge SFRA\Cambridgeshire SFRA 2\DRAWINGS\D2.2.4 Hazard Map.mxd

SFRA Historical Flood Map Extract



KEY

South Cambridgeshire DC & Cambridge City Council Boundaries

Historical Flooding Events

- Fluvial
- Ground Water
- Pluvial
- Sewer
- Oct 2001 Flooded Locations
- Oct 2001 Survey

Historical Flood Outlines

- March 1947
- September 1968
- May 1978
- May 1981
- October 1993
- Easter 1998
- October 2001

Date Modified: 22/09/2010

Drawn By: ukdid001

KEY

South Cambridgeshire DC & Cambridge City Council Boundaries

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OAKINGTON
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TRUMPINGTON
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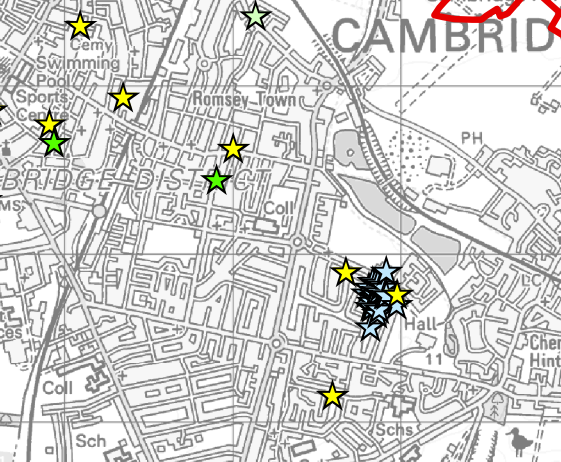
HARSTON



WSP

TITLE:

SOUTH CAMBRIDGESHIRE DC
AND CAMBRIDGE CITY COUNCIL
LEVEL 1 SFRA

FIGURE No:

HISTORICAL DATA
1402 - B - 3.5

0 0.5 1 1.5 2 Kilometres

SCALE: 1:45,000

File: Q:\WSP_UK\WSP_D\Hertford\Cambridge SFRA\Cambridgeshire SFRA 2\DRAWINGS\B3.5 Historical Data.mxd

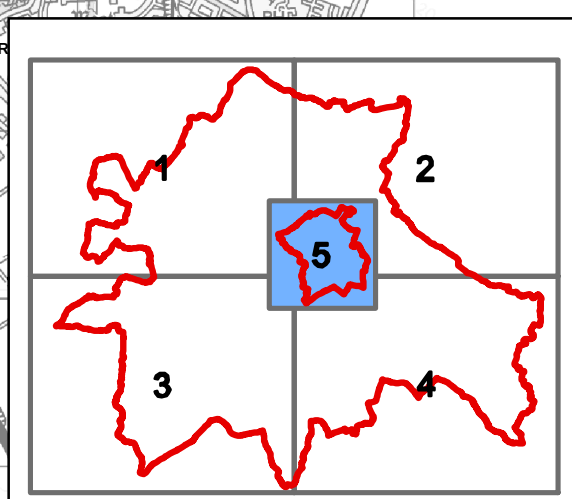
Date Modified: 22/09/2010

Drawn By: ukdid001

KEY

- South Cambridgeshire DC & Cambridge City Council Boundaries
- Groundwater Licenced Abstraction Points
- Zone 1: Inner Protection Zone
- Zone 2: Outer Protection Zone
- Zone 3: Total Catchment

OAKINGTON
IMPINGTON
HISTON
MILTON
GIRTON
MADINGLEY
CAMBRIDGE
TRUMPINGTON
GREAT SHELFORD
LITTLE SHELFORD
HARSTON



0 0.5 1 1.5 2 Kilometres

SCALE: 1:45,000

WSP

TITLE:

SOUTH CAMBRIDGESHIRE DC AND CAMBRIDGE CITY COUNCIL LEVEL 1 SFRA

FIGURE No:

GROUNDWATER SOURCE PROTECTION ZONES 1402 - C - 3.5

File: Q:\WSP_UK\WSP_D\Hertford\Cambridge SFRA\Cambridgeshire SFRA 2\DRAWINGS\C3.5 Groundwater Source Protection Zones.mxd

Appendix K Cambridge City Council Planning Policy Guidance

Cambridge Local Plan Proposals map – 29/9/2015

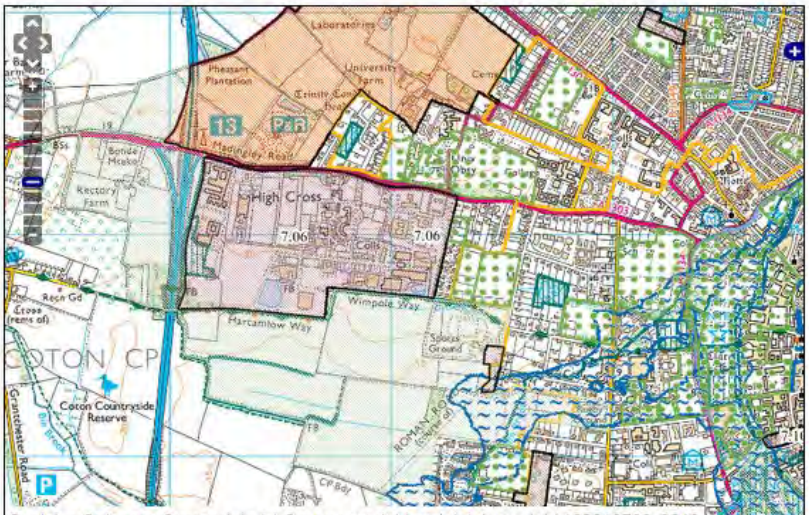
Cambridge City Proposals Map 2009

Other Maps

- North West Cambridge Area Action Plan
- Cambridge East Area Action Plan

To find your way to all areas of major development and City wards, please use drop down list below

Go



Policies at info point:

None found

Legend

District and Local Centre	Area Aaction Plan Boundary	Proposal Site
Protected Open Space	Sites Of Special Scientific Interest	Land For Public Transport
Area Of Major Change	City Centre	Protected Industrial Site
City Boundary	Green Belt	Flood Zone
Site of Local Nature Conservation Importance	Conservation Area	Cambridge Airport Public Safety Zone
Lords Bridge Consultation Area 1	Lords Bridge Consultation Area 2	Primary Shopping Frontage

sensitive and should be compatible with design and conservation objectives. Reducing private non-residential parking will provide scope for more amenity space and contribute to reductions in central area traffic congestion. Key central sites where change is occurring include the Old Press site Mill Lane, New Museums, Downing site, the former School of Divinity, Old Addenbrooke's, the Old Schools, Fitzwilliam Museum, Chemistry, Scroope House site and Engineering. Major development outside the centre includes development around Addenbrooke's and its Clinical School associated with the Trust's 2020 Vision, a new Cancer Research Centre at Addenbrooke's, a relocation of the Department of Education to the Homerton College site, continuing improvements to the Sidgwick Arts Faculty site, and major new University development in West Cambridge and North West Cambridge.

7/6 West Cambridge, South of Madingley Road

Development for University needs will be permitted on the following site south of Madingley Road:

Site 7.06 West Cambridge Site
This site is a major allocation in the 1996 Local Plan for University Faculty development, Research Institutes, commercial research and development, a sports complex, residential and associated uses. Development of the site has commenced in accordance with an agreed Masterplan. The site will provide development opportunity for the Plan period and beyond. Further development, which accords with the provisions of the Masterplan, will be permitted. Progress against the Masterplan will be monitored and reviewed over the Plan period.

7.31 To the south of Madingley Road a major new academic development is being undertaken by the University of Cambridge to provide a range of new space for academic and other uses. It is one of the largest developments ever undertaken in the City and will contribute towards the University maintaining its position as one of the world's foremost universities. The overall site, which covers 66.5 hectares, was the subject of an outline planning approval in 1999, and a Masterplan has been agreed with the University for the development of approximately 250,000 square metres of space. Reserved matters applications have been approved on a number of plots at the eastern end of the site and a number of sites are under construction or have been recently completed.

7.32 Completions include a new computer laboratory (10,500 square metres), a prestigious new research building for Microsoft (6,100 square metres), a new Nano Science building (2,300 square metres) and a park and cycle scheme.

7.33 Planning approval has been granted for a new sports complex. A new building for the Centre for Advanced Photonics and Electronics in conjunction with the Department of Engineering is planned. Applications have been approved or are being

discussed regarding the development of the East Square and East Forum. 200 residences are nearing completion and a site is being sought for 200 more. Infrastructure and strategic landscaping proposals have also been approved and progressed.

7.34 Implementation of other elements of the Masterplan are reliant on securing further Joint Infrastructure Funding and other funding to help the relocation of Materials Science and Engineering Departments onto the site.

7.35 It will be many years before the site is fully developed, perhaps 2020, and the precise sequence cannot be accurately predicted because of uncertainties over funding and the timing of developments. The Masterplan therefore creates a strategic framework to guide the future development of the site. It includes a series of guidelines for the purposes of monitoring the progress of development. This will be reviewed during the Plan period as required.

7/7 College and University of Cambridge Staff and Student Housing

Sites suitable for the development of student hostels or affordable or special needs housing for the Colleges and University staff are identified in the Proposals Schedule and on the Proposals Map.

The development of additional student residential accommodation within existing College sites[1] will be permitted.

Planning permission will be granted for windfall and student hostel sites subject to:
a. amenity considerations;
b. their proximity to the institutions they serve;
c. supervision, if necessary, is provided as appropriate to their size, location and the nature of the occupants; and
d. they do not result in a loss of family residential accommodation.

Appropriate provision should be made for students who are disabled.

[1] Existing College sites are taken to mean sites already accommodating 20 or more students or sites that have planning permission for such.

7.36 Student numbers at the University of Cambridge have grown by 2.0% per annum over the last decade. Within this, undergraduates have increased by 1.1% per annum and postgraduates 4.6% per annum. The most recent forecasts by the University adopted for space planning are more conservative. They suggest undergraduate numbers are likely to grow by around 0.5% per annum to 2011 with postgraduate increases of around 2.0% per annum.

CAMBRIDGE DRAFT SUBMISSION POLICIES MAP - JULY 2013

N

SOUTH CAMBRIDGESHIRE DISTRICT COUNCIL

North West Cambridge Area Action Plan

Cambridge East Area Action Plan

Key

- Cambridge City Boundary
- Conservation Area
- Protected Open Space
- Open Space - North West Cambridge Area Action Plan
- Site of Special Scientific Interest
- City Wildlife, County Wildlife and Local Nature Reserve
- Green Belt
- Strategic District Heating Area
- Cambridge Airport Public Safety Zone
- City Centre
- Primary Shopping Frontage
- Secondary Shopping Frontage
- Primary Shopping Area
- District, Local or Neighbourhood Centre
- Protected Industrial Site
- Indicative Boundary of National Geological Interest (inc. 10m buffer)
- Proposal Site
- Major Development - North West Cambridge Area Action Plan
- City Safeguarded Land
- Opportunity Area
- Area of Major Change
- Area Action Plan

MINERAL AND WASTE SAFEGUARDING

- Mineral Safeguarding Area - Sand and Gravel
- Allocation
- Area of Search
- Existing Site
- Transport Safeguarding Area
- Waste Consultation Area
- Waste Water Treatment Works Safeguarding Area

0 500 1,000 1,500 Metres

This Draft Submission Policies Map illustrates graphically the policies as set out in the Draft Submission Local Plan (2013).
It is proposed that this Map replaces the existing Cambridge Proposals Map: October 2009 in its entirety.

The entirety of the area within the Cambridge City Council administrative boundary is covered by the Mullard Radio Astronomy Observatory, Lord's Bridge Consultation area. See Policy 39.

Reference numbers refer to the main relevant policies in the Draft Submission Local Plan.

For the up-to-date information for the Flood Plain extent please check the Environment Agency's website at www.environment-agency.gov.uk

CAMBRIDGE CITY COUNCIL

Bell School (R42d)

3.60 Outline approval has been granted for up to 347 dwellings and 100-bed student residential accommodation. This has not yet been implemented. Reserved matters approval has been granted for the vehicular access off Babraham Road.

3.61 Figure 3.5 provides a diagrammatic representation of the principal land uses, access and transport arrangements, and landscape provision for the Southern Fringe and its relationship with the Cambridge Biomedical Campus (including Addenbrooke's Hospital) and the rest of the city.

3.62 Any further planning applications within this area will need to be in accordance with the outline consents and/or this policy. Opportunities should be taken to enhance amenity and biodiversity in the associated Green Belt land and access to this and the open countryside beyond. Key features to be taken into account include Hobson's Brook and other features important for biodiversity, existing trees, and the sensitive transition between the urban fringe and the open countryside.

Policy 18: West Cambridge Area of Major Change

Development of this area will be permitted in line with the existing planning permissions. The principal land uses will be:

a. D1 educational uses, associated sui generis research establishments[8] and academic research institutes where it is in the national interest or where they can show a special need to be located close to the University of Cambridge in order to share staff, equipment or data, and to undertake joint collaborative working; and
b. a mix of commercial research uses within use class B1(b) that can demonstrate a special need to be located close to the University of Cambridge;

The development will also include further phases of the sports centre.

Small-scale community facilities, amenities, and A1 (local shop), A3 (café), A4 (public house), D1 (crèche) type uses and student accommodation will be acceptable, if they support existing occupants on the site and add to the social spaces and vibrancy of the area, essential to its continued success.

[8] Research establishments/institutions are taken to mean sui generis uses affiliated with one of the Universities, the Medical Research Council or Addenbrooke's Hospital, where there is a need for regular day-to-day contact or sharing of materials, staff and equipment.

Any densification of development on the site that results in a significant increase in floorspace, over that already approved, will be supported providing that:

c. a revised masterplan has been proposed that takes an integrated and comprehensive approach to the provision and distribution of the uses, and supporting facilities and amenities;
d. phasing of the development will be determined through the masterplan and as the need is proven;
e. development should not exceed four commercial storeys (16 metres in total) and given the sensitivity of the Green Belt to the south and west a lower overall height may be appropriate along these edges;
f. proposals respect the important adjacent Green Belt setting to the south and west, and other neighbouring residential uses and views of the city from the west;
g. it includes a comprehensive transport strategy for the site, incorporating a sustainable transport plan to minimise reliance on private cars. This should include assessing the level, form and type of car parking on the site;
h. that walking, cycling and public transport links (including access for all) to the city centre, railway station(s), other principal educational and employment sites, and other key locations within the city are enhanced to support sustainable development; and
i. that proposals provide appropriate green infrastructure which is well integrated with the existing and new development and with the surrounding area.

The council will be supportive of a site-wide approach to renewable or low carbon energy generation or the future proofing of buildings to allow for connections to energy networks.

Supporting text:

3.63 The West Cambridge site is allocated for uses related to the University of Cambridge. Development has begun in accordance with an approved planning permission and supported by an agreed masterplan and development guidelines.

3.64 The overall site (allocation reference M13), which covers 66.5 hectares, was the subject of an outline planning approval in 1999 that set out the density of development permitted. A masterplan was subsequently agreed with the University of Cambridge for the development of approximately 250,000 sq m of space, which creates a strategic framework to guide future development of the site. It also includes guidelines for monitoring the progress of development.

3.65 Reserved matters and full applications have been approved on a number of plots and a number have been completed or are in the pipeline. The precise sequence and timing of development has been down to the availability of funding and that is likely to continue.

3.66 Figure 3.6 provides a diagrammatic representation of the principal land uses, access and transport arrangements and landscape provision for the West Cambridge site and its relationship with North West Cambridge, the National Institute of Agricultural Botany (NIAB), and the rest of the city.

3.67 The Council has identified an overall strategic need for further employment growth across the city, including making more efficient use of existing employment sites. The University of Cambridge supports that approach and wishes to intensify future development on the West Cambridge site. This is welcomed, as it will provide a more efficient use of land, increased opportunities to meet employment needs, a different approach to place making and enable the provision of more shared social spaces and other ancillary support services to enhance the vibrancy of the area. The latter may be best achieved through grouping of facilities, e.g. near the sports centre.

3.68 There is a generous supply of employment land for these uses around the city. The Council therefore will not be looking at West Cambridge to provide land for general research and development, but instead to provide a development cluster focusing on occupiers with strong links to the University of Cambridge and academic association with cognate activities that would benefit from proximity. This will encourage the development of the higher education cluster and thus benefit the economy of Cambridge and the United Kingdom. It will be appropriate for firms who wish to locate on West Cambridge to demonstrate a clear need to be close to other research facilities associated with the University of Cambridge.

3.69 Accordingly, a needs statement is required to support planning applications for West Cambridge, for built development to satisfactorily demonstrate the need for the development on West Cambridge at the time and that it cannot reasonably be met elsewhere. This would take into account factors such as viability, the demand for various uses, land availability, ownership, location, accessibility and suitability.

3.70 The new proposals will need to be accompanied by a new site-wide masterplan to advise on the form, content, density and phasing of the development, and how it will be integrated with the existing city. The increased density will provide further opportunities to enhance the built form, public realm and street scene of the area. Progress will be monitored and reviewed against the masterplan over the period of the plan.

3.71 The increased activity may put further pressure on the environment and the amenity of nearby residents; in particular the impact on biodiversity and

noise and light pollution in the area will need to be considered in any masterplan review. The sensitivities in relation to the Green Belt and western setting of the city will also need to be appropriately considered.

3.72 Key to the success of the new proposals will be an integrated and accessible sustainable public transport strategy (which considers all modes of travel, including public transport) to ensure that development has an acceptable impact on the surrounding transport network. This should take into account committed planned improvements to the public transport network that will be delivered by North West Cambridge. The additional development would have the advantage of establishing more activity, which will make public transport routes to and from the site more viable. It will also provide an opportunity to review cycle and walking links, and car parking across the site.

3.73 The increased densities being sought on the site, coupled with the possible provision of a swimming pool within the West Cambridge Sports Centre, could open up the potential of combined heat and power technology. There may also be potential for a more comprehensive scheme by linking the site to wider energy networks, for example the heat network being provided at the North West Cambridge site.

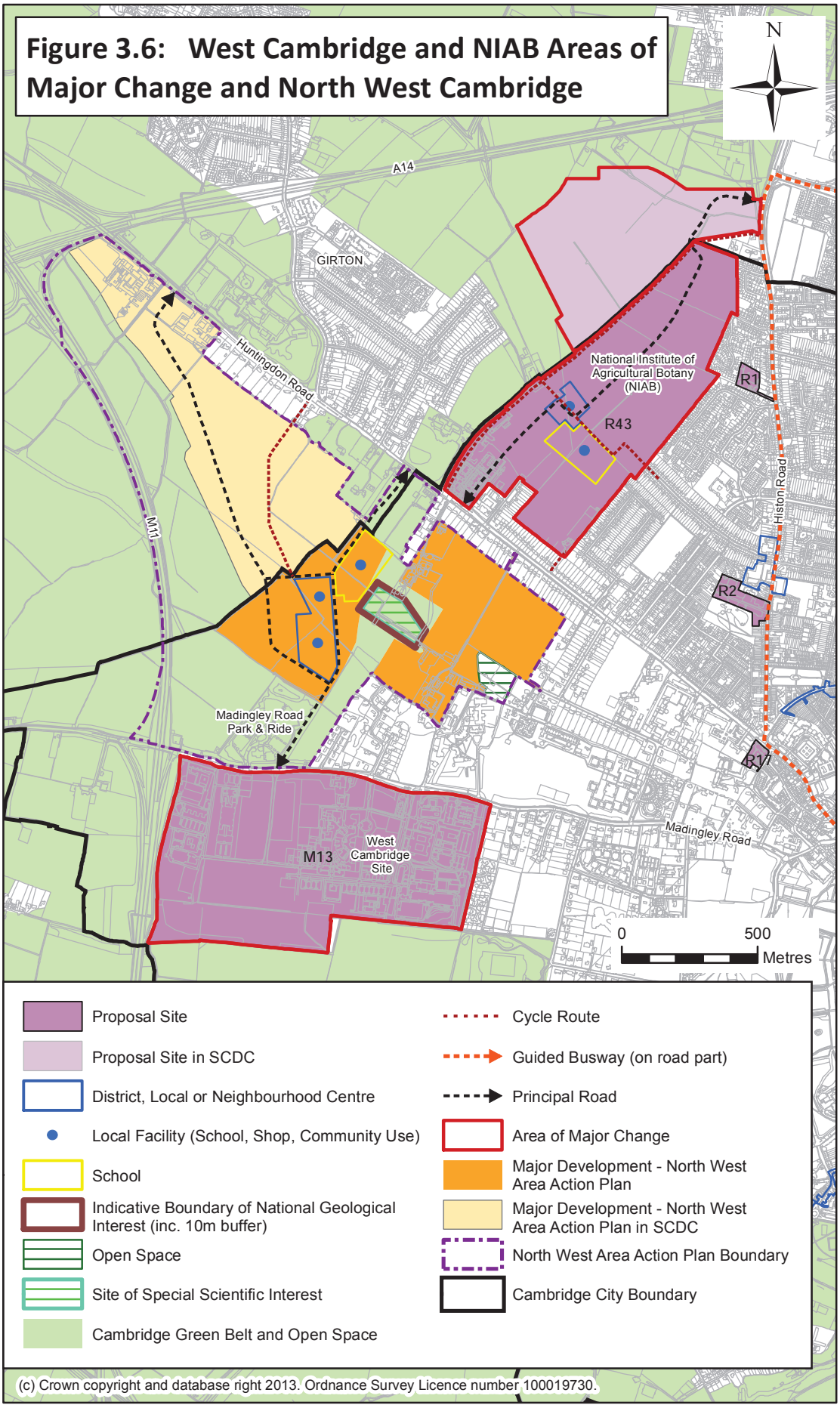


Figure 3.6: West Cambridge and NIAB Areas of Major Change and North West Cambridge
N
A14
GIRTON
Huntingdon Road
M11
National Institute of Agricultural Botany (NIAB)
R1
R43
Histon Road
R2
R17
Madingley Road Park & Ride
M13
West Cambridge Site
Madingley Road
0
500
Metres
Proposal Site
Proposal Site in SCDC
District, Local or Neighbourhood Centre
Local Facility (School, Shop, Community Use)
School
Indicative Boundary of National Geological Interest (inc. 10m buffer)
Open Space
Site of Special Scientific Interest
Cambridge Green Belt and Open Space
Cycle Route
Guided Busway (on road part)
Principal Road
Area of Major Change
Major Development - North West Area Action Plan
Major Development - North West Area Action Plan in SCDC
North West Area Action Plan Boundary
Cambridge City Boundary
(c) Crown copyright and database right 2013. Ordnance Survey Licence number 100019730.

measures. Where an applicant has recently had a Green Deal assessment undertaken or the property has an Energy Performance Certificate (EPC), these could also be submitted as part of the planning application to demonstrate the need to comply with the policy.

4.23 The aim of the policy is to help homeowners implement measures that will enhance the energy efficiency of their homes, helping to reduce fuel costs at a time of rising energy prices. This might help reduce the risk of some homeowners finding themselves in fuel poverty, or in cases where residents are already in fuel poverty, help get them out of this situation. The focus is on cost-effective measures with a simple payback of seven years or less and that would be relatively simple to install with limited disruption. Many of these measures will be eligible for funding through the national Green Deal scheme.

4.24 Care will need to be taken in applying the policy to listed buildings and other heritage assets, to ensure that they are not damaged by inappropriate interventions. The implementation of the policy will be case by case, with officers recommending measures that would be suitable for that particular property, bearing in mind its age, type of construction and historic significance. There may be cases where improvements cannot be made to an existing dwelling without causing harm to the significance of the heritage asset, and in such circumstances the requirements of this policy will not be implemented.

Policy 31: Integrated water management and the water cycle

Development will be permitted provided that:

a. surface water is managed close to its source and on the surface where reasonably practicable to do so;
b. priority is given to the use of nature services[14];
c. water is seen as a resource and is re-used where practicable, offsetting potable water demand, and that a water sensitive approach is taken to the design of the development;
d. the features that manage surface water are commensurate with the design of the development in terms of size, form and materials and make an active contribution to making places for people;
e. surface water management features are multi-functional wherever possible in their land use;
f. any flat roof is a green or brown roof, providing that it is acceptable in terms of its context in the historic environment of Cambridge (see Policy 62: Conservation and Enhancement of Cambridge's Historic Environment)

[14]Nature services are defined by the National Planning Policy Framework as: 'The benefits people obtain from ecosystems such as, food, water, flood and disease control and recreation'. These are also known as ecosystem services.

and the structural capacity of the roof if it is a refurbishment. Green or brown roofs should be widely used in large-scale new communities;

g. there is no discharge from the developed site for rainfall depths up to 5 mm of any rainfall event;
h. the run-off from all hard surfaces shall receive an appropriate level of treatment in accordance with Sustainable Drainage Systems guidelines, SUDS Manual (CIRIA C697), to minimise the risk of pollution;
i. development adjacent to a water body actively seeks to enhance the water body in terms of its hydromorphology, biodiversity potential and setting;
j. watercourses are not culverted and any opportunity to remove culverts is taken; and
k. all hard surfaces are permeable surfaces where reasonably practicable.

Supporting Text:

4.25 The Surface Water Management Plan[15] and Strategic Flood Risk Assessment for Cambridge[16] have found there is little or no capacity in our rivers and watercourses that eventually receive surface water run-off from Cambridge and that it needs to be adequately managed so that flood risk is not increased elsewhere. The appropriate application of sustainable drainage systems to manage surface water within a development is the approach recommended within the technical guidance to the National Planning Policy Framework[17] (NPPF) as a way of managing this risk.

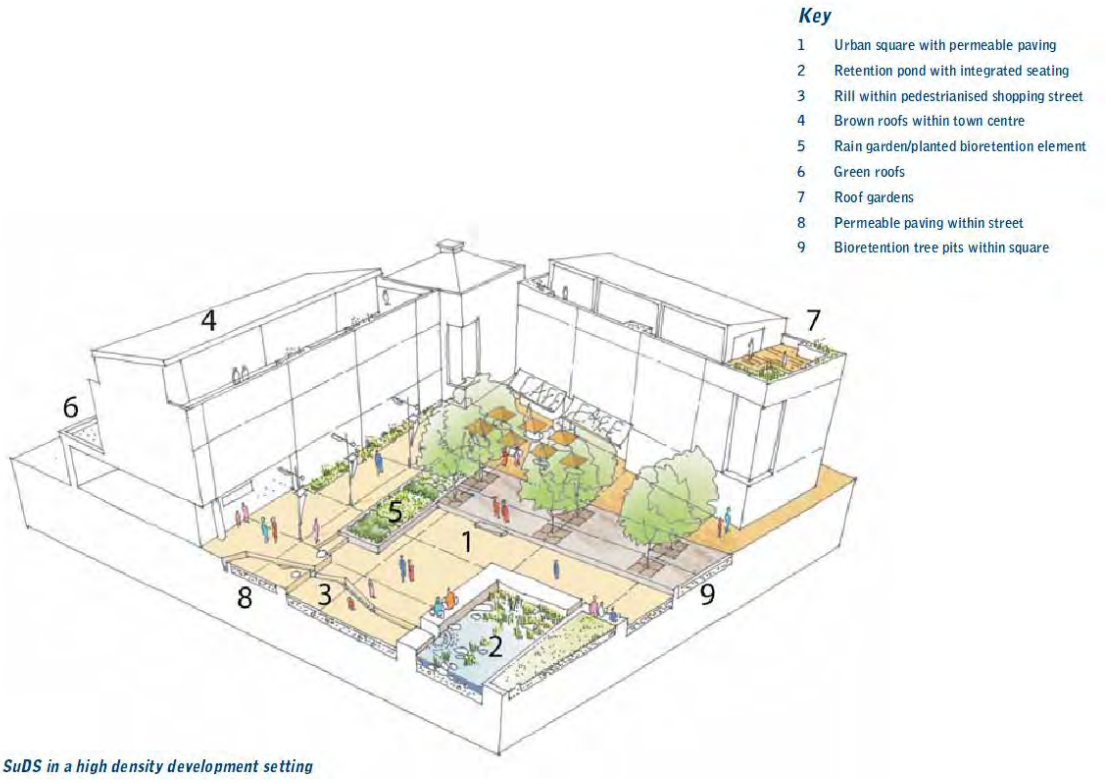
4.26 Current best practice guidance such as the SUDS Manual and Planning for SUDS (CIRIA C697 and C687) should be followed in the design of developments of all sizes, with design principles that are important to Cambridge set out in this policy. Smaller, more resilient features distributed throughout a development should be used, instead of one large management feature. Figure 4.4 provides examples of how to successfully integrate SuDS into a range of developments.

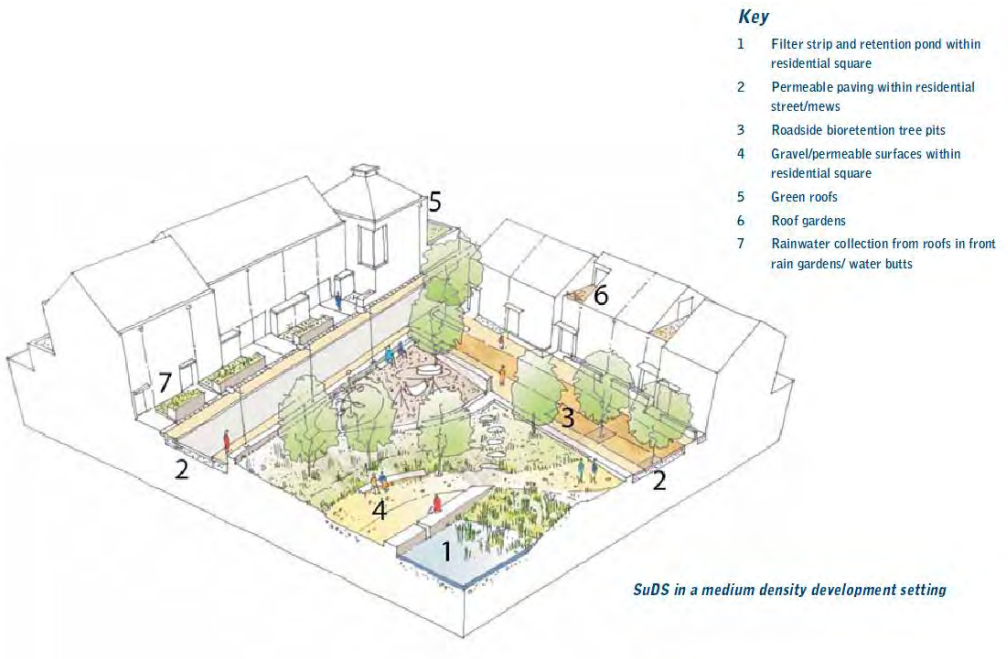
4.27 Managing water close to where it falls and on the surface is often the most cost-effective way to manage surface water. Early consideration in the design process helps achieve this. Managing water on the surface is an opportunity to celebrate water and create developments distinctive to Cambridge.

4.28 Climate change will in future see times of too much water and times of too little water more frequently than now. The design of new developments should reflect this change and value water as a resource than can be stored in times of plenty for re-use in times of deficit.

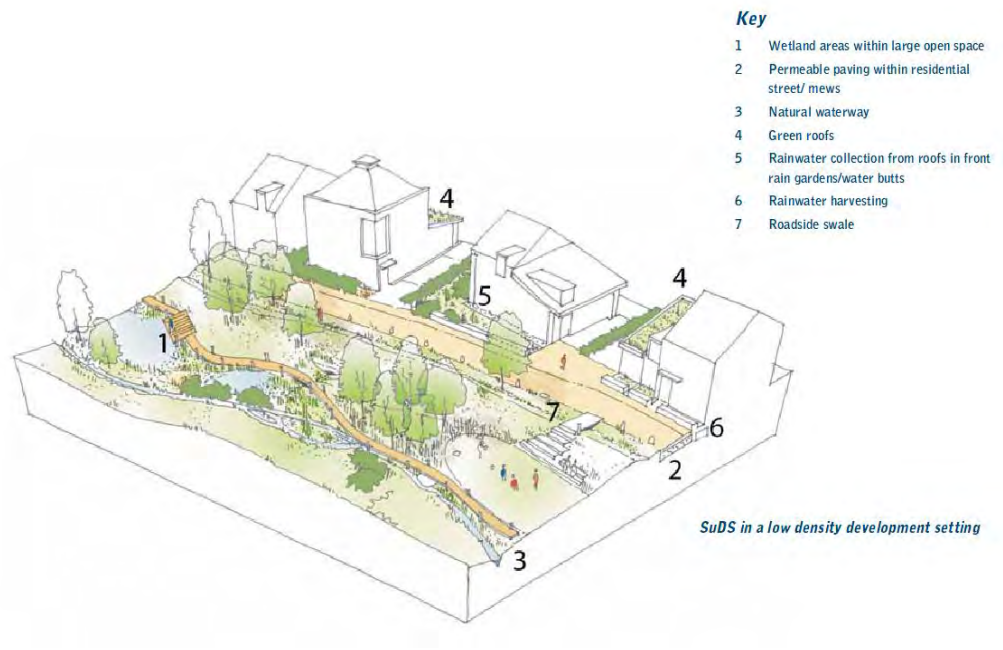
[15] https://www.cambridge.gov.uk/background-documents
[16] https://www.cambridge.gov.uk/strategic-flood-risk-assessment
[17] https://www.gov.uk/government/publications/national-planning-policy-framework-technical-guidance

Figure 4.4: Examples of integrating SuDS into developments[18]





[18] Source: Dickie, S, McKay, G, Ions, L, Shaffer, P (2010) Planning for SUDS - Making it happen, CIRIA, C687, London (ISBN: 978-0-86017-687-9) Go to: www.ciria.org



4.29 Green and brown roofs are a key measure in terms of Cambridge's climate change adaptation policy. They offer multiple benefits for a comparatively small additional construction cost, including forming part of an effective sustainable drainage solution, reducing the amounts of storm water run-off and attenuating peak flow rates. In the summer, a green roof can typically retain 70-80 per cent of rainfall run-off. Predicted climate change means that Cambridge will experience increasing risks of flooding, overheating and drought, manifested through hotter drier summers and warmer wetter winters. Living roofs can reduce the negative effects of climate change, for example by improving a building's energy balance and reducing carbon emissions. The use of vegetation on a roof surface ameliorates the negative thermal effects of conventional roof surfaces through the cooling effect of evapotranspiration, which can also help ameliorate the urban heat island effect (UHI). It can also provide benefit in the form of insulation, helping to reduce the internal cooling load of buildings, thereby reducing energy use and associated carbon emissions. The biodiversity benefits of green roofs are manifold, supporting rare and interesting types of plant, which in turn can host a variety of rare and interesting fauna. Accessible roof space can also provide outdoor living space, particularly in high-density developments. As such, accessible roof space should be viewed as an integral element of a well-designed, high-quality, high-density, more efficient, attractive and liveable city.

4.30 Green/brown roofs can be more cost effective than a traditional roof over the lifetime of a development. A flat roof is defined as a roof with a pitch of between 0° and 10°.

4.31 The EU Water Framework Directive and the associated River Basin Management Plan for the Anglian region[19] require public bodies to have a positive impact on the quality of lakes, rivers and groundwater, collectively called water bodies. The water bodies in Cambridge are currently failing to achieve the required status of 'good'. Quality refers to the quality of the water body in terms of the quality of the water itself, the quality of the shape and form of the water body, and the quality of its biodiversity.

4.32 This policy seeks to ensure all surface water that is discharged to ground or into rivers, watercourses and sewers has an appropriate level of treatment to reduce the risk of diffuse pollution.

4.33 The policy also recognises that development adjacent to a water body provides an opportunity for both the development and the water body and that they should complement and enhance each other.

Policy 32: Flood risk

Potential flood risk from the development

Development will be permitted providing it is demonstrated that:

a. the peak rate of run-off over the lifetime of the development, allowing for climate change, is no greater for the developed site than it was for the undeveloped site;
b. the post-development volume of run-off, allowing for climate change over the development lifetime, is no greater than it would have been for the undeveloped site. If this cannot be achieved then the limiting discharge is 2 litre/s/ha for all events up to the 100-year return period event[20];
c. the development is designed so that the flooding of property in and adjacent to the development would not occur for a 1 in 100 year event, plus an allowance for climate change and in the event of local drainage system failure;
d. the discharge locations have the capacity to receive all foul and surface water flows from the development, including discharge by infiltration, into water bodies and into sewers;
e. there is a management and maintenance plan for the lifetime of the development, which shall include the arrangements for adoption by any

[19] Environment Agency (2009). Water for life and livelihoods. River Basin Management Plan – Anglian River Basin District

[20] Where the pre-development peak rate of run-off for the site would result in a requirement for the post-development flow rate to be less than 5 litre/s at a discharge point, a flow rate of up to 5 litre/s may be used where required to reduce the risk of blockage. If discharge is to be pumped then this allowance does not apply.

public authority or statutory undertaker and any other arrangements to secure the operation of the scheme throughout its lifetime; and

f. the destination of the discharge obeys the following priority order:
    - firstly, to ground via infiltration;
    - then, to a water body;
    - then, to a surface water sewer.

Discharge to a foul water or combined sewer is unacceptable.

Potential flood risk to the development

Development will be permitted if an assessment of the flood risk is undertaken following the principles of the National Planning Policy Framework and additionally:

For an undeveloped site:

g. if it is not located within the Environment Agency's flood zone 3b, unless it is a water-compatible development and does not increase flood risk elsewhere by either displacement of flood water or interruption of flood flow routes and employs flood resilient and resistant construction, including appropriate boundary treatment and has a safe means of evacuation; and

h. if it is not located within the Environment Agency's flood zone 3a, unless it is a water compatible development or minor development when the principles in a) above apply; and

i. if it is located within the Environment Agency's flood zone 2 or a surface water wetspot and employs flood resilient and resistant construction as appropriate; and

j. floor levels are 300mm above the 1-in-100-years flood level, plus an allowance for climate change where appropriate and/or 300mm above adjacent highway levels where appropriate.

For a previously developed site:

Opportunities should be taken to reduce the existing flood risk by the positioning of any development so that it does not increase flood risk elsewhere by either displacement of flood water or interruption of flood flow routes, and it employs flood resilient and resistant construction including appropriate boundary treatment and has a safe means of evacuation.

Supporting Text:

4.34 Both the Strategic Flood Risk Assessment[21] and Surface Water Management Plan for Cambridge[22] have found that without the mitigation measures outlined in this policy, developments could increase flood risk elsewhere.

[21] https://www.cambridge.gov.uk/strategic-flood-risk-assessment
[22] https://www.cambridge.gov.uk/background-documents

Flood risk assessments should make reference to the latest version of these studies. There is also an opportunity to reduce the overall flood risk in Cambridge through redevelopment. This policy seeks to address this with the same design standards applied to new developments on previously developed sites as undeveloped sites, as this refers to the site in its natural state prior to any development taking place.

4.35 The rivers, watercourses, sewers and ground conditions throughout Cambridge have varying amounts of capacity for flow from new developments and an adequate assessment of this capacity must be undertaken to support any development proposals. This policy builds upon the standards currently being achieved in the major growth sites on the fringes of Cambridge.

4.36 The appropriate responsible bodies including the Environment Agency, Anglian Water and Cambridgeshire County Council should be consulted, as appropriate, during the initial design process for any new development or redevelopment. The policies map also shows the area of the city covered by the Environment Agency's flood zones[23] (note that this relates to fluvial flooding only).

4.37 The Great Ouse Catchment Flood Management Plan[24] has assessed how an increase in the flow of water in rivers and watercourses due to climate change will affect Cambridge. It has concluded that flood zones will be inundated more frequently and for longer. This seeks to clarify what development would be acceptable in which flood zones. The findings of the Surface Water Management Plan for Cambridge highlights the importance of a careful consideration of the levels within a development such that if extreme events occur or there is a maintenance issue that causes the drainage system to stop working, properties will not flood as a result of surface water flooding (pluvial).

4.38 In the Environment Agency's flood zone 3, water may be flowing in the general direction of the river and interruption of these flows can increase flood risk to adjacent developments. Careful consideration must be given to the positioning of development on the site so there is no interruption of these flows. This should also include the consideration of boundary treatments to enable floodwater to flow with a minimum of hindrance to the flow.

4.39 Discharge of surface water to a foul or combined sewer is unacceptable.

[23] For further information on the flood zones please see the Environment Agency's website www.environment-agency.gov.uk
[24] http://www.environment-agency.gov.uk/research/planning/114303.aspx

uses alongside the railway and on industrial estates in Cambridge. Over the last ten years, and beyond, Cambridge has seen a loss of land and premises in industrial use as higher value uses, such as residential and retail, have put pressure on sites. The offices and industrial uses make up an important part of the economy; they meet the needs of people and businesses in the local area, in particular the business services that high technology firms rely on, as well as helping to provide a diverse range of jobs. The low technology businesses operate in a more local marketplace and their competitors are more likely to be in other businesses operating in the Cambridge area, and in some cases other businesses around the UK.

Policy 40: Development and expansion of business space

New offices, research and development and research facilities are encouraged to come forward within the following locations:

a. in the City Centre and the Eastern Gateway, providing they are of an appropriate scale and are part of mixed-use schemes with active frontage uses where practicable at ground floor level;
b. in the areas around the two stations (defined and subject to policies in Section Three); and
c. research and research and development facilities will be supported in the Cambridge Biomedical Campus and Addenbrooke's, and at the West Cambridge site, provided they satisfy relevant policies in Section Three of the plan.

Proposals for the development of these uses elsewhere in the city will be considered on their merits and alongside the policies in Section Three of the plan.

Development of larger employment sites, with multiple occupiers, should consider whether they want to provide shared social spaces within the site, to enhance the vitality and attractiveness of the site.

Supporting text:

5.6 The Council will support the forecast growth of 22,100 net additional jobs in Cambridge by 2031, including a net gain of some 8,800 jobs in the 'B' use classes (offices and industry). Growth of jobs in other use classes (including retail, health and education) is more difficult to quantify. Land requirements for and plans for other employment-generating development are considered elsewhere in the plan. Growth on this scale would generate a net demand for just around 70,200 sq m of additional floorspace or 7.4 hectares of land, as shown in Table 5.1, below. Planning for this employment space will ensure the local plan will support the continued development of a strong local

Policy 43: University faculty development

The development or redevelopment of faculty, research and administrative sites for the University of Cambridge and Anglia Ruskin University (including teaching hospital facilities) will be supported when it meets the principles set out in this policy and other planning policies.

Faculty development in the City Centre

In the City Centre, these uses will be permitted provided they:

a. optimise the use of land, including a mix of uses on larger sites to meet the needs of the relevant institution, and
b. take reasonable opportunities to improve circulation for pedestrians and cyclists, together with public realm improvements, reductions in car parking provision and the introduction of active frontages at ground floor level.

The following sites are allocated for these uses and shown on the policies map:

c. mixed-use redevelopment of the Mill Lane/Old Press site (Policy 25); and
d. mixed-use redevelopment of the New Museums site (Site U2).

In addition, development of sites in the Eastern Gateway or near East Road should consider including a significant element of faculty development.

Faculty development outside the City Centre

Beyond the City Centre, the following sites will provide opportunity for enhanced faculty and research facilities:

e. the development of medical teaching facilities and related university research institutes at Cambridge Biomedical Campus (see Policy 16); and
f. the continued development of the West Cambridge site at Madingley Road (see Policy 18).

Other proposals for these uses will be treated on their merits, although there will be a presumption against proposals if they result in a shortage of land for other uses as identified in this plan.

Supporting text:

5.21 Cambridge is a university city, home to both the University of Cambridge and Anglia Ruskin University.

5.22 The University of Cambridge continues to be a world leader in higher education and research. The University of Cambridge is consistently ranked in the top three research universities globally, based on the two internationally recognised measures. It is a vital driver of the Cambridge economy and is the reason why so many high technology and knowledge-based employers decide to locate in the city. It contributes to and is dependent upon the quality of life in the city and City Centre. The University of Cambridge's esteemed reputation has underpinned the Cambridge Phenomenon and much of the city's prosperity in recent years. The University of Cambridge and its colleges are also significant employers in their own right, providing over 12,000 jobs. Their reputation and heritage continues to attract students from across the world, tourists, language students, spin-off enterprise and medical research, and it continues to be a vital driver of the local and national economy.

5.23 The University of Cambridge has an overall estate comprising around 650,000 sq m on 247 hectares, distributed across a number of key locations in the City Centre and West Cambridge. West and North West Cambridge have been the focus of the University of Cambridge's growth and relocations in the past 14 years. Remaining development there will focus on further academic development and commercial research and development. Cambridge Biomedical Campus now has outline consent. The only other key locations where significant change is still planned are the Old Press/Mill Lane area and the New Museums site.

5.24 The University of Cambridge has plans to grow undergraduate numbers by 0.5 per cent a year and postgraduates by 2 per cent a year in order to maintain its globally successful institution. The University of Cambridge's key growth needs are being met by the developments in West and North West Cambridge and around Addenbrooke's, including those satellite centres where the plan is seeking densification and a broader mix of uses. The development of the University of Cambridge's North West Cambridge site is assessed in accordance with the North West Cambridge AAP. The policy acknowledges existing plans of the University of Cambridge on sites outside the City Centre and also provides an opportunity for redevelopment of sites in the City Centre where plans are evolving. The University of Cambridge has other, less advanced, plans for development of faculty uses, for example at Madingley Rise. These will be considered on their merits, and against other relevant policies in the plan – for instance, at Madingley Rise much of the open space is protected.

5.25 Anglia Ruskin University has made significant progress on the East Road site in modernising the faculty accommodation within the framework of the agreed 2009 masterplan. A planning application was subsequently approved and this work is now largely complete and provides around 9,000 sq m of new accommodation.

5.26 When the masterplan was written in 2008, Anglia Ruskin University needed around 12,000 sq m. The campus on East Road remains one of the tightest in the sector. However, implementation of the masterplan has left a shortfall in teaching space. The most recent Anglia Ruskin University estate strategy and corporate plan 2012-2014 has identified a need for at least 6,000 sq m of additional space. As well as catering for growth in student numbers, there is also a need to enhance existing space and recently redeveloped space, e.g. for laboratories, which are not meeting current requirements, and to reconsider the future of Anglia Ruskin University's library on the site. This will require the masterplan for Anglia Ruskin University to be revisited.

5.27 The East Road site and area remain the most sustainable location for Anglia Ruskin University during the next plan period, and any future needs for this institution should, in the first instance, be met close to this site. Therefore, any development proposals that come forward in these areas should consider whether faculty development is an appropriate use.

Policy 44: Specialist colleges and language Schools

The development of existing and new specialist schools will not be permitted unless they provide residential accommodation, social and amenity facilities for all non-local students (students arriving to study from outside Cambridge and the Cambridge sub-region), with controls in place to ensure that the provision of accommodation is in step with the expansion of student places.

Supporting text:

5.28 There are a growing number of specialist schools in Cambridge, including secretarial and tutorial colleges, pre-university foundation courses and crammer schools. These schools concentrate on GCSE and A level qualifications and pre-university foundation courses. They attract a large number of students and contribute significantly to the local economy.

5.29 Cambridge is also an important centre for the study of English as a foreign language. For more than 50 years, overseas students have been coming to Cambridge to study English in language schools (another form of specialist college). The city has 22 permanent foreign language schools and a fluctuating number of around 30 temporary schools, which set up in temporary premises over the summer months. Currently, the annual student load at these centres is thought to be around 31,000, although the average stay is only five weeks.

5.30 The industry has matured in recent years and more and more courses are being run throughout the year and are being focused at a much broader range of students, including people working in business as well as the more traditional younger students.

Table 5.2 Key employment sites in Cambridge

Site	Employment use	Net floorspace (sq m)	Net land (hectares)
Station Areas West	Offices	34,096	5.97
West Cambridge (NB: increased land and floorspace to be determined through development management)	Research and development	19,896	3.03
Cambridge Biomedical Campus and Addenbrooke's	Offices and research and development	151,333	16.43
North West Cambridge	Research and development	6,883	0.87
Fulbourn Road (GB3 and GB4)	Offices and research and development	25,193	3.7
Cambridge Northern Fringe East	Offices and research and development	To be determined through an area action plan	To be determined through an area action plan

5.9 There are six key employment sites in Cambridge that will deliver new jobs and prosperity to the Cambridge area. Developments on these sites will help grow the Cambridge Cluster, by ensuring there is sufficient employment land available in the right locations. Most of these new allocations are for new office or research and development land, as indicated by the forecasts. Many of these sites are highly specialised and their occupancy is restricted; for example, Addenbrooke's has a strong clinical, health and biomedical focus, while West Cambridge has an academic and physical science focus. The specialised nature of these sites means that their build out may be slow as the site managers have particular objectives when seeking to find occupants.

Table 5.3 Employment land supply at March 2012

Employment land provision 2011 to 2031	Net land (hectares)	Net floorspace (sq m)
Employment land developed between April 2011 and March 2012	-7.31	2,812
Employment land allocated or with planning permission at March 2012	19.32	218,955
Total employment land built, allocated or with planning permission 2011 to 2031	12.01	221,767

Appendix L — Micro Drainage Simulation Results
- 1 in 30 Pipe Simulations
- 1 in 100 (+40%) Storage Simulations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes SW PIPES Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	Add Flow / Climate Change (%)	40
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.450	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	100	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

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
S1.000	17.966	0.125	143.7	0.890	8.00	0.0	0.600	o	525	
S1.001	79.485	0.265	299.9	0.865	0.00	0.0	0.600	o	600	
S2.000	104.530	1.000	104.5	0.952	8.00	0.0	0.600	o	675	
S2.001	35.691	0.215	166.0	0.975	0.00	0.0	0.600	o	750	
S2.002	79.737	0.320	249.2	0.204	0.00	0.0	0.600	o	750	
S1.002	61.629	0.185	333.1	0.446	0.00	0.0	0.600	o	800	
S1.003	51.618	0.230	224.4	0.000	0.00	0.0	0.600	o	800	
S1.004	13.469	0.068	198.1	0.000	0.00	0.0	0.600	o	800	
S1.005	12.368	0.062	199.5	0.000	0.00	0.0	0.600	o	800	

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)
S1.000	100.00	8.16	17.400	0.890	0.0	0.0	96.4	1.87	404.0	337.4
S1.001	100.00	9.11	17.200	1.755	0.0	0.0	190.1	1.40	396.1«	665.4
S2.000	100.00	8.68	18.395	0.952	0.0	0.0	103.1	2.56	917.3	361.0
S2.001	100.00	8.95	17.320	1.927	0.0	0.0	208.8	2.17	958.4	730.6
S2.002	100.00	9.71	17.105	2.131	0.0	0.0	230.9	1.77	781.2«	808.0
S1.002	100.00	10.35	16.735	4.332	0.0	0.0	469.3	1.59	799.4«	1642.5
S1.003	100.00	10.79	16.550	4.332	0.0	0.0	469.3	1.94	975.3«	1642.5
S1.004	100.00	10.90	16.320	4.332	0.0	0.0	469.3	2.07	1038.6«	1642.5
S1.005	100.00	11.00	16.252	4.332	0.0	0.0	469.3	2.06	1034.9«	1642.5

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
S3.000	25.768	0.170	151.6	0.286	8.00	0.0	0.600	o	300	
S3.001	22.011	0.110	200.1	0.162	0.00	0.0	0.600	o	300	
S1.006	66.006	0.290	227.6	0.000	0.00	0.0	0.600	o	800	
S1.007	18.446	0.070	263.5	0.000	0.00	0.0	0.600	o	800	
S1.008	130.205	0.500	260.4	0.000	0.00	0.0	0.600	o	800	
S1.009	13.328	0.040	333.2	0.000	0.00	0.0	0.600	o	875	
S1.010	136.349	0.990	137.7	0.000	0.00	0.0	0.600	o	1000	
S4.000	129.886	0.795	163.4	1.173	8.00	0.0	0.600	o	525	
S5.000	69.831	0.520	134.3	1.085	8.00	0.0	0.600	o	600	
S4.001	43.224	0.198	218.3	0.077	0.00	0.0	0.600	o	600	
S4.002	6.272	0.132	47.5	0.405	0.00	0.0	0.600	o	600	
S4.003	44.802	1.990	22.5	0.000	0.00	0.0	0.600	o	600	
S6.000	99.776	0.500	199.6	0.246	8.00	0.0	0.600	o	300	
S7.000	51.619	0.258	200.1	0.398	8.00	0.0	0.600	o	375	
S7.001	64.724	0.324	199.8	0.000	0.00	0.0	0.600	o	375	

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)
S3.000	100.00	8.34	16.970	0.286	0.0	0.0	31.0	1.27	90.1«	108.4
S3.001	100.00	8.67	16.800	0.448	0.0	0.0	48.5	1.11	78.3«	169.9
S1.006	100.00	11.57	16.190	4.780	0.0	0.0	517.8	1.93	968.4«	1812.4
S1.007	100.00	11.75	15.900	4.780	0.0	0.0	517.8	1.79	899.6«	1812.4
S1.008	100.00	12.95	15.830	4.780	0.0	0.0	517.8	1.80	905.0«	1812.4
S1.009	100.00	13.08	15.255	4.780	0.0	0.0	517.8	1.68	1011.0«	1812.4
S1.010	100.00	13.88	15.215	4.780	0.0	0.0	517.8	2.85	2236.7	1812.4
S4.000	100.00	9.24	18.750	1.173	0.0	0.0	127.1	1.75	378.8«	444.7
S5.000	100.00	8.55	18.400	1.085	0.0	0.0	117.5	2.10	593.7	411.4
S4.001	100.00	9.68	17.880	2.335	0.0	0.0	253.0	1.64	464.9«	885.3
S4.002	100.00	9.70	17.682	2.740	0.0	0.0	296.8	3.54	1000.6«	1038.9
S4.003	100.00	9.85	17.550	2.740	0.0	0.0	296.8	5.15	1455.3	1038.9
S6.000	100.00	9.50	18.719	0.246	0.0	0.0	26.6	1.11	78.4«	93.3
S7.000	100.00	8.67	19.100	0.398	0.0	0.0	43.1	1.28	141.1«	150.9
S7.001	100.00	9.52	18.842	0.398	0.0	0.0	43.1	1.28	141.2«	150.9

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
S7.002	43.463	0.217	200.3	0.000	0.00	0.0	0.600	o	375	
S7.003	28.540	0.157	181.8	0.000	0.00	0.0	0.600	o	375	
S6.001	80.238	0.300	267.5	0.000	0.00	0.0	0.600	o	600	
S6.002	3.433	0.179	19.2	0.000	0.00	0.0	0.600	o	600	
S6.003	61.378	0.780	78.7	1.316	0.00	0.0	0.600	o	680	
S6.004	6.371	0.020	318.6	0.000	0.00	0.0	0.600	o	680	
S6.005	40.521	0.110	368.4	0.000	0.00	0.0	0.600	o	750	
S8.000	55.053	0.300	183.5	0.161	8.00	0.0	0.600	o	450	
S8.001	100.444	0.300	334.8	0.504	0.00	0.0	0.600	o	450	
S8.002	7.271	0.120	60.6	0.000	0.00	0.0	0.600	o	450	
S6.006	49.044	1.040	47.2	0.000	0.00	0.0	0.600	o	750	
S4.004	73.185	0.290	252.4	0.280	0.00	0.0	0.600	[]	1	
S4.005	126.298	0.400	315.7	0.000	0.00	0.0	0.600	o	1000	
S9.000	63.403	0.238	266.4	0.075	8.00	0.0	0.600	o	375	
S9.001	6.518	0.022	296.3	0.000	0.00	0.0	0.600	o	375	
S9.002	62.164	0.185	336.0	0.784	0.00	0.0	0.600	o	450	
S9.003	68.571	0.230	298.1	0.353	0.00	0.0	0.600	o	750	

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)
S7.002	100.00	10.08	18.518	0.398	0.0	0.0	43.1	1.28	141.0«	150.9
S7.003	100.00	10.44	18.301	0.398	0.0	0.0	43.1	1.34	148.1«	150.9
S6.001	100.00	11.34	17.919	0.644	0.0	0.0	69.8	1.48	419.7	244.2
S6.002	100.00	11.35	17.619	0.644	0.0	0.0	69.8	5.58	1577.0	244.2
S6.003	100.00	11.70	17.360	1.960	0.0	0.0	212.3	2.97	1078.6	743.1
S6.004	100.00	11.77	16.580	1.960	0.0	0.0	212.3	1.47	533.8«	743.1
S6.005	100.00	12.23	16.560	1.960	0.0	0.0	212.3	1.45	641.5«	743.1
S8.000	100.00	8.61	17.470	0.161	0.0	0.0	17.4	1.50	238.2	61.0
S8.001	100.00	10.13	17.170	0.665	0.0	0.0	72.0	1.11	175.8«	252.1
S8.002	100.00	10.17	16.870	0.665	0.0	0.0	72.0	2.62	416.0	252.1
S6.006	100.00	12.43	16.450	2.625	0.0	0.0	284.4	4.08	1803.1	995.3
S4.004	100.00	13.08	15.410	5.645	0.0	0.0	611.5	1.88	1292.6«	2140.3
S4.005	100.00	14.20	15.300	5.645	0.0	0.0	611.5	1.88	1473.8«	2140.3
S9.000	100.00	8.96	17.190	0.075	0.0	0.0	8.1	1.11	122.1	28.4
S9.001	100.00	9.06	16.952	0.075	0.0	0.0	8.1	1.05	115.7	28.4
S9.002	100.00	10.00	16.855	0.859	0.0	0.0	93.1	1.10	175.5«	325.7
S9.003	100.00	10.71	16.370	1.212	0.0	0.0	131.3	1.62	713.7	459.5

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
S10.000	86.241	0.287	300.5	1.118	8.00	0.0	0.600	o	450	
S10.001	23.031	0.085	271.0	0.000	0.00	0.0	0.600	o	450	
S9.004	40.000	0.130	307.7	0.244	0.00	0.0	0.600	o	750	
S9.005	81.776	0.495	165.2	0.000	0.00	0.0	0.600	o	750	
S9.006	65.659	0.265	247.8	0.000	0.00	0.0	0.600	oo	525	
S9.007	6.999	0.030	233.3	0.412	0.00	0.0	0.600	ooo	525	
S11.000	66.317	0.660	100.5	0.282	8.00	0.0	0.600	o	525	
S9.008	8.392	0.030	279.7	0.000	0.00	0.0	0.600	ooo	525	
S9.009	44.429	0.150	296.2	0.000	0.00	0.0	0.600	ooo	525	
S9.010	54.698	0.190	287.9	0.476	0.00	0.0	0.600	ooo	525	
S9.011	4.281	0.020	214.1	0.000	0.00	0.0	0.600	ooo	525	
S9.012	105.226	0.200	526.1	0.000	0.00	0.0	0.600	o	1000	
S12.000	77.655	0.311	249.7	1.969	8.00	0.0	0.600	o	750	
S12.001	104.843	0.200	524.2	0.000	0.00	0.0	0.600	o	1000	
S13.000	19.206	0.230	83.5	0.177	8.00	0.0	0.600	o	450	
S13.001	69.246	0.745	92.9	0.000	0.00	0.0	0.600	o	450	

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)
S10.000	100.00	9.23	16.812	1.118	0.0	0.0	121.1	1.17	185.7«	423.9
S10.001	100.00	9.54	16.525	1.118	0.0	0.0	121.1	1.23	195.7«	423.9
S9.004	100.00	11.13	16.140	2.574	0.0	0.0	278.8	1.59	702.5«	975.9
S9.005	100.00	11.75	16.010	2.574	0.0	0.0	278.8	2.17	960.7«	975.9
S9.006	100.00	12.52	15.740	2.574	0.0	0.0	278.8	1.42	614.1«	975.9
S9.007	100.00	12.60	15.520	2.986	0.0	0.0	323.5	1.46	949.5«	1132.2
S11.000	100.00	8.49	16.150	0.282	0.0	0.0	30.5	2.23	483.7	106.9
S9.008	100.00	12.71	15.490	3.268	0.0	0.0	354.0	1.33	866.5«	1239.1
S9.009	100.00	13.28	15.460	3.268	0.0	0.0	354.0	1.30	841.8«	1239.1
S9.010	100.00	13.97	15.310	3.744	0.0	0.0	405.6	1.32	854.0«	1419.6
S9.011	100.00	14.02	15.120	3.744	0.0	0.0	405.6	1.53	991.7«	1419.6
S9.012	100.00	15.23	15.100	3.744	0.0	0.0	405.6	1.45	1139.5«	1419.6
S12.000	100.00	8.73	15.200	1.969	0.0	0.0	213.3	1.77	780.4	746.6
S12.001	100.00	9.93	15.100	1.969	0.0	0.0	213.3	1.45	1141.6	746.6
S13.000	100.00	8.14	17.010	0.177	0.0	0.0	19.2	2.23	354.1	67.1
S13.001	100.00	8.69	16.780	0.177	0.0	0.0	19.2	2.11	335.5	67.1

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
S13.002	97.217	0.570	170.6	1.098	0.00	0.0	0.600	o	525	
S13.003	24.661	0.090	274.0	0.000	0.00	0.0	0.600	o	525	
S13.004	204.153	0.400	510.4	0.000	0.00	0.0	0.600	o	1000	
S14.000	25.044	0.039	642.1	0.697	8.00	0.0	0.600	o	525	
S14.001	146.187	0.426	343.2	1.313	0.00	0.0	0.600	o	1000	
S1.011	219.264	0.360	609.1	0.370	0.00	0.0	0.600	o	1000	
S15.000	72.359	0.449	161.2	1.079	8.00	0.0	0.600	o	450	
S16.000	56.376	0.606	93.0	0.232	8.00	0.0	0.600	o	300	
S15.001	7.451	0.075	99.3	0.000	0.00	0.0	0.600	o	525	
S1.012	231.624	0.390	593.9	0.658	0.00	0.0	0.600	o	1000	
S1.013	18.790	0.303	62.0	0.000	0.00	0.0	0.600	o	450	
S1.014	107.105	0.515	208.0	0.000	0.00	0.0	0.600	o	450	
S17.000	104.533	0.500	209.1	1.280	8.00	0.0	0.600	o	525	
S17.001	76.774	0.450	170.6	0.081	0.00	0.0	0.600	o	525	
S17.002	37.514	0.200	187.6	0.729	0.00	0.0	0.600	o	600	

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)
S13.002	100.00	9.64	15.960	1.275	0.0	0.0	138.1	1.71	370.7«	483.4
S13.003	100.00	9.94	15.390	1.275	0.0	0.0	138.1	1.35	291.9«	483.4
S13.004	100.00	12.25	15.300	1.275	0.0	0.0	138.1	1.47	1157.1	483.4
S14.000	100.00	8.48	15.370	0.697	0.0	0.0	75.5	0.88	189.7«	264.3
S14.001	100.00	9.83	15.330	2.010	0.0	0.0	217.7	1.80	1413.3	762.1
S1.011	92.31	17.94	13.300	19.793	0.0	0.0	1979.3	1.35	1058.4«	6927.4
S15.000	100.00	8.75	13.524	1.079	0.0	0.0	116.9	1.60	254.3«	409.1
S16.000	100.00	8.58	13.831	0.232	0.0	0.0	25.1	1.63	115.3	88.0
S15.001	100.00	8.81	13.000	1.311	0.0	0.0	142.0	2.25	486.5«	497.1
S1.012	84.23	20.77	12.940	21.762	0.0	0.0	1985.8	1.36	1071.9«	6950.3
S1.013	83.92	20.89	12.800	21.762	0.0	0.0	1985.8	2.59	411.2«	6950.3
S1.014	80.82	22.16	12.497	21.762	0.0	0.0	1985.8	1.41	223.6«	6950.3
S17.000	100.00	9.13	13.000	1.280	0.0	0.0	138.7	1.55	334.5«	485.3
S17.001	100.00	9.87	12.500	1.361	0.0	0.0	147.4	1.71	370.6«	516.0
S17.002	100.00	10.23	11.975	2.090	0.0	0.0	226.4	1.77	501.8«	792.4

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
S17.003	30.729	0.050	614.6	0.000	0.00	0.0	0.600	o	1000	
S17.004	4.539	0.020	226.9	0.000	0.00	0.0	0.600	o	300	
S1.015	14.656	0.142	103.2	0.000	0.00	0.0	0.600	o	600	
S1.016	8.662	0.040	216.5	0.000	0.00	0.0	0.600	o	600	
S1.017	12.722	0.040	318.1	0.000	0.00	0.0	0.600	o	1000	
S18.000	117.749	0.736	160.0	0.000	8.00	20.0	0.600	o	225	
S18.001	111.766	0.699	159.9	0.000	0.00	15.0	0.600	o	225	
S18.002	26.453	0.150	176.4	0.000	0.00	10.0	0.600	o	300	
S18.003	64.485	0.370	174.3	0.000	0.00	0.0	0.600	o	300	
S18.004	59.956	0.340	176.3	0.000	0.00	5.0	0.600	o	300	
S18.005	52.143	0.300	173.8	0.000	0.00	5.0	0.600	o	300	
S18.006	24.212	0.140	172.9	0.000	0.00	0.0	0.600	o	300	
S19.000	42.461	0.456	93.1	0.000	8.00	10.0	0.600	o	150	
S19.001	29.038	0.312	93.1	0.000	0.00	0.0	0.600	o	150	
S19.002	7.458	0.080	93.2	0.000	0.00	0.0	0.600	o	150	
S19.003	34.547	0.350	98.7	0.000	0.00	15.0	0.600	o	225	
S19.004	88.659	0.800	110.8	0.000	0.00	0.0	0.600	o	225	
S19.005	6.492	0.045	144.3	0.000	0.00	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)
S17.003	100.00	10.61	11.850	2.090	0.0	0.0	226.4	1.34	1053.6	792.4
S17.004	100.00	10.68	11.800	2.090	0.0	0.0	226.4	1.04	73.5«	792.4
S1.015	80.58	22.26	11.832	23.852	0.0	0.0	2082.1	2.40	677.7«	7287.2
S1.016	80.38	22.35	11.690	23.852	0.0	0.0	2082.1	1.65	466.8«	7287.2
S1.017	80.11	22.46	11.650	23.852	0.0	0.0	2082.1	1.87	1468.4«	7287.2
S18.000	100.00	9.90	18.140	0.000	20.0	0.0	8.0	1.03	41.0	28.0
S18.001	100.00	11.71	17.404	0.000	35.0	0.0	14.0	1.03	41.0«	49.0
S18.002	100.00	12.08	16.630	0.000	45.0	0.0	18.0	1.18	83.5	63.0
S18.003	100.00	12.99	16.480	0.000	45.0	0.0	18.0	1.19	84.0	63.0
S18.004	100.00	13.83	16.110	0.000	50.0	0.0	20.0	1.18	83.5	70.0
S18.005	100.00	14.56	15.770	0.000	55.0	0.0	22.0	1.19	84.1	77.0
S18.006	100.00	14.90	15.470	0.000	55.0	0.0	22.0	1.19	84.3	77.0
S19.000	100.00	8.68	17.523	0.000	10.0	0.0	4.0	1.04	18.4	14.0
S19.001	100.00	9.14	17.067	0.000	10.0	0.0	4.0	1.04	18.4	14.0
S19.002	100.00	9.26	16.755	0.000	10.0	0.0	4.0	1.04	18.4	14.0
S19.003	100.00	9.70	16.600	0.000	25.0	0.0	10.0	1.32	52.3	35.0
S19.004	100.00	10.89	16.250	0.000	25.0	0.0	10.0	1.24	49.4	35.0
S19.005	100.00	10.99	15.450	0.000	25.0	0.0	10.0	1.09	43.2	35.0

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
S18.007	128.495	0.740	173.6	0.000	0.00	0.0	0.600	o	300	
S20.000	85.961	0.530	162.2	0.000	8.00	5.0	0.600	o	225	
S20.001	74.193	0.370	200.5	0.000	0.00	0.0	0.600	o	225	
S20.002	11.170	1.655	6.7	0.000	0.00	0.0	0.600	o	225	
S18.008	105.664	0.610	173.2	0.000	0.00	15.0	0.600	o	300	
S18.009	48.123	0.280	171.9	0.000	0.00	5.0	0.600	o	300	
S18.010	38.176	0.220	173.5	0.000	0.00	5.0	0.600	o	300	
S18.011	67.097	0.305	220.0	0.000	0.00	5.0	0.600	o	300	
S18.012	169.773	0.850	199.7	0.000	0.00	10.0	0.600	o	375	
S21.000	99.686	0.670	148.8	0.000	8.00	10.0	0.600	o	225	
S21.001	7.183	0.050	143.7	0.000	0.00	5.0	0.600	o	225	
S21.002	41.289	0.280	147.5	0.000	0.00	0.0	0.600	o	225	
S21.003	51.231	0.340	150.7	0.000	0.00	0.0	0.600	o	225	
S22.000	96.242	0.650	148.1	0.000	8.00	15.0	0.600	o	225	
S22.001	114.435	0.770	148.6	0.000	0.00	10.0	0.600	o	225	
S21.004	72.684	0.490	148.3	0.000	0.00	10.0	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)
S18.007	96.43	16.70	15.330	0.000	80.0	0.0	32.0	1.19	84.1«	112.0
S20.000	100.00	9.40	17.220	0.000	5.0	0.0	2.0	1.02	40.7	7.0
S20.001	100.00	10.74	16.690	0.000	5.0	0.0	2.0	0.92	36.6	7.0
S20.002	100.00	10.78	16.320	0.000	5.0	0.0	2.0	5.07	201.6	7.0
S18.008	91.56	18.18	14.590	0.000	100.0	0.0	40.0	1.19	84.2«	140.0
S18.009	89.52	18.85	13.980	0.000	105.0	0.0	42.0	1.20	84.6«	147.0
S18.010	87.98	19.38	13.700	0.000	110.0	0.0	44.0	1.19	84.2«	154.0
S18.011	85.08	20.44	13.480	0.000	115.0	0.0	46.0	1.06	74.6«	161.0
S18.012	79.67	22.66	13.100	0.000	125.0	0.0	50.0	1.28	141.2«	175.0
S21.000	100.00	9.55	14.750	0.000	10.0	0.0	4.0	1.07	42.5	14.0
S21.001	100.00	9.66	14.080	0.000	15.0	0.0	6.0	1.09	43.3	21.0
S21.002	100.00	10.30	14.030	0.000	15.0	0.0	6.0	1.07	42.7	21.0
S21.003	100.00	11.11	13.750	0.000	15.0	0.0	6.0	1.06	42.3	21.0
S22.000	100.00	9.50	14.830	0.000	15.0	0.0	6.0	1.07	42.6	21.0
S22.001	100.00	11.28	14.180	0.000	25.0	0.0	10.0	1.07	42.6	35.0
S21.004	100.00	12.22	13.335	0.000	50.0	0.0	20.0	1.29	91.1	70.0

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
S23.000	101.423	2.480	40.9	0.000	8.00	0.0	0.600	o	225	
S23.001	154.404	0.430	359.1	0.000	0.00	0.0	0.600	o	375	
S23.002	4.870	0.020	243.5	0.000	0.00	0.0	0.600	o	375	
S21.005	134.423	0.520	258.5	0.000	0.00	0.0	0.600	o	375	
S18.013	63.087	0.250	252.3	0.000	0.00	0.0	0.600	o	375	
S18.014	5.657	0.340	16.6	0.000	0.00	0.0	0.600	o	375	
S1.018	17.396	0.019	915.6	0.000	0.00	0.0	0.600	o	1000	

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)
S23.000	100.00	8.82	15.850	0.000	0.0	0.0	0.0	2.05	81.6	0.0
S23.001	100.00	11.53	13.220	0.000	0.0	0.0	0.0	0.95	105.0	0.0
S23.002	100.00	11.60	12.790	0.000	0.0	0.0	0.0	1.16	127.8	0.0
S21.005	100.00	14.21	12.770	0.000	50.0	0.0	20.0	1.12	123.9	70.0
S18.013	77.63	23.58	12.250	0.000	175.0	0.0	70.0	1.14	125.5«	245.0
S18.014	77.58	23.60	12.000	0.000	175.0	0.0	70.0	4.46	492.7	245.0
S1.018	77.02	23.87	11.620	23.852	175.0	0.0	2082.1	1.10	861.5«	7287.2

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	D2 (1km)	0.258	Winter Storms	No
Return Period (years)	30	D3 (1km)	0.297	Cv (Summer)	0.750
Site Location		E (1km)	0.318	Cv (Winter)	0.840
C (1km)	-0.026	F (1km)	2.445	Storm Duration (mins)	30
D1 (1km)	0.314	Summer Storms	Yes		

Summary of Results for 30 minute 30 year Summer (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S1.000	S1	18.729	0.804	0.000	0.88		239.4	SURCHARGED
S1.001	S2	18.659	0.859	0.000	1.25		454.1	SURCHARGED
S2.000	S3	18.656	-0.414	0.000	0.31		266.7	OK
S2.001	S4	18.531	0.461	0.000	0.64		466.6	SURCHARGED
S2.002	S5	18.470	0.615	0.000	0.69		479.4	SURCHARGED
S1.002	S6	18.354	0.819	0.000	1.42		977.6	SURCHARGED
S1.003	S7	18.076	0.726	0.000	1.11		909.7	SURCHARGED
S1.004	S8	17.830	0.710	0.000	1.42		908.8	SURCHARGED
S1.005	S9	17.604	0.552	0.000	1.45		901.4	SURCHARGED
S3.000	S10	17.634	0.364	0.000	1.02		82.6	SURCHARGED
S3.001	S11	17.525	0.425	0.000	1.84		126.8	SURCHARGED
S1.006	S12	17.376	0.386	0.000	1.14		958.1	SURCHARGED
S1.007	S13	17.029	0.329	0.000	1.55		946.1	SURCHARGED
S1.008	S14	16.758	0.128	0.000	1.08		906.4	SURCHARGED
S1.009	S15	16.160	0.030	0.000	1.56		891.5	FLOOD RISK
S1.010	S16	15.677	-0.538	0.000	0.44		889.5	OK
S4.000	S17	19.473	0.198	0.000	0.84		302.2	SURCHARGED
S5.000	S18	19.059	0.059	0.000	0.52		278.1	SURCHARGED
S4.001	S19	18.926	0.446	0.000	1.44		576.7	SURCHARGED
S4.002	S20	18.517	0.235	0.000	1.71		622.6	SURCHARGED
S4.003	S21	17.850	-0.300	0.000	0.50		622.7	OK
S6.000	S22	18.944	-0.075	0.000	0.91		69.5	OK
S7.000	S23	19.369	-0.106	0.000	0.85		111.5	OK
S7.001	S24	19.105	-0.112	0.000	0.82		109.2	OK
S7.002	S25	18.783	-0.110	0.000	0.84		107.8	OK
S7.003	S26	18.562	-0.114	0.000	0.82		107.3	OK
S6.001	S27	18.198	-0.321	0.000	0.44		168.6	OK
S6.002	S28	17.881	-0.338	0.000	0.40		168.1	OK
S6.003	S29	17.708	-0.332	0.000	0.51		483.5	OK
S6.004	S30	17.290	0.030	0.000	1.79		474.6	SURCHARGED
S6.005	S31	17.117	-0.193	0.000	0.90		473.8	OK
S8.000	S32	17.666	-0.254	0.000	0.20		44.6	OK
S8.001	S33	17.638	0.018	0.000	1.02		170.3	SURCHARGED
S8.002	S34	17.193	-0.127	0.000	0.86		168.6	OK
S6.006	S35	16.789	-0.411	0.000	0.42		637.9	OK
S4.004	S36	16.448	0.438	0.000	1.13		1277.1	SURCHARGED
S4.005	S37	16.077	-0.223	0.000	0.96		1275.7	OK
S9.000	S38	17.497	-0.068	0.000	0.18		20.9	OK
S9.001	S39	17.478	0.151	0.000	0.55		42.2	SURCHARGED
S9.002	S40	17.473	0.168	0.000	1.37		222.4	SURCHARGED
S9.003	S41	16.894	-0.226	0.000	0.48		299.0	OK
S10.000	S42	18.004	0.742	0.000	1.69		296.0	SURCHARGED
S10.001	S43	17.152	0.177	0.000	1.82		294.8	SURCHARGED
S9.004	S44	16.852	-0.038	0.000	1.00		573.4	OK
S9.005	S45	16.531	-0.229	0.000	0.66		569.2	OK

Summary of Results for 30 minute 30 year Summer (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S9.006	S46	16.318	0.053	0.000	1.01		564.5	SURCHARGED
S9.007	S47	16.048	0.003	0.000	1.04		587.4	SURCHARGED
S11.000	S48	16.300	-0.375	0.000	0.18		79.2	OK
S9.008	S49	16.015	0.000	0.000	1.15		626.0	OK
S9.009	S50	15.944	-0.041	0.000	0.84		619.8	OK
S9.010	S51	15.842	0.007	0.000	0.83		639.4	SURCHARGED
S9.011	S52	15.711	0.066	0.000	1.29		638.3	SURCHARGED
S9.012	S53	15.677	-0.423	0.000	0.63		638.5	OK
S12.000	S54	15.802	-0.148	0.000	0.76		532.0	OK
S12.001	S55	15.614	-0.486	0.000	0.52		531.0	OK
S13.000	S56	17.140	-0.320	0.000	0.19		50.0	OK
S13.001	S57	16.900	-0.330	0.000	0.16		49.8	OK
S13.002	S58	16.560	0.075	0.000	0.98		343.0	SURCHARGED
S13.003	S59	15.996	0.081	0.000	1.44		339.8	SURCHARGED
S13.004	S60	15.683	-0.617	0.000	0.31		339.0	OK
S14.000	S61	15.895	0.000	0.000	1.43		195.5	OK
S14.001	S62	15.799	-0.531	0.000	0.45		575.7	OK
S1.011	S63	14.790	0.490	0.000	0.05		53.0	SURCHARGED
S15.000	S64	14.371	0.397	0.000	1.23		292.7	SURCHARGED
S16.000	S65	13.999	-0.132	0.000	0.60		65.1	OK
S15.001	S66	13.708	0.183	0.000	1.38		343.4	SURCHARGED
S1.012	S67	13.536	-0.404	0.000	0.42		422.1	OK
S1.013	S68	13.528	0.278	0.000	0.18		54.6	SURCHARGED
S1.014	S69	12.651	-0.296	0.000	0.26		54.6	OK
S17.000	S70	13.659	0.134	0.000	1.08		339.7	SURCHARGED
S17.001	S71	13.108	0.083	0.000	0.98		336.3	SURCHARGED
S17.002	S72	12.681	0.106	0.000	1.12		475.5	SURCHARGED
S17.003	S73	12.425	-0.425	0.000	0.63		475.6	OK
S17.004	S74	12.017	-0.083	0.000	0.01		0.3	OK
S1.015	S75	12.163	-0.269	0.000	0.13		49.3	OK
S1.016	S76	12.155	-0.135	0.000	0.18		49.3	OK
S1.017	S77	12.149	-0.501	0.000	0.06		49.2	OK
S18.000	S78	18.252	-0.113	0.000	0.50		20.0	OK
S18.001	S79	17.566	-0.063	0.000	0.87		35.0	OK
S18.002	S80	16.922	-0.008	0.000	0.60		45.0	OK
S18.003	S81	16.871	0.091	0.000	0.56		45.0	SURCHARGED
S18.004	S82	16.767	0.357	0.000	0.63		50.0	SURCHARGED
S18.005	S83	16.646	0.576	0.000	0.69		54.9	SURCHARGED
S18.006	S84	16.517	0.747	0.000	0.71		53.6	SURCHARGED
S19.000	S85	17.603	-0.070	0.000	0.56		10.0	OK
S19.001	S86	17.148	-0.069	0.000	0.57		10.0	OK
S19.002	S87	16.845	-0.060	0.000	0.63		10.0	OK
S19.003	S88	16.758	-0.067	0.000	0.51		25.0	OK
S19.004	S89	16.671	0.196	0.000	0.52		25.0	SURCHARGED
S19.005	S90	16.473	0.798	0.000	0.84		25.0	SURCHARGED
S18.007	S91	16.451	0.821	0.000	0.91		74.8	SURCHARGED
S20.000	S92	17.273	-0.172	0.000	0.13		5.0	OK
S20.001	S93	16.746	-0.169	0.000	0.14		5.0	OK
S20.002	S94	16.346	-0.199	0.000	0.03		5.0	OK

Summary of Results for 30 minute 30 year Summer (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S18.008	S95	15.831	0.941	0.000	1.15		94.3	SURCHARGED
S18.009	S96	15.015	0.735	0.000	1.25		99.1	SURCHARGED
S18.010	S97	14.578	0.578	0.000	1.33		103.9	SURCHARGED
S18.011	S98	14.186	0.406	0.000	1.52		108.7	SURCHARGED
S18.012	S99	13.474	-0.001	0.000	0.85		117.3	OK
S21.000	S100	14.824	-0.151	0.000	0.24		10.0	OK
S21.001	S101	14.189	-0.116	0.000	0.48		15.0	OK
S21.002	S102	14.124	-0.131	0.000	0.37		15.0	OK
S21.003	S103	13.844	-0.131	0.000	0.37		15.0	OK
S22.000	S104	14.923	-0.132	0.000	0.36		15.0	OK
S22.001	S105	14.306	-0.099	0.000	0.60		25.0	OK
S21.004	S106	13.498	-0.137	0.000	0.57		50.0	OK
S23.000	S107	15.850	-0.225	0.000	0.00		0.0	OK
S23.001	S108	13.220	-0.375	0.000	0.00		0.0	OK
S23.002	S109	12.960	-0.205	0.000	0.00		0.0	OK
S21.005	S110	12.960	-0.185	0.000	0.42		50.0	OK
S18.013	S111	12.852	0.227	0.000	1.41		165.7	SURCHARGED
S18.014	S112	12.325	-0.050	0.000	0.72		165.3	OK
S1.018	S113	12.146	-0.474	0.000	0.62		214.4	OK

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes SW PIPES Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	Add Flow / Climate Change (%)	40
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.450	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	100	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

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
S1.000	17.966	0.125	143.7	0.890	8.00	0.0	0.600	o	525	
S1.001	79.485	0.265	299.9	0.865	0.00	0.0	0.600	o	600	
S2.000	104.530	1.000	104.5	0.952	8.00	0.0	0.600	o	675	
S2.001	35.691	0.215	166.0	0.975	0.00	0.0	0.600	o	750	
S2.002	79.737	0.320	249.2	0.204	0.00	0.0	0.600	o	750	
S1.002	61.629	0.185	333.1	0.446	0.00	0.0	0.600	o	800	
S1.003	51.618	0.230	224.4	0.000	0.00	0.0	0.600	o	800	
S1.004	13.469	0.068	198.1	0.000	0.00	0.0	0.600	o	800	
S1.005	12.368	0.062	199.5	0.000	0.00	0.0	0.600	o	800	

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)
S1.000	100.00	8.16	17.400	0.890	0.0	0.0	96.4	1.87	404.0	337.4
S1.001	100.00	9.11	17.200	1.755	0.0	0.0	190.1	1.40	396.1«	665.4
S2.000	100.00	8.68	18.395	0.952	0.0	0.0	103.1	2.56	917.3	361.0
S2.001	100.00	8.95	17.320	1.927	0.0	0.0	208.8	2.17	958.4	730.6
S2.002	100.00	9.71	17.105	2.131	0.0	0.0	230.9	1.77	781.2«	808.0
S1.002	100.00	10.35	16.735	4.332	0.0	0.0	469.3	1.59	799.4«	1642.5
S1.003	100.00	10.79	16.550	4.332	0.0	0.0	469.3	1.94	975.3«	1642.5
S1.004	100.00	10.90	16.320	4.332	0.0	0.0	469.3	2.07	1038.6«	1642.5
S1.005	100.00	11.00	16.252	4.332	0.0	0.0	469.3	2.06	1034.9«	1642.5

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
S3.000	25.768	0.170	151.6	0.286	8.00	0.0	0.600	o	300	
S3.001	22.011	0.110	200.1	0.162	0.00	0.0	0.600	o	300	
S1.006	66.006	0.290	227.6	0.000	0.00	0.0	0.600	o	800	
S1.007	18.446	0.070	263.5	0.000	0.00	0.0	0.600	o	800	
S1.008	130.205	0.500	260.4	0.000	0.00	0.0	0.600	o	800	
S1.009	13.328	0.040	333.2	0.000	0.00	0.0	0.600	o	875	
S1.010	136.349	0.990	137.7	0.000	0.00	0.0	0.600	o	1000	
S4.000	129.886	0.795	163.4	1.173	8.00	0.0	0.600	o	525	
S5.000	69.831	0.520	134.3	1.085	8.00	0.0	0.600	o	600	
S4.001	43.224	0.198	218.3	0.077	0.00	0.0	0.600	o	600	
S4.002	6.272	0.132	47.5	0.405	0.00	0.0	0.600	o	600	
S4.003	44.802	1.990	22.5	0.000	0.00	0.0	0.600	o	600	
S6.000	99.776	0.500	199.6	0.246	8.00	0.0	0.600	o	300	
S7.000	51.619	0.258	200.1	0.398	8.00	0.0	0.600	o	375	
S7.001	64.724	0.324	199.8	0.000	0.00	0.0	0.600	o	375	

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)
S3.000	100.00	8.34	16.970	0.286	0.0	0.0	31.0	1.27	90.1«	108.4
S3.001	100.00	8.67	16.800	0.448	0.0	0.0	48.5	1.11	78.3«	169.9
S1.006	100.00	11.57	16.190	4.780	0.0	0.0	517.8	1.93	968.4«	1812.4
S1.007	100.00	11.75	15.900	4.780	0.0	0.0	517.8	1.79	899.6«	1812.4
S1.008	100.00	12.95	15.830	4.780	0.0	0.0	517.8	1.80	905.0«	1812.4
S1.009	100.00	13.08	15.255	4.780	0.0	0.0	517.8	1.68	1011.0«	1812.4
S1.010	100.00	13.88	15.215	4.780	0.0	0.0	517.8	2.85	2236.7	1812.4
S4.000	100.00	9.24	18.750	1.173	0.0	0.0	127.1	1.75	378.8«	444.7
S5.000	100.00	8.55	18.400	1.085	0.0	0.0	117.5	2.10	593.7	411.4
S4.001	100.00	9.68	17.880	2.335	0.0	0.0	253.0	1.64	464.9«	885.3
S4.002	100.00	9.70	17.682	2.740	0.0	0.0	296.8	3.54	1000.6«	1038.9
S4.003	100.00	9.85	17.550	2.740	0.0	0.0	296.8	5.15	1455.3	1038.9
S6.000	100.00	9.50	18.719	0.246	0.0	0.0	26.6	1.11	78.4«	93.3
S7.000	100.00	8.67	19.100	0.398	0.0	0.0	43.1	1.28	141.1«	150.9
S7.001	100.00	9.52	18.842	0.398	0.0	0.0	43.1	1.28	141.2«	150.9

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
S7.002	43.463	0.217	200.3	0.000	0.00	0.0	0.600	o	375	
S7.003	28.540	0.157	181.8	0.000	0.00	0.0	0.600	o	375	
S6.001	80.238	0.300	267.5	0.000	0.00	0.0	0.600	o	600	
S6.002	3.433	0.179	19.2	0.000	0.00	0.0	0.600	o	600	
S6.003	61.378	0.780	78.7	1.316	0.00	0.0	0.600	o	680	
S6.004	6.371	0.020	318.6	0.000	0.00	0.0	0.600	o	680	
S6.005	40.521	0.110	368.4	0.000	0.00	0.0	0.600	o	750	
S8.000	55.053	0.300	183.5	0.161	8.00	0.0	0.600	o	450	
S8.001	100.444	0.300	334.8	0.504	0.00	0.0	0.600	o	450	
S8.002	7.271	0.120	60.6	0.000	0.00	0.0	0.600	o	450	
S6.006	49.044	1.040	47.2	0.000	0.00	0.0	0.600	o	750	
S4.004	73.185	0.290	252.4	0.280	0.00	0.0	0.600	[]	1	
S4.005	126.298	0.400	315.7	0.000	0.00	0.0	0.600	o	1000	
S9.000	63.403	0.238	266.4	0.075	8.00	0.0	0.600	o	375	
S9.001	6.518	0.022	296.3	0.000	0.00	0.0	0.600	o	375	
S9.002	62.164	0.185	336.0	0.784	0.00	0.0	0.600	o	450	
S9.003	68.571	0.230	298.1	0.353	0.00	0.0	0.600	o	750	

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)
S7.002	100.00	10.08	18.518	0.398	0.0	0.0	43.1	1.28	141.0«	150.9
S7.003	100.00	10.44	18.301	0.398	0.0	0.0	43.1	1.34	148.1«	150.9
S6.001	100.00	11.34	17.919	0.644	0.0	0.0	69.8	1.48	419.7	244.2
S6.002	100.00	11.35	17.619	0.644	0.0	0.0	69.8	5.58	1577.0	244.2
S6.003	100.00	11.70	17.360	1.960	0.0	0.0	212.3	2.97	1078.6	743.1
S6.004	100.00	11.77	16.580	1.960	0.0	0.0	212.3	1.47	533.8«	743.1
S6.005	100.00	12.23	16.560	1.960	0.0	0.0	212.3	1.45	641.5«	743.1
S8.000	100.00	8.61	17.470	0.161	0.0	0.0	17.4	1.50	238.2	61.0
S8.001	100.00	10.13	17.170	0.665	0.0	0.0	72.0	1.11	175.8«	252.1
S8.002	100.00	10.17	16.870	0.665	0.0	0.0	72.0	2.62	416.0	252.1
S6.006	100.00	12.43	16.450	2.625	0.0	0.0	284.4	4.08	1803.1	995.3
S4.004	100.00	13.08	15.410	5.645	0.0	0.0	611.5	1.88	1292.6«	2140.3
S4.005	100.00	14.20	15.300	5.645	0.0	0.0	611.5	1.88	1473.8«	2140.3
S9.000	100.00	8.96	17.190	0.075	0.0	0.0	8.1	1.11	122.1	28.4
S9.001	100.00	9.06	16.952	0.075	0.0	0.0	8.1	1.05	115.7	28.4
S9.002	100.00	10.00	16.855	0.859	0.0	0.0	93.1	1.10	175.5«	325.7
S9.003	100.00	10.71	16.370	1.212	0.0	0.0	131.3	1.62	713.7	459.5

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
S10.000	86.241	0.287	300.5	1.118	8.00	0.0	0.600	o	450	
S10.001	23.031	0.085	271.0	0.000	0.00	0.0	0.600	o	450	
S9.004	40.000	0.130	307.7	0.244	0.00	0.0	0.600	o	750	
S9.005	81.776	0.495	165.2	0.000	0.00	0.0	0.600	o	750	
S9.006	65.659	0.265	247.8	0.000	0.00	0.0	0.600	oo	525	
S9.007	6.999	0.030	233.3	0.412	0.00	0.0	0.600	ooo	525	
S11.000	66.317	0.660	100.5	0.282	8.00	0.0	0.600	o	525	
S9.008	8.392	0.030	279.7	0.000	0.00	0.0	0.600	ooo	525	
S9.009	44.429	0.150	296.2	0.000	0.00	0.0	0.600	ooo	525	
S9.010	54.698	0.190	287.9	0.476	0.00	0.0	0.600	ooo	525	
S9.011	4.281	0.020	214.1	0.000	0.00	0.0	0.600	ooo	525	
S9.012	105.226	0.200	526.1	0.000	0.00	0.0	0.600	o	1000	
S12.000	77.655	0.311	249.7	1.969	8.00	0.0	0.600	o	750	
S12.001	104.843	0.200	524.2	0.000	0.00	0.0	0.600	o	1000	
S13.000	19.206	0.230	83.5	0.177	8.00	0.0	0.600	o	450	
S13.001	69.246	0.745	92.9	0.000	0.00	0.0	0.600	o	450	

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)
S10.000	100.00	9.23	16.812	1.118	0.0	0.0	121.1	1.17	185.7«	423.9
S10.001	100.00	9.54	16.525	1.118	0.0	0.0	121.1	1.23	195.7«	423.9
S9.004	100.00	11.13	16.140	2.574	0.0	0.0	278.8	1.59	702.5«	975.9
S9.005	100.00	11.75	16.010	2.574	0.0	0.0	278.8	2.17	960.7«	975.9
S9.006	100.00	12.52	15.740	2.574	0.0	0.0	278.8	1.42	614.1«	975.9
S9.007	100.00	12.60	15.520	2.986	0.0	0.0	323.5	1.46	949.5«	1132.2
S11.000	100.00	8.49	16.150	0.282	0.0	0.0	30.5	2.23	483.7	106.9
S9.008	100.00	12.71	15.490	3.268	0.0	0.0	354.0	1.33	866.5«	1239.1
S9.009	100.00	13.28	15.460	3.268	0.0	0.0	354.0	1.30	841.8«	1239.1
S9.010	100.00	13.97	15.310	3.744	0.0	0.0	405.6	1.32	854.0«	1419.6
S9.011	100.00	14.02	15.120	3.744	0.0	0.0	405.6	1.53	991.7«	1419.6
S9.012	100.00	15.23	15.100	3.744	0.0	0.0	405.6	1.45	1139.5«	1419.6
S12.000	100.00	8.73	15.200	1.969	0.0	0.0	213.3	1.77	780.4	746.6
S12.001	100.00	9.93	15.100	1.969	0.0	0.0	213.3	1.45	1141.6	746.6
S13.000	100.00	8.14	17.010	0.177	0.0	0.0	19.2	2.23	354.1	67.1
S13.001	100.00	8.69	16.780	0.177	0.0	0.0	19.2	2.11	335.5	67.1

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
S13.002	97.217	0.570	170.6	1.098	0.00	0.0	0.600	o	525	
S13.003	24.661	0.090	274.0	0.000	0.00	0.0	0.600	o	525	
S13.004	204.153	0.400	510.4	0.000	0.00	0.0	0.600	o	1000	
S14.000	25.044	0.039	642.1	0.697	8.00	0.0	0.600	o	525	
S14.001	146.187	0.426	343.2	1.313	0.00	0.0	0.600	o	1000	
S1.011	219.264	0.360	609.1	0.370	0.00	0.0	0.600	o	1000	
S15.000	72.359	0.449	161.2	1.079	8.00	0.0	0.600	o	450	
S16.000	56.376	0.606	93.0	0.232	8.00	0.0	0.600	o	300	
S15.001	7.451	0.075	99.3	0.000	0.00	0.0	0.600	o	525	
S1.012	231.624	0.390	593.9	0.658	0.00	0.0	0.600	o	1000	
S1.013	18.790	0.303	62.0	0.000	0.00	0.0	0.600	o	450	
S1.014	107.105	0.515	208.0	0.000	0.00	0.0	0.600	o	450	
S17.000	104.533	0.500	209.1	1.280	8.00	0.0	0.600	o	525	
S17.001	76.774	0.450	170.6	0.081	0.00	0.0	0.600	o	525	
S17.002	37.514	0.200	187.6	0.729	0.00	0.0	0.600	o	600	

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)
S13.002	100.00	9.64	15.960	1.275	0.0	0.0	138.1	1.71	370.7«	483.4
S13.003	100.00	9.94	15.390	1.275	0.0	0.0	138.1	1.35	291.9«	483.4
S13.004	100.00	12.25	15.300	1.275	0.0	0.0	138.1	1.47	1157.1	483.4
S14.000	100.00	8.48	15.370	0.697	0.0	0.0	75.5	0.88	189.7«	264.3
S14.001	100.00	9.83	15.330	2.010	0.0	0.0	217.7	1.80	1413.3	762.1
S1.011	92.31	17.94	13.300	19.793	0.0	0.0	1979.3	1.35	1058.4«	6927.4
S15.000	100.00	8.75	13.524	1.079	0.0	0.0	116.9	1.60	254.3«	409.1
S16.000	100.00	8.58	13.831	0.232	0.0	0.0	25.1	1.63	115.3	88.0
S15.001	100.00	8.81	13.000	1.311	0.0	0.0	142.0	2.25	486.5«	497.1
S1.012	84.23	20.77	12.940	21.762	0.0	0.0	1985.8	1.36	1071.9«	6950.3
S1.013	83.92	20.89	12.800	21.762	0.0	0.0	1985.8	2.59	411.2«	6950.3
S1.014	80.82	22.16	12.497	21.762	0.0	0.0	1985.8	1.41	223.6«	6950.3
S17.000	100.00	9.13	13.000	1.280	0.0	0.0	138.7	1.55	334.5«	485.3
S17.001	100.00	9.87	12.500	1.361	0.0	0.0	147.4	1.71	370.6«	516.0
S17.002	100.00	10.23	11.975	2.090	0.0	0.0	226.4	1.77	501.8«	792.4

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
S17.003	30.729	0.050	614.6	0.000	0.00	0.0	0.600	o	1000	
S17.004	4.539	0.020	226.9	0.000	0.00	0.0	0.600	o	300	
S1.015	14.656	0.142	103.2	0.000	0.00	0.0	0.600	o	600	
S1.016	8.662	0.040	216.5	0.000	0.00	0.0	0.600	o	600	
S1.017	12.722	0.040	318.1	0.000	0.00	0.0	0.600	o	1000	
S18.000	117.749	0.736	160.0	0.000	8.00	20.0	0.600	o	225	
S18.001	111.766	0.699	159.9	0.000	0.00	15.0	0.600	o	225	
S18.002	26.453	0.150	176.4	0.000	0.00	10.0	0.600	o	300	
S18.003	64.485	0.370	174.3	0.000	0.00	0.0	0.600	o	300	
S18.004	59.956	0.340	176.3	0.000	0.00	5.0	0.600	o	300	
S18.005	52.143	0.300	173.8	0.000	0.00	5.0	0.600	o	300	
S18.006	24.212	0.140	172.9	0.000	0.00	0.0	0.600	o	300	
S19.000	42.461	0.456	93.1	0.000	8.00	10.0	0.600	o	150	
S19.001	29.038	0.312	93.1	0.000	0.00	0.0	0.600	o	150	
S19.002	7.458	0.080	93.2	0.000	0.00	0.0	0.600	o	150	
S19.003	34.547	0.350	98.7	0.000	0.00	15.0	0.600	o	225	
S19.004	88.659	0.800	110.8	0.000	0.00	0.0	0.600	o	225	
S19.005	6.492	0.045	144.3	0.000	0.00	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)
S17.003	100.00	10.61	11.850	2.090	0.0	0.0	226.4	1.34	1053.6	792.4
S17.004	100.00	10.68	11.800	2.090	0.0	0.0	226.4	1.04	73.5«	792.4
S1.015	80.58	22.26	11.832	23.852	0.0	0.0	2082.1	2.40	677.7«	7287.2
S1.016	80.38	22.35	11.690	23.852	0.0	0.0	2082.1	1.65	466.8«	7287.2
S1.017	80.11	22.46	11.650	23.852	0.0	0.0	2082.1	1.87	1468.4«	7287.2
S18.000	100.00	9.90	18.140	0.000	20.0	0.0	8.0	1.03	41.0	28.0
S18.001	100.00	11.71	17.404	0.000	35.0	0.0	14.0	1.03	41.0«	49.0
S18.002	100.00	12.08	16.630	0.000	45.0	0.0	18.0	1.18	83.5	63.0
S18.003	100.00	12.99	16.480	0.000	45.0	0.0	18.0	1.19	84.0	63.0
S18.004	100.00	13.83	16.110	0.000	50.0	0.0	20.0	1.18	83.5	70.0
S18.005	100.00	14.56	15.770	0.000	55.0	0.0	22.0	1.19	84.1	77.0
S18.006	100.00	14.90	15.470	0.000	55.0	0.0	22.0	1.19	84.3	77.0
S19.000	100.00	8.68	17.523	0.000	10.0	0.0	4.0	1.04	18.4	14.0
S19.001	100.00	9.14	17.067	0.000	10.0	0.0	4.0	1.04	18.4	14.0
S19.002	100.00	9.26	16.755	0.000	10.0	0.0	4.0	1.04	18.4	14.0
S19.003	100.00	9.70	16.600	0.000	25.0	0.0	10.0	1.32	52.3	35.0
S19.004	100.00	10.89	16.250	0.000	25.0	0.0	10.0	1.24	49.4	35.0
S19.005	100.00	10.99	15.450	0.000	25.0	0.0	10.0	1.09	43.2	35.0

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
S18.007	128.495	0.740	173.6	0.000	0.00	0.0	0.600	o	300	
S20.000	85.961	0.530	162.2	0.000	8.00	5.0	0.600	o	225	
S20.001	74.193	0.370	200.5	0.000	0.00	0.0	0.600	o	225	
S20.002	11.170	1.655	6.7	0.000	0.00	0.0	0.600	o	225	
S18.008	105.664	0.610	173.2	0.000	0.00	15.0	0.600	o	300	
S18.009	48.123	0.280	171.9	0.000	0.00	5.0	0.600	o	300	
S18.010	38.176	0.220	173.5	0.000	0.00	5.0	0.600	o	300	
S18.011	67.097	0.305	220.0	0.000	0.00	5.0	0.600	o	300	
S18.012	169.773	0.850	199.7	0.000	0.00	10.0	0.600	o	375	
S21.000	99.686	0.670	148.8	0.000	8.00	10.0	0.600	o	225	
S21.001	7.183	0.050	143.7	0.000	0.00	5.0	0.600	o	225	
S21.002	41.289	0.280	147.5	0.000	0.00	0.0	0.600	o	225	
S21.003	51.231	0.340	150.7	0.000	0.00	0.0	0.600	o	225	
S22.000	96.242	0.650	148.1	0.000	8.00	15.0	0.600	o	225	
S22.001	114.435	0.770	148.6	0.000	0.00	10.0	0.600	o	225	
S21.004	72.684	0.490	148.3	0.000	0.00	10.0	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)
S18.007	96.43	16.70	15.330	0.000	80.0	0.0	32.0	1.19	84.1«	112.0
S20.000	100.00	9.40	17.220	0.000	5.0	0.0	2.0	1.02	40.7	7.0
S20.001	100.00	10.74	16.690	0.000	5.0	0.0	2.0	0.92	36.6	7.0
S20.002	100.00	10.78	16.320	0.000	5.0	0.0	2.0	5.07	201.6	7.0
S18.008	91.56	18.18	14.590	0.000	100.0	0.0	40.0	1.19	84.2«	140.0
S18.009	89.52	18.85	13.980	0.000	105.0	0.0	42.0	1.20	84.6«	147.0
S18.010	87.98	19.38	13.700	0.000	110.0	0.0	44.0	1.19	84.2«	154.0
S18.011	85.08	20.44	13.480	0.000	115.0	0.0	46.0	1.06	74.6«	161.0
S18.012	79.67	22.66	13.100	0.000	125.0	0.0	50.0	1.28	141.2«	175.0
S21.000	100.00	9.55	14.750	0.000	10.0	0.0	4.0	1.07	42.5	14.0
S21.001	100.00	9.66	14.080	0.000	15.0	0.0	6.0	1.09	43.3	21.0
S21.002	100.00	10.30	14.030	0.000	15.0	0.0	6.0	1.07	42.7	21.0
S21.003	100.00	11.11	13.750	0.000	15.0	0.0	6.0	1.06	42.3	21.0
S22.000	100.00	9.50	14.830	0.000	15.0	0.0	6.0	1.07	42.6	21.0
S22.001	100.00	11.28	14.180	0.000	25.0	0.0	10.0	1.07	42.6	35.0
S21.004	100.00	12.22	13.335	0.000	50.0	0.0	20.0	1.29	91.1	70.0

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
S23.000	101.423	2.480	40.9	0.000	8.00	0.0	0.600	o	225	
S23.001	154.404	0.430	359.1	0.000	0.00	0.0	0.600	o	375	
S23.002	4.870	0.020	243.5	0.000	0.00	0.0	0.600	o	375	
S21.005	134.423	0.520	258.5	0.000	0.00	0.0	0.600	o	375	
S18.013	63.087	0.250	252.3	0.000	0.00	0.0	0.600	o	375	
S18.014	5.657	0.340	16.6	0.000	0.00	0.0	0.600	o	375	
S1.018	17.396	0.019	915.6	0.000	0.00	0.0	0.600	o	1000	

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)
S23.000	100.00	8.82	15.850	0.000	0.0	0.0	0.0	2.05	81.6	0.0
S23.001	100.00	11.53	13.220	0.000	0.0	0.0	0.0	0.95	105.0	0.0
S23.002	100.00	11.60	12.790	0.000	0.0	0.0	0.0	1.16	127.8	0.0
S21.005	100.00	14.21	12.770	0.000	50.0	0.0	20.0	1.12	123.9	70.0
S18.013	77.63	23.58	12.250	0.000	175.0	0.0	70.0	1.14	125.5«	245.0
S18.014	77.58	23.60	12.000	0.000	175.0	0.0	70.0	4.46	492.7	245.0
S1.018	77.02	23.87	11.620	23.852	175.0	0.0	2082.1	1.10	861.5«	7287.2

Simulation Criteria for Storm

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

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	D2 (1km)	0.258	Winter Storms	Yes
Return Period (years)	30	D3 (1km)	0.297	Cv (Summer)	0.750
Site Location		E (1km)	0.318	Cv (Winter)	0.840
C (1km)	-0.026	F (1km)	2.445	Storm Duration (mins)	30
D1 (1km)	0.314	Summer Storms	No		

Summary of Results for 30 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S1.000	S1	18.891	0.966	0.000	0.84		229.1	SURCHARGED
S1.001	S2	18.835	1.035	0.000	1.23		447.8	SURCHARGED
S2.000	S3	18.774	-0.296	0.000	0.31		266.6	OK
S2.001	S4	18.712	0.642	0.000	0.63		453.9	SURCHARGED
S2.002	S5	18.654	0.799	0.000	0.67		470.1	SURCHARGED
S1.002	S6	18.536	1.001	0.000	1.39		958.8	SURCHARGED
S1.003	S7	18.232	0.882	0.000	1.11		912.3	SURCHARGED
S1.004	S8	17.971	0.851	0.000	1.40		895.7	SURCHARGED
S1.005	S9	17.729	0.677	0.000	1.44		894.8	SURCHARGED
S3.000	S10	17.764	0.494	0.000	0.97		78.4	SURCHARGED
S3.001	S11	17.656	0.556	0.000	1.79		123.6	SURCHARGED
S1.006	S12	17.486	0.496	0.000	1.15		966.0	SURCHARGED
S1.007	S13	17.121	0.421	0.000	1.58		963.3	SURCHARGED
S1.008	S14	16.847	0.217	0.000	1.13		945.3	SURCHARGED
S1.009	S15	16.238	0.108	0.000	1.63		928.4	FLOOD RISK
S1.010	S16	15.690	-0.525	0.000	0.45		920.1	OK
S4.000	S17	19.526	0.251	0.000	0.84		302.0	SURCHARGED
S5.000	S18	19.109	0.109	0.000	0.52		278.3	SURCHARGED
S4.001	S19	18.973	0.493	0.000	1.46		583.8	SURCHARGED
S4.002	S20	18.553	0.271	0.000	1.79		651.5	SURCHARGED
S4.003	S21	17.858	-0.292	0.000	0.52		651.8	OK
S6.000	S22	18.944	-0.075	0.000	0.91		69.4	OK
S7.000	S23	19.369	-0.106	0.000	0.85		111.5	OK
S7.001	S24	19.105	-0.112	0.000	0.82		109.5	OK
S7.002	S25	18.783	-0.110	0.000	0.84		108.4	OK
S7.003	S26	18.563	-0.113	0.000	0.83		108.0	OK
S6.001	S27	18.199	-0.320	0.000	0.44		170.3	OK
S6.002	S28	17.883	-0.336	0.000	0.40		169.9	OK
S6.003	S29	17.711	-0.329	0.000	0.52		491.1	OK
S6.004	S30	17.342	0.082	0.000	1.80		477.7	SURCHARGED
S6.005	S31	17.119	-0.191	0.000	0.91		476.6	OK
S8.000	S32	17.663	-0.257	0.000	0.20		44.2	OK
S8.001	S33	17.634	0.014	0.000	1.02		170.9	SURCHARGED
S8.002	S34	17.195	-0.125	0.000	0.87		169.6	OK
S6.006	S35	16.790	-0.410	0.000	0.43		645.7	OK
S4.004	S36	16.508	0.498	0.000	1.18		1331.0	SURCHARGED
S4.005	S37	16.101	-0.199	0.000	1.00		1330.5	OK
S9.000	S38	17.494	-0.071	0.000	0.18		20.6	OK
S9.001	S39	17.474	0.147	0.000	0.52		39.6	SURCHARGED
S9.002	S40	17.469	0.164	0.000	1.39		225.6	SURCHARGED
S9.003	S41	16.941	-0.179	0.000	0.47		295.0	OK
S10.000	S42	18.018	0.756	0.000	1.70		298.1	SURCHARGED
S10.001	S43	17.175	0.200	0.000	1.83		295.6	SURCHARGED
S9.004	S44	16.890	0.000	0.000	1.05		604.9	OK
S9.005	S45	16.579	-0.181	0.000	0.68		586.4	OK

Summary of Results for 30 minute 30 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S9.006	S46	16.360	0.095	0.000	1.02		575.3	SURCHARGED
S9.007	S47	16.083	0.038	0.000	1.08		607.0	SURCHARGED
S11.000	S48	16.300	-0.375	0.000	0.18		79.2	OK
S9.008	S49	16.048	0.033	0.000	1.21		655.4	SURCHARGED
S9.009	S50	16.005	0.020	0.000	0.87		646.6	FLOOD RISK
S9.010	S51	15.891	0.056	0.000	0.89		682.2	SURCHARGED
S9.011	S52	15.741	0.096	0.000	1.38		682.1	SURCHARGED
S9.012	S53	15.703	-0.397	0.000	0.67		682.1	OK
S12.000	S54	15.805	-0.145	0.000	0.77		534.6	OK
S12.001	S55	15.616	-0.484	0.000	0.53		534.1	OK
S13.000	S56	17.140	-0.320	0.000	0.18		50.0	OK
S13.001	S57	16.900	-0.330	0.000	0.16		49.8	OK
S13.002	S58	16.547	0.062	0.000	0.98		340.5	SURCHARGED
S13.003	S59	15.995	0.080	0.000	1.43		338.1	SURCHARGED
S13.004	S60	15.682	-0.618	0.000	0.31		339.1	OK
S14.000	S61	15.895	0.000	0.000	1.43		195.4	OK
S14.001	S62	15.793	-0.537	0.000	0.44		565.3	OK
S1.011	S63	14.847	0.547	0.000	0.05		53.0	SURCHARGED
S15.000	S64	14.391	0.417	0.000	1.23		293.2	SURCHARGED
S16.000	S65	13.999	-0.132	0.000	0.60		65.1	OK
S15.001	S66	13.734	0.209	0.000	1.37		341.8	SURCHARGED
S1.012	S67	13.561	-0.379	0.000	0.44		447.1	OK
S1.013	S68	13.554	0.304	0.000	0.18		54.6	SURCHARGED
S1.014	S69	12.651	-0.296	0.000	0.26		54.6	OK
S17.000	S70	13.680	0.155	0.000	1.07		338.5	SURCHARGED
S17.001	S71	13.143	0.118	0.000	0.99		339.1	SURCHARGED
S17.002	S72	12.707	0.132	0.000	1.16		489.4	SURCHARGED
S17.003	S73	12.435	-0.415	0.000	0.64		488.6	OK
S17.004	S74	12.040	-0.060	0.000	0.01		0.3	OK
S1.015	S75	12.163	-0.269	0.000	0.13		49.4	OK
S1.016	S76	12.155	-0.135	0.000	0.18		49.3	OK
S1.017	S77	12.149	-0.501	0.000	0.06		49.3	OK
S18.000	S78	18.252	-0.113	0.000	0.50		20.0	OK
S18.001	S79	17.566	-0.063	0.000	0.87		35.0	OK
S18.002	S80	16.922	-0.008	0.000	0.60		45.0	OK
S18.003	S81	16.871	0.091	0.000	0.56		45.0	SURCHARGED
S18.004	S82	16.767	0.357	0.000	0.63		50.0	SURCHARGED
S18.005	S83	16.646	0.576	0.000	0.69		54.9	SURCHARGED
S18.006	S84	16.517	0.747	0.000	0.71		53.6	SURCHARGED
S19.000	S85	17.603	-0.070	0.000	0.56		10.0	OK
S19.001	S86	17.148	-0.069	0.000	0.57		10.0	OK
S19.002	S87	16.845	-0.060	0.000	0.63		10.0	OK
S19.003	S88	16.758	-0.067	0.000	0.51		25.0	OK
S19.004	S89	16.671	0.196	0.000	0.52		25.0	SURCHARGED
S19.005	S90	16.473	0.798	0.000	0.84		25.0	SURCHARGED
S18.007	S91	16.451	0.821	0.000	0.91		74.8	SURCHARGED
S20.000	S92	17.273	-0.172	0.000	0.13		5.0	OK
S20.001	S93	16.746	-0.169	0.000	0.14		5.0	OK
S20.002	S94	16.346	-0.199	0.000	0.03		5.0	OK

Summary of Results for 30 minute 30 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S18.008	S95	15.831	0.941	0.000	1.15		94.3	SURCHARGED
S18.009	S96	15.015	0.735	0.000	1.25		99.1	SURCHARGED
S18.010	S97	14.578	0.578	0.000	1.33		103.9	SURCHARGED
S18.011	S98	14.186	0.406	0.000	1.52		108.7	SURCHARGED
S18.012	S99	13.474	-0.001	0.000	0.85		117.3	OK
S21.000	S100	14.824	-0.151	0.000	0.24		10.0	OK
S21.001	S101	14.189	-0.116	0.000	0.48		15.0	OK
S21.002	S102	14.124	-0.131	0.000	0.37		15.0	OK
S21.003	S103	13.844	-0.131	0.000	0.37		15.0	OK
S22.000	S104	14.923	-0.132	0.000	0.36		15.0	OK
S22.001	S105	14.306	-0.099	0.000	0.60		25.0	OK
S21.004	S106	13.498	-0.137	0.000	0.57		50.0	OK
S23.000	S107	15.850	-0.225	0.000	0.00		0.0	OK
S23.001	S108	13.220	-0.375	0.000	0.00		0.0	OK
S23.002	S109	12.960	-0.205	0.000	0.00		0.0	OK
S21.005	S110	12.960	-0.185	0.000	0.42		50.0	OK
S18.013	S111	12.852	0.227	0.000	1.41		165.7	SURCHARGED
S18.014	S112	12.325	-0.050	0.000	0.72		165.3	OK
S1.018	S113	12.146	-0.474	0.000	0.62		214.4	OK

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes SW PIPES Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	Add Flow / Climate Change (%)	40
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.450	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	100	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

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)
S1.018	S	12.800	11.601	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	15
Ratio R	0.450		

Summary of Results for 15 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S1.000	S1	19.431	1.506	0.000	0.97		262.9	SURCHARGED
S1.001	S2	19.312	1.512	0.000	1.42		516.6	SURCHARGED
S2.000	S3	19.229	0.159	0.000	0.36		301.8	SURCHARGED
S2.001	S4	19.124	1.054	0.000	0.70		506.1	SURCHARGED
S2.002	S5	19.046	1.191	0.000	0.74		513.5	SURCHARGED
S1.002	S6	18.908	1.373	0.000	1.61		1107.0	SURCHARGED
S1.003	S7	18.562	1.212	0.000	1.25		1019.6	SURCHARGED
S1.004	S8	18.269	1.149	0.000	1.58		1016.8	SURCHARGED
S1.005	S9	17.999	0.947	0.000	1.62		1006.3	SURCHARGED
S3.000	S10	18.028	0.758	0.000	1.21		97.5	SURCHARGED
S3.001	S11	17.862	0.762	0.000	2.25		155.1	SURCHARGED
S1.006	S12	17.725	0.735	0.000	1.25		1051.2	SURCHARGED
S1.007	S13	17.309	0.609	0.000	1.71		1043.7	SURCHARGED
S1.008	S14	16.982	0.352	0.000	1.19		1000.9	SURCHARGED
S1.009	S15	16.268	0.138	0.000	1.75		1000.1	FLOOD RISK
S1.010	S16	15.709	-0.506	0.000	0.48		981.6	OK
S4.000	S17	19.937	0.662	0.000	0.96		345.9	SURCHARGED
S5.000	S18	19.377	0.377	0.000	0.60		321.9	SURCHARGED
S4.001	S19	19.194	0.714	0.000	1.68		671.7	SURCHARGED
S4.002	S20	18.629	0.347	0.000	1.95		709.9	SURCHARGED
S4.003	S21	17.874	-0.276	0.000	0.57		710.5	OK
S6.000	S22	19.054	0.035	0.000	1.05		79.6	SURCHARGED
S7.000	S23	19.399	-0.076	0.000	0.99		129.4	OK
S7.001	S24	19.136	-0.081	0.000	0.96		128.0	OK
S7.002	S25	18.816	-0.077	0.000	0.98		126.8	OK
S7.003	S26	18.595	-0.081	0.000	0.97		126.1	OK
S6.001	S27	18.229	-0.290	0.000	0.52		199.8	OK
S6.002	S28	17.909	-0.310	0.000	0.47		199.0	OK
S6.003	S29	17.743	-0.297	0.000	0.59		561.4	OK
S6.004	S30	17.478	0.218	0.000	2.01		533.9	SURCHARGED
S6.005	S31	17.310	0.000	0.000	1.00		526.3	OK
S8.000	S32	17.825	-0.095	0.000	0.25		54.2	OK
S8.001	S33	17.797	0.177	0.000	1.19		199.6	SURCHARGED
S8.002	S34	17.235	-0.085	0.000	1.00		195.2	OK
S6.006	S35	16.993	-0.207	0.000	0.46		700.3	OK
S4.004	S36	16.769	0.759	0.000	1.26		1417.4	SURCHARGED
S4.005	S37	16.303	0.003	0.000	1.06		1414.3	FLOOD RISK
S9.000	S38	17.678	0.113	0.000	0.23		25.9	SURCHARGED
S9.001	S39	17.656	0.329	0.000	0.74		56.5	SURCHARGED
S9.002	S40	17.651	0.346	0.000	1.64		265.4	SURCHARGED
S9.003	S41	16.987	-0.133	0.000	0.56		348.6	OK
S10.000	S42	18.450	1.188	0.000	1.96		342.9	SURCHARGED
S10.001	S43	17.295	0.320	0.000	2.11		342.0	SURCHARGED
S9.004	S44	16.921	0.031	0.000	1.21		691.7	SURCHARGED
S9.005	S45	16.697	-0.063	0.000	0.76		657.3	OK

Summary of Results for 15 minute 100 year Summer (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S9.006	S46	16.423	0.158	0.000	1.14		638.4	SURCHARGED
S9.007	S47	16.088	0.043	0.000	1.14		643.0	SURCHARGED
S11.000	S48	16.312	-0.363	0.000	0.21		92.2	OK
S9.008	S49	16.048	0.033	0.000	1.27		692.4	SURCHARGED
S9.009	S50	16.003	0.018	0.000	0.92		679.9	FLOOD RISK
S9.010	S51	15.884	0.049	0.000	0.88		677.3	SURCHARGED
S9.011	S52	15.737	0.092	0.000	1.37		675.6	SURCHARGED
S9.012	S53	15.699	-0.401	0.000	0.67		676.5	OK
S12.000	S54	15.919	-0.031	0.000	0.89		620.5	OK
S12.001	S55	15.666	-0.434	0.000	0.61		620.7	OK
S13.000	S56	17.151	-0.309	0.000	0.21		58.0	OK
S13.001	S57	16.920	-0.310	0.000	0.19		58.0	OK
S13.002	S58	16.840	0.355	0.000	1.15		400.3	SURCHARGED
S13.003	S59	16.064	0.149	0.000	1.66		393.5	SURCHARGED
S13.004	S60	15.717	-0.583	0.000	0.36		395.0	OK
S14.000	S61	15.938	0.043	0.000	1.69		230.0	SURCHARGED
S14.001	S62	15.856	-0.474	0.000	0.54		695.0	OK
S1.011	S63	14.740	0.440	0.000	0.05		53.0	SURCHARGED
S15.000	S64	14.720	0.746	0.000	1.44		341.8	SURCHARGED
S16.000	S65	14.045	-0.086	0.000	0.69		75.3	OK
S15.001	S66	13.784	0.259	0.000	1.65		411.0	SURCHARGED
S1.012	S67	13.536	-0.404	0.000	0.48		486.1	OK
S1.013	S68	13.503	0.253	0.000	0.18		54.6	SURCHARGED
S1.014	S69	12.651	-0.296	0.000	0.26		54.6	OK
S17.000	S70	14.051	0.526	0.000	1.21		383.0	SURCHARGED
S17.001	S71	13.339	0.314	0.000	1.11		382.4	SURCHARGED
S17.002	S72	12.784	0.209	0.000	1.25		527.4	SURCHARGED
S17.003	S73	12.465	-0.385	0.000	0.70		527.1	OK
S17.004	S74	11.995	-0.105	0.000	0.01		0.4	OK
S1.015	S75	12.163	-0.269	0.000	0.13		49.3	OK
S1.016	S76	12.155	-0.135	0.000	0.18		49.2	OK
S1.017	S77	12.149	-0.501	0.000	0.06		49.2	OK
S18.000	S78	18.252	-0.113	0.000	0.50		20.0	OK
S18.001	S79	17.566	-0.063	0.000	0.87		35.0	OK
S18.002	S80	16.922	-0.008	0.000	0.60		45.0	OK
S18.003	S81	16.871	0.091	0.000	0.56		45.0	SURCHARGED
S18.004	S82	16.767	0.357	0.000	0.63		50.0	SURCHARGED
S18.005	S83	16.646	0.576	0.000	0.69		54.9	SURCHARGED
S18.006	S84	16.517	0.747	0.000	0.71		53.6	SURCHARGED
S19.000	S85	17.603	-0.070	0.000	0.56		10.0	OK
S19.001	S86	17.148	-0.069	0.000	0.57		10.0	OK
S19.002	S87	16.845	-0.060	0.000	0.63		10.0	OK
S19.003	S88	16.758	-0.067	0.000	0.51		25.0	OK
S19.004	S89	16.671	0.196	0.000	0.52		25.0	SURCHARGED
S19.005	S90	16.473	0.798	0.000	0.84		25.0	SURCHARGED
S18.007	S91	16.451	0.821	0.000	0.91		74.8	SURCHARGED
S20.000	S92	17.273	-0.172	0.000	0.13		5.0	OK
S20.001	S93	16.746	-0.169	0.000	0.14		5.0	OK
S20.002	S94	16.346	-0.199	0.000	0.03		5.0	OK

Summary of Results for 15 minute 100 year Summer (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S18.008	S95	15.831	0.941	0.000	1.15		94.3	SURCHARGED
S18.009	S96	15.015	0.735	0.000	1.25		99.1	SURCHARGED
S18.010	S97	14.578	0.578	0.000	1.33		103.9	SURCHARGED
S18.011	S98	14.186	0.406	0.000	1.52		108.7	SURCHARGED
S18.012	S99	13.474	-0.001	0.000	0.85		117.3	OK
S21.000	S100	14.824	-0.151	0.000	0.24		10.0	OK
S21.001	S101	14.189	-0.116	0.000	0.48		15.0	OK
S21.002	S102	14.124	-0.131	0.000	0.37		15.0	OK
S21.003	S103	13.844	-0.131	0.000	0.37		15.0	OK
S22.000	S104	14.923	-0.132	0.000	0.36		15.0	OK
S22.001	S105	14.306	-0.099	0.000	0.60		25.0	OK
S21.004	S106	13.498	-0.137	0.000	0.57		50.0	OK
S23.000	S107	15.850	-0.225	0.000	0.00		0.0	OK
S23.001	S108	13.220	-0.375	0.000	0.00		0.0	OK
S23.002	S109	12.960	-0.205	0.000	0.00		0.0	OK
S21.005	S110	12.960	-0.185	0.000	0.42		50.0	OK
S18.013	S111	12.852	0.227	0.000	1.41		165.7	SURCHARGED
S18.014	S112	12.325	-0.050	0.000	0.72		165.3	OK
S1.018	S113	12.146	-0.474	0.000	0.62		214.3	OK

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes SW PIPES Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	Add Flow / Climate Change (%)	40
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.450	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	100	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

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
S1.000	17.966	0.125	143.7	0.890	8.00	0.0	0.600	o	525	
S1.001	79.485	0.265	299.9	0.865	0.00	0.0	0.600	o	600	
S2.000	104.530	1.000	104.5	0.952	8.00	0.0	0.600	o	675	
S2.001	35.691	0.215	166.0	0.975	0.00	0.0	0.600	o	750	
S2.002	79.737	0.320	249.2	0.204	0.00	0.0	0.600	o	750	
S1.002	61.629	0.185	333.1	0.446	0.00	0.0	0.600	o	800	
S1.003	51.618	0.230	224.4	0.000	0.00	0.0	0.600	o	800	
S1.004	13.469	0.068	198.1	0.000	0.00	0.0	0.600	o	800	
S1.005	12.368	0.062	199.5	0.000	0.00	0.0	0.600	o	800	

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)
S1.000	100.00	8.16	17.400	0.890	0.0	0.0	96.4	1.87	404.0	337.4
S1.001	100.00	9.11	17.200	1.755	0.0	0.0	190.1	1.40	396.1«	665.4
S2.000	100.00	8.68	18.395	0.952	0.0	0.0	103.1	2.56	917.3	361.0
S2.001	100.00	8.95	17.320	1.927	0.0	0.0	208.8	2.17	958.4	730.6
S2.002	100.00	9.71	17.105	2.131	0.0	0.0	230.9	1.77	781.2«	808.0
S1.002	100.00	10.35	16.735	4.332	0.0	0.0	469.3	1.59	799.4«	1642.5
S1.003	100.00	10.79	16.550	4.332	0.0	0.0	469.3	1.94	975.3«	1642.5
S1.004	100.00	10.90	16.320	4.332	0.0	0.0	469.3	2.07	1038.6«	1642.5
S1.005	100.00	11.00	16.252	4.332	0.0	0.0	469.3	2.06	1034.9«	1642.5

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
S3.000	25.768	0.170	151.6	0.286	8.00	0.0	0.600	o	300	
S3.001	22.011	0.110	200.1	0.162	0.00	0.0	0.600	o	300	
S1.006	66.006	0.290	227.6	0.000	0.00	0.0	0.600	o	800	
S1.007	18.446	0.070	263.5	0.000	0.00	0.0	0.600	o	800	
S1.008	130.205	0.500	260.4	0.000	0.00	0.0	0.600	o	800	
S1.009	13.328	0.040	333.2	0.000	0.00	0.0	0.600	o	875	
S1.010	136.349	0.990	137.7	0.000	0.00	0.0	0.600	o	1000	
S4.000	129.886	0.795	163.4	1.173	8.00	0.0	0.600	o	525	
S5.000	69.831	0.520	134.3	1.085	8.00	0.0	0.600	o	600	
S4.001	43.224	0.198	218.3	0.077	0.00	0.0	0.600	o	600	
S4.002	6.272	0.132	47.5	0.405	0.00	0.0	0.600	o	600	
S4.003	44.802	1.990	22.5	0.000	0.00	0.0	0.600	o	600	
S6.000	99.776	0.500	199.6	0.246	8.00	0.0	0.600	o	300	
S7.000	51.619	0.258	200.1	0.398	8.00	0.0	0.600	o	375	
S7.001	64.724	0.324	199.8	0.000	0.00	0.0	0.600	o	375	

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)
S3.000	100.00	8.34	16.970	0.286	0.0	0.0	31.0	1.27	90.1«	108.4
S3.001	100.00	8.67	16.800	0.448	0.0	0.0	48.5	1.11	78.3«	169.9
S1.006	100.00	11.57	16.190	4.780	0.0	0.0	517.8	1.93	968.4«	1812.4
S1.007	100.00	11.75	15.900	4.780	0.0	0.0	517.8	1.79	899.6«	1812.4
S1.008	100.00	12.95	15.830	4.780	0.0	0.0	517.8	1.80	905.0«	1812.4
S1.009	100.00	13.08	15.255	4.780	0.0	0.0	517.8	1.68	1011.0«	1812.4
S1.010	100.00	13.88	15.215	4.780	0.0	0.0	517.8	2.85	2236.7	1812.4
S4.000	100.00	9.24	18.750	1.173	0.0	0.0	127.1	1.75	378.8«	444.7
S5.000	100.00	8.55	18.400	1.085	0.0	0.0	117.5	2.10	593.7	411.4
S4.001	100.00	9.68	17.880	2.335	0.0	0.0	253.0	1.64	464.9«	885.3
S4.002	100.00	9.70	17.682	2.740	0.0	0.0	296.8	3.54	1000.6«	1038.9
S4.003	100.00	9.85	17.550	2.740	0.0	0.0	296.8	5.15	1455.3	1038.9
S6.000	100.00	9.50	18.719	0.246	0.0	0.0	26.6	1.11	78.4«	93.3
S7.000	100.00	8.67	19.100	0.398	0.0	0.0	43.1	1.28	141.1«	150.9
S7.001	100.00	9.52	18.842	0.398	0.0	0.0	43.1	1.28	141.2«	150.9

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
S7.002	43.463	0.217	200.3	0.000	0.00	0.0	0.600	o	375	
S7.003	28.540	0.157	181.8	0.000	0.00	0.0	0.600	o	375	
S6.001	80.238	0.300	267.5	0.000	0.00	0.0	0.600	o	600	
S6.002	3.433	0.179	19.2	0.000	0.00	0.0	0.600	o	600	
S6.003	61.378	0.780	78.7	1.316	0.00	0.0	0.600	o	680	
S6.004	6.371	0.020	318.6	0.000	0.00	0.0	0.600	o	680	
S6.005	40.521	0.110	368.4	0.000	0.00	0.0	0.600	o	750	
S8.000	55.053	0.300	183.5	0.161	8.00	0.0	0.600	o	450	
S8.001	100.444	0.300	334.8	0.504	0.00	0.0	0.600	o	450	
S8.002	7.271	0.120	60.6	0.000	0.00	0.0	0.600	o	450	
S6.006	49.044	1.040	47.2	0.000	0.00	0.0	0.600	o	750	
S4.004	73.185	0.290	252.4	0.280	0.00	0.0	0.600	[]	1	
S4.005	126.298	0.400	315.7	0.000	0.00	0.0	0.600	o	1000	
S9.000	63.403	0.238	266.4	0.075	8.00	0.0	0.600	o	375	
S9.001	6.518	0.022	296.3	0.000	0.00	0.0	0.600	o	375	
S9.002	62.164	0.185	336.0	0.784	0.00	0.0	0.600	o	450	
S9.003	68.571	0.230	298.1	0.353	0.00	0.0	0.600	o	750	

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)
S7.002	100.00	10.08	18.518	0.398	0.0	0.0	43.1	1.28	141.0«	150.9
S7.003	100.00	10.44	18.301	0.398	0.0	0.0	43.1	1.34	148.1«	150.9
S6.001	100.00	11.34	17.919	0.644	0.0	0.0	69.8	1.48	419.7	244.2
S6.002	100.00	11.35	17.619	0.644	0.0	0.0	69.8	5.58	1577.0	244.2
S6.003	100.00	11.70	17.360	1.960	0.0	0.0	212.3	2.97	1078.6	743.1
S6.004	100.00	11.77	16.580	1.960	0.0	0.0	212.3	1.47	533.8«	743.1
S6.005	100.00	12.23	16.560	1.960	0.0	0.0	212.3	1.45	641.5«	743.1
S8.000	100.00	8.61	17.470	0.161	0.0	0.0	17.4	1.50	238.2	61.0
S8.001	100.00	10.13	17.170	0.665	0.0	0.0	72.0	1.11	175.8«	252.1
S8.002	100.00	10.17	16.870	0.665	0.0	0.0	72.0	2.62	416.0	252.1
S6.006	100.00	12.43	16.450	2.625	0.0	0.0	284.4	4.08	1803.1	995.3
S4.004	100.00	13.08	15.410	5.645	0.0	0.0	611.5	1.88	1292.6«	2140.3
S4.005	100.00	14.20	15.300	5.645	0.0	0.0	611.5	1.88	1473.8«	2140.3
S9.000	100.00	8.96	17.190	0.075	0.0	0.0	8.1	1.11	122.1	28.4
S9.001	100.00	9.06	16.952	0.075	0.0	0.0	8.1	1.05	115.7	28.4
S9.002	100.00	10.00	16.855	0.859	0.0	0.0	93.1	1.10	175.5«	325.7
S9.003	100.00	10.71	16.370	1.212	0.0	0.0	131.3	1.62	713.7	459.5

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
S10.000	86.241	0.287	300.5	1.118	8.00	0.0	0.600	o	450	
S10.001	23.031	0.085	271.0	0.000	0.00	0.0	0.600	o	450	
S9.004	40.000	0.130	307.7	0.244	0.00	0.0	0.600	o	750	
S9.005	81.776	0.495	165.2	0.000	0.00	0.0	0.600	o	750	
S9.006	65.659	0.265	247.8	0.000	0.00	0.0	0.600	oo	525	
S9.007	6.999	0.030	233.3	0.412	0.00	0.0	0.600	ooo	525	
S11.000	66.317	0.660	100.5	0.282	8.00	0.0	0.600	o	525	
S9.008	8.392	0.030	279.7	0.000	0.00	0.0	0.600	ooo	525	
S9.009	44.429	0.150	296.2	0.000	0.00	0.0	0.600	ooo	525	
S9.010	54.698	0.190	287.9	0.476	0.00	0.0	0.600	ooo	525	
S9.011	4.281	0.020	214.1	0.000	0.00	0.0	0.600	ooo	525	
S9.012	105.226	0.200	526.1	0.000	0.00	0.0	0.600	o	1000	
S12.000	77.655	0.311	249.7	1.969	8.00	0.0	0.600	o	750	
S12.001	104.843	0.200	524.2	0.000	0.00	0.0	0.600	o	1000	
S13.000	19.206	0.230	83.5	0.177	8.00	0.0	0.600	o	450	
S13.001	69.246	0.745	92.9	0.000	0.00	0.0	0.600	o	450	

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)
S10.000	100.00	9.23	16.812	1.118	0.0	0.0	121.1	1.17	185.7«	423.9
S10.001	100.00	9.54	16.525	1.118	0.0	0.0	121.1	1.23	195.7«	423.9
S9.004	100.00	11.13	16.140	2.574	0.0	0.0	278.8	1.59	702.5«	975.9
S9.005	100.00	11.75	16.010	2.574	0.0	0.0	278.8	2.17	960.7«	975.9
S9.006	100.00	12.52	15.740	2.574	0.0	0.0	278.8	1.42	614.1«	975.9
S9.007	100.00	12.60	15.520	2.986	0.0	0.0	323.5	1.46	949.5«	1132.2
S11.000	100.00	8.49	16.150	0.282	0.0	0.0	30.5	2.23	483.7	106.9
S9.008	100.00	12.71	15.490	3.268	0.0	0.0	354.0	1.33	866.5«	1239.1
S9.009	100.00	13.28	15.460	3.268	0.0	0.0	354.0	1.30	841.8«	1239.1
S9.010	100.00	13.97	15.310	3.744	0.0	0.0	405.6	1.32	854.0«	1419.6
S9.011	100.00	14.02	15.120	3.744	0.0	0.0	405.6	1.53	991.7«	1419.6
S9.012	100.00	15.23	15.100	3.744	0.0	0.0	405.6	1.45	1139.5«	1419.6
S12.000	100.00	8.73	15.200	1.969	0.0	0.0	213.3	1.77	780.4	746.6
S12.001	100.00	9.93	15.100	1.969	0.0	0.0	213.3	1.45	1141.6	746.6
S13.000	100.00	8.14	17.010	0.177	0.0	0.0	19.2	2.23	354.1	67.1
S13.001	100.00	8.69	16.780	0.177	0.0	0.0	19.2	2.11	335.5	67.1

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
S13.002	97.217	0.570	170.6	1.098	0.00	0.0	0.600	o	525	
S13.003	24.661	0.090	274.0	0.000	0.00	0.0	0.600	o	525	
S13.004	204.153	0.400	510.4	0.000	0.00	0.0	0.600	o	1000	
S14.000	25.044	0.039	642.1	0.697	8.00	0.0	0.600	o	525	
S14.001	146.187	0.426	343.2	1.313	0.00	0.0	0.600	o	1000	
S1.011	219.264	0.360	609.1	0.370	0.00	0.0	0.600	o	1000	
S15.000	72.359	0.449	161.2	1.079	8.00	0.0	0.600	o	450	
S16.000	56.376	0.606	93.0	0.232	8.00	0.0	0.600	o	300	
S15.001	7.451	0.075	99.3	0.000	0.00	0.0	0.600	o	525	
S1.012	231.624	0.390	593.9	0.658	0.00	0.0	0.600	o	1000	
S1.013	18.790	0.303	62.0	0.000	0.00	0.0	0.600	o	450	
S1.014	107.105	0.515	208.0	0.000	0.00	0.0	0.600	o	450	
S17.000	104.533	0.500	209.1	1.280	8.00	0.0	0.600	o	525	
S17.001	76.774	0.450	170.6	0.081	0.00	0.0	0.600	o	525	
S17.002	37.514	0.200	187.6	0.729	0.00	0.0	0.600	o	600	

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)
S13.002	100.00	9.64	15.960	1.275	0.0	0.0	138.1	1.71	370.7«	483.4
S13.003	100.00	9.94	15.390	1.275	0.0	0.0	138.1	1.35	291.9«	483.4
S13.004	100.00	12.25	15.300	1.275	0.0	0.0	138.1	1.47	1157.1	483.4
S14.000	100.00	8.48	15.370	0.697	0.0	0.0	75.5	0.88	189.7«	264.3
S14.001	100.00	9.83	15.330	2.010	0.0	0.0	217.7	1.80	1413.3	762.1
S1.011	92.31	17.94	13.300	19.793	0.0	0.0	1979.3	1.35	1058.4«	6927.4
S15.000	100.00	8.75	13.524	1.079	0.0	0.0	116.9	1.60	254.3«	409.1
S16.000	100.00	8.58	13.831	0.232	0.0	0.0	25.1	1.63	115.3	88.0
S15.001	100.00	8.81	13.000	1.311	0.0	0.0	142.0	2.25	486.5«	497.1
S1.012	84.23	20.77	12.940	21.762	0.0	0.0	1985.8	1.36	1071.9«	6950.3
S1.013	83.92	20.89	12.800	21.762	0.0	0.0	1985.8	2.59	411.2«	6950.3
S1.014	80.82	22.16	12.497	21.762	0.0	0.0	1985.8	1.41	223.6«	6950.3
S17.000	100.00	9.13	13.000	1.280	0.0	0.0	138.7	1.55	334.5«	485.3
S17.001	100.00	9.87	12.500	1.361	0.0	0.0	147.4	1.71	370.6«	516.0
S17.002	100.00	10.23	11.975	2.090	0.0	0.0	226.4	1.77	501.8«	792.4

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
S17.003	30.729	0.050	614.6	0.000	0.00	0.0	0.600	o	1000	
S17.004	4.539	0.020	226.9	0.000	0.00	0.0	0.600	o	300	
S1.015	14.656	0.142	103.2	0.000	0.00	0.0	0.600	o	600	
S1.016	8.662	0.040	216.5	0.000	0.00	0.0	0.600	o	600	
S1.017	12.722	0.040	318.1	0.000	0.00	0.0	0.600	o	1000	
S18.000	117.749	0.736	160.0	0.000	8.00	20.0	0.600	o	225	
S18.001	111.766	0.699	159.9	0.000	0.00	15.0	0.600	o	225	
S18.002	26.453	0.150	176.4	0.000	0.00	10.0	0.600	o	300	
S18.003	64.485	0.370	174.3	0.000	0.00	0.0	0.600	o	300	
S18.004	59.956	0.340	176.3	0.000	0.00	5.0	0.600	o	300	
S18.005	52.143	0.300	173.8	0.000	0.00	5.0	0.600	o	300	
S18.006	24.212	0.140	172.9	0.000	0.00	0.0	0.600	o	300	
S19.000	42.461	0.456	93.1	0.000	8.00	10.0	0.600	o	150	
S19.001	29.038	0.312	93.1	0.000	0.00	0.0	0.600	o	150	
S19.002	7.458	0.080	93.2	0.000	0.00	0.0	0.600	o	150	
S19.003	34.547	0.350	98.7	0.000	0.00	15.0	0.600	o	225	
S19.004	88.659	0.800	110.8	0.000	0.00	0.0	0.600	o	225	
S19.005	6.492	0.045	144.3	0.000	0.00	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)
S17.003	100.00	10.61	11.850	2.090	0.0	0.0	226.4	1.34	1053.6	792.4
S17.004	100.00	10.68	11.800	2.090	0.0	0.0	226.4	1.04	73.5«	792.4
S1.015	80.58	22.26	11.832	23.852	0.0	0.0	2082.1	2.40	677.7«	7287.2
S1.016	80.38	22.35	11.690	23.852	0.0	0.0	2082.1	1.65	466.8«	7287.2
S1.017	80.11	22.46	11.650	23.852	0.0	0.0	2082.1	1.87	1468.4«	7287.2
S18.000	100.00	9.90	18.140	0.000	20.0	0.0	8.0	1.03	41.0	28.0
S18.001	100.00	11.71	17.404	0.000	35.0	0.0	14.0	1.03	41.0«	49.0
S18.002	100.00	12.08	16.630	0.000	45.0	0.0	18.0	1.18	83.5	63.0
S18.003	100.00	12.99	16.480	0.000	45.0	0.0	18.0	1.19	84.0	63.0
S18.004	100.00	13.83	16.110	0.000	50.0	0.0	20.0	1.18	83.5	70.0
S18.005	100.00	14.56	15.770	0.000	55.0	0.0	22.0	1.19	84.1	77.0
S18.006	100.00	14.90	15.470	0.000	55.0	0.0	22.0	1.19	84.3	77.0
S19.000	100.00	8.68	17.523	0.000	10.0	0.0	4.0	1.04	18.4	14.0
S19.001	100.00	9.14	17.067	0.000	10.0	0.0	4.0	1.04	18.4	14.0
S19.002	100.00	9.26	16.755	0.000	10.0	0.0	4.0	1.04	18.4	14.0
S19.003	100.00	9.70	16.600	0.000	25.0	0.0	10.0	1.32	52.3	35.0
S19.004	100.00	10.89	16.250	0.000	25.0	0.0	10.0	1.24	49.4	35.0
S19.005	100.00	10.99	15.450	0.000	25.0	0.0	10.0	1.09	43.2	35.0

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
S18.007	128.495	0.740	173.6	0.000	0.00	0.0	0.600	o	300	
S20.000	85.961	0.530	162.2	0.000	8.00	5.0	0.600	o	225	
S20.001	74.193	0.370	200.5	0.000	0.00	0.0	0.600	o	225	
S20.002	11.170	1.655	6.7	0.000	0.00	0.0	0.600	o	225	
S18.008	105.664	0.610	173.2	0.000	0.00	15.0	0.600	o	300	
S18.009	48.123	0.280	171.9	0.000	0.00	5.0	0.600	o	300	
S18.010	38.176	0.220	173.5	0.000	0.00	5.0	0.600	o	300	
S18.011	67.097	0.305	220.0	0.000	0.00	5.0	0.600	o	300	
S18.012	169.773	0.850	199.7	0.000	0.00	10.0	0.600	o	375	
S21.000	99.686	0.670	148.8	0.000	8.00	10.0	0.600	o	225	
S21.001	7.183	0.050	143.7	0.000	0.00	5.0	0.600	o	225	
S21.002	41.289	0.280	147.5	0.000	0.00	0.0	0.600	o	225	
S21.003	51.231	0.340	150.7	0.000	0.00	0.0	0.600	o	225	
S22.000	96.242	0.650	148.1	0.000	8.00	15.0	0.600	o	225	
S22.001	114.435	0.770	148.6	0.000	0.00	10.0	0.600	o	225	
S21.004	72.684	0.490	148.3	0.000	0.00	10.0	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)
S18.007	96.43	16.70	15.330	0.000	80.0	0.0	32.0	1.19	84.1«	112.0
S20.000	100.00	9.40	17.220	0.000	5.0	0.0	2.0	1.02	40.7	7.0
S20.001	100.00	10.74	16.690	0.000	5.0	0.0	2.0	0.92	36.6	7.0
S20.002	100.00	10.78	16.320	0.000	5.0	0.0	2.0	5.07	201.6	7.0
S18.008	91.56	18.18	14.590	0.000	100.0	0.0	40.0	1.19	84.2«	140.0
S18.009	89.52	18.85	13.980	0.000	105.0	0.0	42.0	1.20	84.6«	147.0
S18.010	87.98	19.38	13.700	0.000	110.0	0.0	44.0	1.19	84.2«	154.0
S18.011	85.08	20.44	13.480	0.000	115.0	0.0	46.0	1.06	74.6«	161.0
S18.012	79.67	22.66	13.100	0.000	125.0	0.0	50.0	1.28	141.2«	175.0
S21.000	100.00	9.55	14.750	0.000	10.0	0.0	4.0	1.07	42.5	14.0
S21.001	100.00	9.66	14.080	0.000	15.0	0.0	6.0	1.09	43.3	21.0
S21.002	100.00	10.30	14.030	0.000	15.0	0.0	6.0	1.07	42.7	21.0
S21.003	100.00	11.11	13.750	0.000	15.0	0.0	6.0	1.06	42.3	21.0
S22.000	100.00	9.50	14.830	0.000	15.0	0.0	6.0	1.07	42.6	21.0
S22.001	100.00	11.28	14.180	0.000	25.0	0.0	10.0	1.07	42.6	35.0
S21.004	100.00	12.22	13.335	0.000	50.0	0.0	20.0	1.29	91.1	70.0

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
S23.000	101.423	2.480	40.9	0.000	8.00	0.0	0.600	o	225	
S23.001	154.404	0.430	359.1	0.000	0.00	0.0	0.600	o	375	
S23.002	4.870	0.020	243.5	0.000	0.00	0.0	0.600	o	375	
S21.005	134.423	0.520	258.5	0.000	0.00	0.0	0.600	o	375	
S18.013	63.087	0.250	252.3	0.000	0.00	0.0	0.600	o	375	
S18.014	5.657	0.340	16.6	0.000	0.00	0.0	0.600	o	375	
S1.018	17.396	0.019	915.6	0.000	0.00	0.0	0.600	o	1000	

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)
S23.000	100.00	8.82	15.850	0.000	0.0	0.0	0.0	2.05	81.6	0.0
S23.001	100.00	11.53	13.220	0.000	0.0	0.0	0.0	0.95	105.0	0.0
S23.002	100.00	11.60	12.790	0.000	0.0	0.0	0.0	1.16	127.8	0.0
S21.005	100.00	14.21	12.770	0.000	50.0	0.0	20.0	1.12	123.9	70.0
S18.013	77.63	23.58	12.250	0.000	175.0	0.0	70.0	1.14	125.5«	245.0
S18.014	77.58	23.60	12.000	0.000	175.0	0.0	70.0	4.46	492.7	245.0
S1.018	77.02	23.87	11.620	23.852	175.0	0.0	2082.1	1.10	861.5«	7287.2

Simulation Criteria for Storm

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

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	15
Ratio R	0.450		

Summary of Results for 15 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S1.000	S1	20.041	2.116	0.000	1.04		281.8	SURCHARGED
S1.001	S2	19.913	2.113	0.000	1.50		544.7	SURCHARGED
S2.000	S3	19.803	0.733	0.000	0.39		331.0	SURCHARGED
S2.001	S4	19.708	1.638	0.000	0.73		531.3	SURCHARGED
S2.002	S5	19.631	1.776	0.000	0.75		527.1	SURCHARGED
S1.002	S6	19.478	1.943	0.000	1.65		1131.0	SURCHARGED
S1.003	S7	19.083	1.733	0.000	1.32		1080.1	SURCHARGED
S1.004	S8	18.721	1.601	0.000	1.64		1053.8	SURCHARGED
S1.005	S9	18.394	1.342	0.000	1.67		1040.8	SURCHARGED
S3.000	S10	18.365	1.095	0.000	1.23		99.0	SURCHARGED
S3.001	S11	18.228	1.128	0.000	2.35		162.1	SURCHARGED
S1.006	S12	18.071	1.081	0.000	1.34		1127.5	SURCHARGED
S1.007	S13	17.576	0.876	0.000	1.84		1123.2	SURCHARGED
S1.008	S14	17.188	0.558	0.000	1.30		1092.9	SURCHARGED
S1.009	S15	16.311	0.181	0.000	1.92		1093.4	FLOOD RISK
S1.010	S16	15.737	-0.478	0.000	0.53		1079.4	OK
S4.000	S17	20.319	1.044	0.000	1.03		373.9	SURCHARGED
S5.000	S18	19.644	0.644	0.000	0.65		351.8	SURCHARGED
S4.001	S19	19.423	0.943	0.000	1.83		731.3	SURCHARGED
S4.002	S20	18.759	0.477	0.000	2.17		788.5	SURCHARGED
S4.003	S21	17.896	-0.254	0.000	0.63		788.0	OK
S6.000	S22	19.178	0.159	0.000	1.16		87.9	SURCHARGED
S7.000	S23	19.514	0.039	0.000	1.09		142.5	SURCHARGED
S7.001	S24	19.214	-0.003	0.000	1.00		132.6	OK
S7.002	S25	18.850	-0.043	0.000	1.00		129.1	OK
S7.003	S26	18.599	-0.077	0.000	0.99		129.0	OK
S6.001	S27	18.238	-0.281	0.000	0.55		210.8	OK
S6.002	S28	17.918	-0.301	0.000	0.50		209.9	OK
S6.003	S29	17.844	-0.196	0.000	0.63		596.3	OK
S6.004	S30	17.524	0.264	0.000	2.24		595.2	SURCHARGED
S6.005	S31	17.310	0.000	0.000	1.13		592.8	OK
S8.000	S32	17.917	-0.003	0.000	0.27		59.5	OK
S8.001	S33	17.888	0.268	0.000	1.30		218.2	SURCHARGED
S8.002	S34	17.323	0.003	0.000	1.03		200.2	SURCHARGED
S6.006	S35	17.181	-0.019	0.000	0.49		745.9	OK
S4.004	S36	16.935	0.925	0.000	1.36		1539.7	SURCHARGED
S4.005	S37	16.390	0.090	0.000	1.16		1544.0	FLOOD RISK
S9.000	S38	17.768	0.203	0.000	0.25		28.2	SURCHARGED
S9.001	S39	17.745	0.418	0.000	0.71		54.4	SURCHARGED
S9.002	S40	17.739	0.434	0.000	1.80		292.1	FLOOD RISK
S9.003	S41	17.109	-0.011	0.000	0.59		368.2	OK
S10.000	S42	18.800	1.538	0.000	2.13		373.2	SURCHARGED
S10.001	S43	17.475	0.500	0.000	2.29		370.4	SURCHARGED
S9.004	S44	17.062	0.172	0.000	1.33		762.2	SURCHARGED
S9.005	S45	16.874	0.114	0.000	0.83		716.3	SURCHARGED

Summary of Results for 15 minute 100 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S9.006	S46	16.575	0.310	0.000	1.21		681.1	SURCHARGED
S9.007	S47	16.198	0.153	0.000	1.23		693.9	FLOOD RISK
S11.000	S48	16.321	-0.354	0.000	0.23		102.6	OK
S9.008	S49	16.154	0.139	0.000	1.35		734.6	FLOOD RISK
S9.009	S50	16.100	0.115	0.000	0.98		727.4	FLOOD RISK
S9.010	S51	15.956	0.121	0.000	0.96		737.4	SURCHARGED
S9.011	S52	15.780	0.135	0.000	1.49		735.8	SURCHARGED
S9.012	S53	15.736	-0.364	0.000	0.73		735.4	OK
S12.000	S54	16.007	0.057	0.000	0.98		684.1	SURCHARGED
S12.001	S55	15.704	-0.396	0.000	0.68		684.0	OK
S13.000	S56	17.158	-0.302	0.000	0.24		64.6	OK
S13.001	S57	17.022	-0.208	0.000	0.21		66.6	OK
S13.002	S58	16.984	0.499	0.000	1.23		428.8	SURCHARGED
S13.003	S59	16.107	0.192	0.000	1.79		424.1	SURCHARGED
S13.004	S60	15.732	-0.568	0.000	0.39		422.6	OK
S14.000	S61	15.985	0.090	0.000	1.87		254.8	SURCHARGED
S14.001	S62	15.877	-0.453	0.000	0.57		740.6	OK
S1.011	S63	14.792	0.492	0.000	0.05		53.0	SURCHARGED
S15.000	S64	14.999	1.025	0.000	1.58		375.9	SURCHARGED
S16.000	S65	14.179	0.048	0.000	0.73		79.7	SURCHARGED
S15.001	S66	13.871	0.346	0.000	1.81		449.9	SURCHARGED
S1.012	S67	13.561	-0.379	0.000	0.53		533.8	OK
S1.013	S68	13.526	0.276	0.000	0.18		54.6	SURCHARGED
S1.014	S69	12.651	-0.296	0.000	0.26		54.6	OK
S17.000	S70	14.392	0.867	0.000	1.28		404.6	SURCHARGED
S17.001	S71	13.572	0.547	0.000	1.20		411.7	SURCHARGED
S17.002	S72	12.911	0.336	0.000	1.38		584.8	SURCHARGED
S17.003	S73	12.516	-0.334	0.000	0.77		586.4	OK
S17.004	S74	12.016	-0.084	0.000	0.01		0.4	OK
S1.015	S75	12.163	-0.269	0.000	0.13		49.3	OK
S1.016	S76	12.155	-0.135	0.000	0.18		49.3	OK
S1.017	S77	12.149	-0.501	0.000	0.06		49.2	OK
S18.000	S78	18.252	-0.113	0.000	0.50		20.0	OK
S18.001	S79	17.566	-0.063	0.000	0.87		35.0	OK
S18.002	S80	16.922	-0.008	0.000	0.60		45.0	OK
S18.003	S81	16.871	0.091	0.000	0.56		45.0	SURCHARGED
S18.004	S82	16.767	0.357	0.000	0.63		50.0	SURCHARGED
S18.005	S83	16.646	0.576	0.000	0.69		54.9	SURCHARGED
S18.006	S84	16.517	0.747	0.000	0.71		53.6	SURCHARGED
S19.000	S85	17.603	-0.070	0.000	0.56		10.0	OK
S19.001	S86	17.148	-0.069	0.000	0.57		10.0	OK
S19.002	S87	16.845	-0.060	0.000	0.63		10.0	OK
S19.003	S88	16.758	-0.067	0.000	0.51		25.0	OK
S19.004	S89	16.671	0.196	0.000	0.52		25.0	SURCHARGED
S19.005	S90	16.473	0.798	0.000	0.84		25.0	SURCHARGED
S18.007	S91	16.451	0.821	0.000	0.91		74.8	SURCHARGED
S20.000	S92	17.273	-0.172	0.000	0.13		5.0	OK
S20.001	S93	16.746	-0.169	0.000	0.14		5.0	OK
S20.002	S94	16.346	-0.199	0.000	0.03		5.0	OK

Summary of Results for 15 minute 100 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S18.008	S95	15.831	0.941	0.000	1.15		94.3	SURCHARGED
S18.009	S96	15.015	0.735	0.000	1.25		99.1	SURCHARGED
S18.010	S97	14.578	0.578	0.000	1.33		103.9	SURCHARGED
S18.011	S98	14.186	0.406	0.000	1.52		108.7	SURCHARGED
S18.012	S99	13.474	-0.001	0.000	0.85		117.3	OK
S21.000	S100	14.824	-0.151	0.000	0.24		10.0	OK
S21.001	S101	14.189	-0.116	0.000	0.48		15.0	OK
S21.002	S102	14.124	-0.131	0.000	0.37		15.0	OK
S21.003	S103	13.844	-0.131	0.000	0.37		15.0	OK
S22.000	S104	14.923	-0.132	0.000	0.36		15.0	OK
S22.001	S105	14.306	-0.099	0.000	0.60		25.0	OK
S21.004	S106	13.498	-0.137	0.000	0.57		50.0	OK
S23.000	S107	15.850	-0.225	0.000	0.00		0.0	OK
S23.001	S108	13.220	-0.375	0.000	0.00		0.0	OK
S23.002	S109	12.960	-0.205	0.000	0.00		0.0	OK
S21.005	S110	12.960	-0.185	0.000	0.42		50.0	OK
S18.013	S111	12.852	0.227	0.000	1.41		165.7	SURCHARGED
S18.014	S112	12.325	-0.050	0.000	0.72		165.3	OK
S1.018	S113	12.146	-0.474	0.000	0.62		214.4	OK

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes SW PIPES Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	Add Flow / Climate Change (%)	40
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.450	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	100	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

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
S1.000	17.966	0.125	143.7	0.890	8.00	0.0	0.600	o	525	
S1.001	79.485	0.265	299.9	0.865	0.00	0.0	0.600	o	600	
S2.000	104.530	1.000	104.5	0.952	8.00	0.0	0.600	o	675	
S2.001	35.691	0.215	166.0	0.975	0.00	0.0	0.600	o	750	
S2.002	79.737	0.320	249.2	0.204	0.00	0.0	0.600	o	750	
S1.002	61.629	0.185	333.1	0.446	0.00	0.0	0.600	o	800	
S1.003	51.618	0.230	224.4	0.000	0.00	0.0	0.600	o	800	
S1.004	13.469	0.068	198.1	0.000	0.00	0.0	0.600	o	800	
S1.005	12.368	0.062	199.5	0.000	0.00	0.0	0.600	o	800	

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)
S1.000	100.00	8.16	17.400	0.890	0.0	0.0	96.4	1.87	404.0	337.4
S1.001	100.00	9.11	17.200	1.755	0.0	0.0	190.1	1.40	396.1«	665.4
S2.000	100.00	8.68	18.395	0.952	0.0	0.0	103.1	2.56	917.3	361.0
S2.001	100.00	8.95	17.320	1.927	0.0	0.0	208.8	2.17	958.4	730.6
S2.002	100.00	9.71	17.105	2.131	0.0	0.0	230.9	1.77	781.2«	808.0
S1.002	100.00	10.35	16.735	4.332	0.0	0.0	469.3	1.59	799.4«	1642.5
S1.003	100.00	10.79	16.550	4.332	0.0	0.0	469.3	1.94	975.3«	1642.5
S1.004	100.00	10.90	16.320	4.332	0.0	0.0	469.3	2.07	1038.6«	1642.5
S1.005	100.00	11.00	16.252	4.332	0.0	0.0	469.3	2.06	1034.9«	1642.5

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
S3.000	25.768	0.170	151.6	0.286	8.00	0.0	0.600	o	300	
S3.001	22.011	0.110	200.1	0.162	0.00	0.0	0.600	o	300	
S1.006	66.006	0.290	227.6	0.000	0.00	0.0	0.600	o	800	
S1.007	18.446	0.070	263.5	0.000	0.00	0.0	0.600	o	800	
S1.008	130.205	0.500	260.4	0.000	0.00	0.0	0.600	o	800	
S1.009	13.328	0.040	333.2	0.000	0.00	0.0	0.600	o	875	
S1.010	136.349	0.990	137.7	0.000	0.00	0.0	0.600	o	1000	
S4.000	129.886	0.795	163.4	1.173	8.00	0.0	0.600	o	525	
S5.000	69.831	0.520	134.3	1.085	8.00	0.0	0.600	o	600	
S4.001	43.224	0.198	218.3	0.077	0.00	0.0	0.600	o	600	
S4.002	6.272	0.132	47.5	0.405	0.00	0.0	0.600	o	600	
S4.003	44.802	1.990	22.5	0.000	0.00	0.0	0.600	o	600	
S6.000	99.776	0.500	199.6	0.246	8.00	0.0	0.600	o	300	
S7.000	51.619	0.258	200.1	0.398	8.00	0.0	0.600	o	375	
S7.001	64.724	0.324	199.8	0.000	0.00	0.0	0.600	o	375	

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)
S3.000	100.00	8.34	16.970	0.286	0.0	0.0	31.0	1.27	90.1«	108.4
S3.001	100.00	8.67	16.800	0.448	0.0	0.0	48.5	1.11	78.3«	169.9
S1.006	100.00	11.57	16.190	4.780	0.0	0.0	517.8	1.93	968.4«	1812.4
S1.007	100.00	11.75	15.900	4.780	0.0	0.0	517.8	1.79	899.6«	1812.4
S1.008	100.00	12.95	15.830	4.780	0.0	0.0	517.8	1.80	905.0«	1812.4
S1.009	100.00	13.08	15.255	4.780	0.0	0.0	517.8	1.68	1011.0«	1812.4
S1.010	100.00	13.88	15.215	4.780	0.0	0.0	517.8	2.85	2236.7	1812.4
S4.000	100.00	9.24	18.750	1.173	0.0	0.0	127.1	1.75	378.8«	444.7
S5.000	100.00	8.55	18.400	1.085	0.0	0.0	117.5	2.10	593.7	411.4
S4.001	100.00	9.68	17.880	2.335	0.0	0.0	253.0	1.64	464.9«	885.3
S4.002	100.00	9.70	17.682	2.740	0.0	0.0	296.8	3.54	1000.6«	1038.9
S4.003	100.00	9.85	17.550	2.740	0.0	0.0	296.8	5.15	1455.3	1038.9
S6.000	100.00	9.50	18.719	0.246	0.0	0.0	26.6	1.11	78.4«	93.3
S7.000	100.00	8.67	19.100	0.398	0.0	0.0	43.1	1.28	141.1«	150.9
S7.001	100.00	9.52	18.842	0.398	0.0	0.0	43.1	1.28	141.2«	150.9

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
S7.002	43.463	0.217	200.3	0.000	0.00	0.0	0.600	o	375	
S7.003	28.540	0.157	181.8	0.000	0.00	0.0	0.600	o	375	
S6.001	80.238	0.300	267.5	0.000	0.00	0.0	0.600	o	600	
S6.002	3.433	0.179	19.2	0.000	0.00	0.0	0.600	o	600	
S6.003	61.378	0.780	78.7	1.316	0.00	0.0	0.600	o	680	
S6.004	6.371	0.020	318.6	0.000	0.00	0.0	0.600	o	680	
S6.005	40.521	0.110	368.4	0.000	0.00	0.0	0.600	o	750	
S8.000	55.053	0.300	183.5	0.161	8.00	0.0	0.600	o	450	
S8.001	100.444	0.300	334.8	0.504	0.00	0.0	0.600	o	450	
S8.002	7.271	0.120	60.6	0.000	0.00	0.0	0.600	o	450	
S6.006	49.044	1.040	47.2	0.000	0.00	0.0	0.600	o	750	
S4.004	73.185	0.290	252.4	0.280	0.00	0.0	0.600	[]	1	
S4.005	126.298	0.400	315.7	0.000	0.00	0.0	0.600	o	1000	
S9.000	63.403	0.238	266.4	0.075	8.00	0.0	0.600	o	375	
S9.001	6.518	0.022	296.3	0.000	0.00	0.0	0.600	o	375	
S9.002	62.164	0.185	336.0	0.784	0.00	0.0	0.600	o	450	
S9.003	68.571	0.230	298.1	0.353	0.00	0.0	0.600	o	750	

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)
S7.002	100.00	10.08	18.518	0.398	0.0	0.0	43.1	1.28	141.0«	150.9
S7.003	100.00	10.44	18.301	0.398	0.0	0.0	43.1	1.34	148.1«	150.9
S6.001	100.00	11.34	17.919	0.644	0.0	0.0	69.8	1.48	419.7	244.2
S6.002	100.00	11.35	17.619	0.644	0.0	0.0	69.8	5.58	1577.0	244.2
S6.003	100.00	11.70	17.360	1.960	0.0	0.0	212.3	2.97	1078.6	743.1
S6.004	100.00	11.77	16.580	1.960	0.0	0.0	212.3	1.47	533.8«	743.1
S6.005	100.00	12.23	16.560	1.960	0.0	0.0	212.3	1.45	641.5«	743.1
S8.000	100.00	8.61	17.470	0.161	0.0	0.0	17.4	1.50	238.2	61.0
S8.001	100.00	10.13	17.170	0.665	0.0	0.0	72.0	1.11	175.8«	252.1
S8.002	100.00	10.17	16.870	0.665	0.0	0.0	72.0	2.62	416.0	252.1
S6.006	100.00	12.43	16.450	2.625	0.0	0.0	284.4	4.08	1803.1	995.3
S4.004	100.00	13.08	15.410	5.645	0.0	0.0	611.5	1.88	1292.6«	2140.3
S4.005	100.00	14.20	15.300	5.645	0.0	0.0	611.5	1.88	1473.8«	2140.3
S9.000	100.00	8.96	17.190	0.075	0.0	0.0	8.1	1.11	122.1	28.4
S9.001	100.00	9.06	16.952	0.075	0.0	0.0	8.1	1.05	115.7	28.4
S9.002	100.00	10.00	16.855	0.859	0.0	0.0	93.1	1.10	175.5«	325.7
S9.003	100.00	10.71	16.370	1.212	0.0	0.0	131.3	1.62	713.7	459.5

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
S10.000	86.241	0.287	300.5	1.118	8.00	0.0	0.600	o	450	
S10.001	23.031	0.085	271.0	0.000	0.00	0.0	0.600	o	450	
S9.004	40.000	0.130	307.7	0.244	0.00	0.0	0.600	o	750	
S9.005	81.776	0.495	165.2	0.000	0.00	0.0	0.600	o	750	
S9.006	65.659	0.265	247.8	0.000	0.00	0.0	0.600	oo	525	
S9.007	6.999	0.030	233.3	0.412	0.00	0.0	0.600	ooo	525	
S11.000	66.317	0.660	100.5	0.282	8.00	0.0	0.600	o	525	
S9.008	8.392	0.030	279.7	0.000	0.00	0.0	0.600	ooo	525	
S9.009	44.429	0.150	296.2	0.000	0.00	0.0	0.600	ooo	525	
S9.010	54.698	0.190	287.9	0.476	0.00	0.0	0.600	ooo	525	
S9.011	4.281	0.020	214.1	0.000	0.00	0.0	0.600	ooo	525	
S9.012	105.226	0.200	526.1	0.000	0.00	0.0	0.600	o	1000	
S12.000	77.655	0.311	249.7	1.969	8.00	0.0	0.600	o	750	
S12.001	104.843	0.200	524.2	0.000	0.00	0.0	0.600	o	1000	
S13.000	19.206	0.230	83.5	0.177	8.00	0.0	0.600	o	450	
S13.001	69.246	0.745	92.9	0.000	0.00	0.0	0.600	o	450	

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)
S10.000	100.00	9.23	16.812	1.118	0.0	0.0	121.1	1.17	185.7«	423.9
S10.001	100.00	9.54	16.525	1.118	0.0	0.0	121.1	1.23	195.7«	423.9
S9.004	100.00	11.13	16.140	2.574	0.0	0.0	278.8	1.59	702.5«	975.9
S9.005	100.00	11.75	16.010	2.574	0.0	0.0	278.8	2.17	960.7«	975.9
S9.006	100.00	12.52	15.740	2.574	0.0	0.0	278.8	1.42	614.1«	975.9
S9.007	100.00	12.60	15.520	2.986	0.0	0.0	323.5	1.46	949.5«	1132.2
S11.000	100.00	8.49	16.150	0.282	0.0	0.0	30.5	2.23	483.7	106.9
S9.008	100.00	12.71	15.490	3.268	0.0	0.0	354.0	1.33	866.5«	1239.1
S9.009	100.00	13.28	15.460	3.268	0.0	0.0	354.0	1.30	841.8«	1239.1
S9.010	100.00	13.97	15.310	3.744	0.0	0.0	405.6	1.32	854.0«	1419.6
S9.011	100.00	14.02	15.120	3.744	0.0	0.0	405.6	1.53	991.7«	1419.6
S9.012	100.00	15.23	15.100	3.744	0.0	0.0	405.6	1.45	1139.5«	1419.6
S12.000	100.00	8.73	15.200	1.969	0.0	0.0	213.3	1.77	780.4	746.6
S12.001	100.00	9.93	15.100	1.969	0.0	0.0	213.3	1.45	1141.6	746.6
S13.000	100.00	8.14	17.010	0.177	0.0	0.0	19.2	2.23	354.1	67.1
S13.001	100.00	8.69	16.780	0.177	0.0	0.0	19.2	2.11	335.5	67.1

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
S13.002	97.217	0.570	170.6	1.098	0.00	0.0	0.600	o	525	
S13.003	24.661	0.090	274.0	0.000	0.00	0.0	0.600	o	525	
S13.004	204.153	0.400	510.4	0.000	0.00	0.0	0.600	o	1000	
S14.000	25.044	0.039	642.1	0.697	8.00	0.0	0.600	o	525	
S14.001	146.187	0.426	343.2	1.313	0.00	0.0	0.600	o	1000	
S1.011	219.264	0.360	609.1	0.370	0.00	0.0	0.600	o	1000	
S15.000	72.359	0.449	161.2	1.079	8.00	0.0	0.600	o	450	
S16.000	56.376	0.606	93.0	0.232	8.00	0.0	0.600	o	300	
S15.001	7.451	0.075	99.3	0.000	0.00	0.0	0.600	o	525	
S1.012	231.624	0.390	593.9	0.658	0.00	0.0	0.600	o	1000	
S1.013	18.790	0.303	62.0	0.000	0.00	0.0	0.600	o	450	
S1.014	107.105	0.515	208.0	0.000	0.00	0.0	0.600	o	450	
S17.000	104.533	0.500	209.1	1.280	8.00	0.0	0.600	o	525	
S17.001	76.774	0.450	170.6	0.081	0.00	0.0	0.600	o	525	
S17.002	37.514	0.200	187.6	0.729	0.00	0.0	0.600	o	600	

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)
S13.002	100.00	9.64	15.960	1.275	0.0	0.0	138.1	1.71	370.7«	483.4
S13.003	100.00	9.94	15.390	1.275	0.0	0.0	138.1	1.35	291.9«	483.4
S13.004	100.00	12.25	15.300	1.275	0.0	0.0	138.1	1.47	1157.1	483.4
S14.000	100.00	8.48	15.370	0.697	0.0	0.0	75.5	0.88	189.7«	264.3
S14.001	100.00	9.83	15.330	2.010	0.0	0.0	217.7	1.80	1413.3	762.1
S1.011	92.31	17.94	13.300	19.793	0.0	0.0	1979.3	1.35	1058.4«	6927.4
S15.000	100.00	8.75	13.524	1.079	0.0	0.0	116.9	1.60	254.3«	409.1
S16.000	100.00	8.58	13.831	0.232	0.0	0.0	25.1	1.63	115.3	88.0
S15.001	100.00	8.81	13.000	1.311	0.0	0.0	142.0	2.25	486.5«	497.1
S1.012	84.23	20.77	12.940	21.762	0.0	0.0	1985.8	1.36	1071.9«	6950.3
S1.013	83.92	20.89	12.800	21.762	0.0	0.0	1985.8	2.59	411.2«	6950.3
S1.014	80.82	22.16	12.497	21.762	0.0	0.0	1985.8	1.41	223.6«	6950.3
S17.000	100.00	9.13	13.000	1.280	0.0	0.0	138.7	1.55	334.5«	485.3
S17.001	100.00	9.87	12.500	1.361	0.0	0.0	147.4	1.71	370.6«	516.0
S17.002	100.00	10.23	11.975	2.090	0.0	0.0	226.4	1.77	501.8«	792.4

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
S17.003	30.729	0.050	614.6	0.000	0.00	0.0	0.600	o	1000	
S17.004	4.539	0.020	226.9	0.000	0.00	0.0	0.600	o	300	
S1.015	14.656	0.142	103.2	0.000	0.00	0.0	0.600	o	600	
S1.016	8.662	0.040	216.5	0.000	0.00	0.0	0.600	o	600	
S1.017	12.722	0.040	318.1	0.000	0.00	0.0	0.600	o	1000	
S18.000	117.749	0.736	160.0	0.000	8.00	20.0	0.600	o	225	
S18.001	111.766	0.699	159.9	0.000	0.00	15.0	0.600	o	225	
S18.002	26.453	0.150	176.4	0.000	0.00	10.0	0.600	o	300	
S18.003	64.485	0.370	174.3	0.000	0.00	0.0	0.600	o	300	
S18.004	59.956	0.340	176.3	0.000	0.00	5.0	0.600	o	300	
S18.005	52.143	0.300	173.8	0.000	0.00	5.0	0.600	o	300	
S18.006	24.212	0.140	172.9	0.000	0.00	0.0	0.600	o	300	
S19.000	42.461	0.456	93.1	0.000	8.00	10.0	0.600	o	150	
S19.001	29.038	0.312	93.1	0.000	0.00	0.0	0.600	o	150	
S19.002	7.458	0.080	93.2	0.000	0.00	0.0	0.600	o	150	
S19.003	34.547	0.350	98.7	0.000	0.00	15.0	0.600	o	225	
S19.004	88.659	0.800	110.8	0.000	0.00	0.0	0.600	o	225	
S19.005	6.492	0.045	144.3	0.000	0.00	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)
S17.003	100.00	10.61	11.850	2.090	0.0	0.0	226.4	1.34	1053.6	792.4
S17.004	100.00	10.68	11.800	2.090	0.0	0.0	226.4	1.04	73.5«	792.4
S1.015	80.58	22.26	11.832	23.852	0.0	0.0	2082.1	2.40	677.7«	7287.2
S1.016	80.38	22.35	11.690	23.852	0.0	0.0	2082.1	1.65	466.8«	7287.2
S1.017	80.11	22.46	11.650	23.852	0.0	0.0	2082.1	1.87	1468.4«	7287.2
S18.000	100.00	9.90	18.140	0.000	20.0	0.0	8.0	1.03	41.0	28.0
S18.001	100.00	11.71	17.404	0.000	35.0	0.0	14.0	1.03	41.0«	49.0
S18.002	100.00	12.08	16.630	0.000	45.0	0.0	18.0	1.18	83.5	63.0
S18.003	100.00	12.99	16.480	0.000	45.0	0.0	18.0	1.19	84.0	63.0
S18.004	100.00	13.83	16.110	0.000	50.0	0.0	20.0	1.18	83.5	70.0
S18.005	100.00	14.56	15.770	0.000	55.0	0.0	22.0	1.19	84.1	77.0
S18.006	100.00	14.90	15.470	0.000	55.0	0.0	22.0	1.19	84.3	77.0
S19.000	100.00	8.68	17.523	0.000	10.0	0.0	4.0	1.04	18.4	14.0
S19.001	100.00	9.14	17.067	0.000	10.0	0.0	4.0	1.04	18.4	14.0
S19.002	100.00	9.26	16.755	0.000	10.0	0.0	4.0	1.04	18.4	14.0
S19.003	100.00	9.70	16.600	0.000	25.0	0.0	10.0	1.32	52.3	35.0
S19.004	100.00	10.89	16.250	0.000	25.0	0.0	10.0	1.24	49.4	35.0
S19.005	100.00	10.99	15.450	0.000	25.0	0.0	10.0	1.09	43.2	35.0

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
S18.007	128.495	0.740	173.6	0.000	0.00	0.0	0.600	o	300	
S20.000	85.961	0.530	162.2	0.000	8.00	5.0	0.600	o	225	
S20.001	74.193	0.370	200.5	0.000	0.00	0.0	0.600	o	225	
S20.002	11.170	1.655	6.7	0.000	0.00	0.0	0.600	o	225	
S18.008	105.664	0.610	173.2	0.000	0.00	15.0	0.600	o	300	
S18.009	48.123	0.280	171.9	0.000	0.00	5.0	0.600	o	300	
S18.010	38.176	0.220	173.5	0.000	0.00	5.0	0.600	o	300	
S18.011	67.097	0.305	220.0	0.000	0.00	5.0	0.600	o	300	
S18.012	169.773	0.850	199.7	0.000	0.00	10.0	0.600	o	375	
S21.000	99.686	0.670	148.8	0.000	8.00	10.0	0.600	o	225	
S21.001	7.183	0.050	143.7	0.000	0.00	5.0	0.600	o	225	
S21.002	41.289	0.280	147.5	0.000	0.00	0.0	0.600	o	225	
S21.003	51.231	0.340	150.7	0.000	0.00	0.0	0.600	o	225	
S22.000	96.242	0.650	148.1	0.000	8.00	15.0	0.600	o	225	
S22.001	114.435	0.770	148.6	0.000	0.00	10.0	0.600	o	225	
S21.004	72.684	0.490	148.3	0.000	0.00	10.0	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)
S18.007	96.43	16.70	15.330	0.000	80.0	0.0	32.0	1.19	84.1«	112.0
S20.000	100.00	9.40	17.220	0.000	5.0	0.0	2.0	1.02	40.7	7.0
S20.001	100.00	10.74	16.690	0.000	5.0	0.0	2.0	0.92	36.6	7.0
S20.002	100.00	10.78	16.320	0.000	5.0	0.0	2.0	5.07	201.6	7.0
S18.008	91.56	18.18	14.590	0.000	100.0	0.0	40.0	1.19	84.2«	140.0
S18.009	89.52	18.85	13.980	0.000	105.0	0.0	42.0	1.20	84.6«	147.0
S18.010	87.98	19.38	13.700	0.000	110.0	0.0	44.0	1.19	84.2«	154.0
S18.011	85.08	20.44	13.480	0.000	115.0	0.0	46.0	1.06	74.6«	161.0
S18.012	79.67	22.66	13.100	0.000	125.0	0.0	50.0	1.28	141.2«	175.0
S21.000	100.00	9.55	14.750	0.000	10.0	0.0	4.0	1.07	42.5	14.0
S21.001	100.00	9.66	14.080	0.000	15.0	0.0	6.0	1.09	43.3	21.0
S21.002	100.00	10.30	14.030	0.000	15.0	0.0	6.0	1.07	42.7	21.0
S21.003	100.00	11.11	13.750	0.000	15.0	0.0	6.0	1.06	42.3	21.0
S22.000	100.00	9.50	14.830	0.000	15.0	0.0	6.0	1.07	42.6	21.0
S22.001	100.00	11.28	14.180	0.000	25.0	0.0	10.0	1.07	42.6	35.0
S21.004	100.00	12.22	13.335	0.000	50.0	0.0	20.0	1.29	91.1	70.0

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
S23.000	101.423	2.480	40.9	0.000	8.00	0.0	0.600	o	225	
S23.001	154.404	0.430	359.1	0.000	0.00	0.0	0.600	o	375	
S23.002	4.870	0.020	243.5	0.000	0.00	0.0	0.600	o	375	
S21.005	134.423	0.520	258.5	0.000	0.00	0.0	0.600	o	375	
S18.013	63.087	0.250	252.3	0.000	0.00	0.0	0.600	o	375	
S18.014	5.657	0.340	16.6	0.000	0.00	0.0	0.600	o	375	
S1.018	17.396	0.019	915.6	0.000	0.00	0.0	0.600	o	1000	

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)
S23.000	100.00	8.82	15.850	0.000	0.0	0.0	0.0	2.05	81.6	0.0
S23.001	100.00	11.53	13.220	0.000	0.0	0.0	0.0	0.95	105.0	0.0
S23.002	100.00	11.60	12.790	0.000	0.0	0.0	0.0	1.16	127.8	0.0
S21.005	100.00	14.21	12.770	0.000	50.0	0.0	20.0	1.12	123.9	70.0
S18.013	77.63	23.58	12.250	0.000	175.0	0.0	70.0	1.14	125.5«	245.0
S18.014	77.58	23.60	12.000	0.000	175.0	0.0	70.0	4.46	492.7	245.0
S1.018	77.02	23.87	11.620	23.852	175.0	0.0	2082.1	1.10	861.5«	7287.2

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.450		

Summary of Results for 30 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S1.000	S1	19.376	1.451	0.000	0.92		249.4	SURCHARGED
S1.001	S2	19.290	1.490	0.000	1.37		496.3	SURCHARGED
S2.000	S3	19.217	0.147	0.000	0.35		300.3	SURCHARGED
S2.001	S4	19.140	1.070	0.000	0.68		496.8	SURCHARGED
S2.002	S5	19.068	1.213	0.000	0.70		486.6	SURCHARGED
S1.002	S6	18.925	1.390	0.000	1.55		1067.3	SURCHARGED
S1.003	S7	18.595	1.245	0.000	1.22		1001.2	SURCHARGED
S1.004	S8	18.300	1.180	0.000	1.53		983.1	SURCHARGED
S1.005	S9	18.022	0.970	0.000	1.54		955.8	SURCHARGED
S3.000	S10	18.019	0.749	0.000	1.11		89.9	SURCHARGED
S3.001	S11	17.885	0.785	0.000	2.09		143.9	SURCHARGED
S1.006	S12	17.743	0.753	0.000	1.23		1037.5	SURCHARGED
S1.007	S13	17.326	0.626	0.000	1.70		1034.3	SURCHARGED
S1.008	S14	17.004	0.374	0.000	1.20		1008.5	SURCHARGED
S1.009	S15	16.270	0.140	0.000	1.76		1004.7	FLOOD RISK
S1.010	S16	15.713	-0.502	0.000	0.49		992.4	OK
S4.000	S17	19.881	0.606	0.000	0.93		336.8	SURCHARGED
S5.000	S18	19.348	0.348	0.000	0.58		310.6	SURCHARGED
S4.001	S19	19.174	0.694	0.000	1.64		656.6	SURCHARGED
S4.002	S20	18.638	0.356	0.000	1.95		710.6	SURCHARGED
S4.003	S21	17.875	-0.275	0.000	0.57		711.5	OK
S6.000	S22	19.031	0.012	0.000	1.02		77.5	SURCHARGED
S7.000	S23	19.397	-0.078	0.000	0.98		127.6	OK
S7.001	S24	19.133	-0.084	0.000	0.94		124.9	OK
S7.002	S25	18.810	-0.083	0.000	0.96		123.3	OK
S7.003	S26	18.589	-0.087	0.000	0.94		122.8	OK
S6.001	S27	18.224	-0.295	0.000	0.50		193.4	OK
S6.002	S28	17.903	-0.316	0.000	0.46		194.0	OK
S6.003	S29	17.737	-0.303	0.000	0.58		550.8	OK
S6.004	S30	17.455	0.195	0.000	2.01		532.1	SURCHARGED
S6.005	S31	17.288	-0.022	0.000	1.00		524.8	OK
S8.000	S32	17.776	-0.144	0.000	0.24		51.6	OK
S8.001	S33	17.748	0.128	0.000	1.16		194.7	SURCHARGED
S8.002	S34	17.225	-0.095	0.000	0.98		192.0	OK
S6.006	S35	16.990	-0.210	0.000	0.46		704.8	OK
S4.004	S36	16.768	0.758	0.000	1.25		1415.8	SURCHARGED
S4.005	S37	16.307	0.007	0.000	1.07		1420.2	FLOOD RISK
S9.000	S38	17.629	0.064	0.000	0.21		24.4	SURCHARGED
S9.001	S39	17.607	0.280	0.000	0.61		46.2	SURCHARGED
S9.002	S40	17.601	0.296	0.000	1.59		257.3	SURCHARGED
S9.003	S41	16.983	-0.137	0.000	0.52		324.6	OK
S10.000	S42	18.371	1.109	0.000	1.90		333.6	SURCHARGED
S10.001	S43	17.284	0.309	0.000	2.06		334.0	SURCHARGED
S9.004	S44	16.920	0.030	0.000	1.20		690.6	SURCHARGED
S9.005	S45	16.725	-0.035	0.000	0.76		658.1	OK

Summary of Results for 30 minute 100 year Summer (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S9.006	S46	16.466	0.201	0.000	1.12		628.3	SURCHARGED
S9.007	S47	16.141	0.096	0.000	1.16		652.3	FLOOD RISK
S11.000	S48	16.311	-0.364	0.000	0.20		90.6	OK
S9.008	S49	16.101	0.086	0.000	1.27		690.1	SURCHARGED
S9.009	S50	16.053	0.068	0.000	0.93		686.7	FLOOD RISK
S9.010	S51	15.927	0.092	0.000	0.93		713.5	SURCHARGED
S9.011	S52	15.763	0.118	0.000	1.44		712.7	SURCHARGED
S9.012	S53	15.722	-0.378	0.000	0.71		713.3	OK
S12.000	S54	15.902	-0.048	0.000	0.87		607.9	OK
S12.001	S55	15.658	-0.442	0.000	0.60		605.5	OK
S13.000	S56	17.150	-0.310	0.000	0.21		57.3	OK
S13.001	S57	16.910	-0.320	0.000	0.18		57.0	OK
S13.002	S58	16.759	0.274	0.000	1.11		385.1	SURCHARGED
S13.003	S59	16.046	0.131	0.000	1.61		380.8	SURCHARGED
S13.004	S60	15.709	-0.591	0.000	0.35		381.4	OK
S14.000	S61	15.928	0.033	0.000	1.66		225.7	SURCHARGED
S14.001	S62	15.838	-0.492	0.000	0.51		656.3	OK
S1.011	S63	14.859	0.559	0.000	0.05		53.0	SURCHARGED
S15.000	S64	14.680	0.706	0.000	1.40		332.6	SURCHARGED
S16.000	S65	14.039	-0.092	0.000	0.68		73.9	OK
S15.001	S66	13.811	0.286	0.000	1.58		392.1	SURCHARGED
S1.012	S67	13.566	-0.374	0.000	0.48		490.0	OK
S1.013	S68	13.559	0.309	0.000	0.18		54.6	SURCHARGED
S1.014	S69	12.651	-0.296	0.000	0.26		54.6	OK
S17.000	S70	13.985	0.460	0.000	1.19		374.6	SURCHARGED
S17.001	S71	13.313	0.288	0.000	1.09		373.1	SURCHARGED
S17.002	S72	12.777	0.202	0.000	1.24		525.6	SURCHARGED
S17.003	S73	12.463	-0.387	0.000	0.69		523.7	OK
S17.004	S74	12.045	-0.055	0.000	0.01		0.3	OK
S1.015	S75	12.163	-0.269	0.000	0.13		49.4	OK
S1.016	S76	12.155	-0.135	0.000	0.18		49.4	OK
S1.017	S77	12.149	-0.501	0.000	0.06		49.3	OK
S18.000	S78	18.252	-0.113	0.000	0.50		20.0	OK
S18.001	S79	17.566	-0.063	0.000	0.87		35.0	OK
S18.002	S80	16.922	-0.008	0.000	0.60		45.0	OK
S18.003	S81	16.871	0.091	0.000	0.56		45.0	SURCHARGED
S18.004	S82	16.767	0.357	0.000	0.63		50.0	SURCHARGED
S18.005	S83	16.646	0.576	0.000	0.69		54.9	SURCHARGED
S18.006	S84	16.517	0.747	0.000	0.71		53.6	SURCHARGED
S19.000	S85	17.603	-0.070	0.000	0.56		10.0	OK
S19.001	S86	17.148	-0.069	0.000	0.57		10.0	OK
S19.002	S87	16.845	-0.060	0.000	0.63		10.0	OK
S19.003	S88	16.758	-0.067	0.000	0.51		25.0	OK
S19.004	S89	16.671	0.196	0.000	0.52		25.0	SURCHARGED
S19.005	S90	16.473	0.798	0.000	0.84		25.0	SURCHARGED
S18.007	S91	16.451	0.821	0.000	0.91		74.8	SURCHARGED
S20.000	S92	17.273	-0.172	0.000	0.13		5.0	OK
S20.001	S93	16.746	-0.169	0.000	0.14		5.0	OK
S20.002	S94	16.346	-0.199	0.000	0.03		5.0	OK

Summary of Results for 30 minute 100 year Summer (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S18.008	S95	15.831	0.941	0.000	1.15		94.3	SURCHARGED
S18.009	S96	15.015	0.735	0.000	1.25		99.1	SURCHARGED
S18.010	S97	14.578	0.578	0.000	1.33		103.9	SURCHARGED
S18.011	S98	14.186	0.406	0.000	1.52		108.7	SURCHARGED
S18.012	S99	13.474	-0.001	0.000	0.85		117.3	OK
S21.000	S100	14.824	-0.151	0.000	0.24		10.0	OK
S21.001	S101	14.189	-0.116	0.000	0.48		15.0	OK
S21.002	S102	14.124	-0.131	0.000	0.37		15.0	OK
S21.003	S103	13.844	-0.131	0.000	0.37		15.0	OK
S22.000	S104	14.923	-0.132	0.000	0.36		15.0	OK
S22.001	S105	14.306	-0.099	0.000	0.60		25.0	OK
S21.004	S106	13.498	-0.137	0.000	0.57		50.0	OK
S23.000	S107	15.850	-0.225	0.000	0.00		0.0	OK
S23.001	S108	13.220	-0.375	0.000	0.00		0.0	OK
S23.002	S109	12.960	-0.205	0.000	0.00		0.0	OK
S21.005	S110	12.960	-0.185	0.000	0.42		50.0	OK
S18.013	S111	12.852	0.227	0.000	1.41		165.7	SURCHARGED
S18.014	S112	12.325	-0.050	0.000	0.72		165.3	OK
S1.018	S113	12.146	-0.474	0.000	0.62		214.4	OK

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes SW PIPES Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	Add Flow / Climate Change (%)	40
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.450	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	100	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

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
S1.000	17.966	0.125	143.7	0.890	8.00	0.0	0.600	o	525	
S1.001	79.485	0.265	299.9	0.865	0.00	0.0	0.600	o	600	
S2.000	104.530	1.000	104.5	0.952	8.00	0.0	0.600	o	675	
S2.001	35.691	0.215	166.0	0.975	0.00	0.0	0.600	o	750	
S2.002	79.737	0.320	249.2	0.204	0.00	0.0	0.600	o	750	
S1.002	61.629	0.185	333.1	0.446	0.00	0.0	0.600	o	800	
S1.003	51.618	0.230	224.4	0.000	0.00	0.0	0.600	o	800	
S1.004	13.469	0.068	198.1	0.000	0.00	0.0	0.600	o	800	
S1.005	12.368	0.062	199.5	0.000	0.00	0.0	0.600	o	800	

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)
S1.000	100.00	8.16	17.400	0.890	0.0	0.0	96.4	1.87	404.0	337.4
S1.001	100.00	9.11	17.200	1.755	0.0	0.0	190.1	1.40	396.1«	665.4
S2.000	100.00	8.68	18.395	0.952	0.0	0.0	103.1	2.56	917.3	361.0
S2.001	100.00	8.95	17.320	1.927	0.0	0.0	208.8	2.17	958.4	730.6
S2.002	100.00	9.71	17.105	2.131	0.0	0.0	230.9	1.77	781.2«	808.0
S1.002	100.00	10.35	16.735	4.332	0.0	0.0	469.3	1.59	799.4«	1642.5
S1.003	100.00	10.79	16.550	4.332	0.0	0.0	469.3	1.94	975.3«	1642.5
S1.004	100.00	10.90	16.320	4.332	0.0	0.0	469.3	2.07	1038.6«	1642.5
S1.005	100.00	11.00	16.252	4.332	0.0	0.0	469.3	2.06	1034.9«	1642.5

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
S3.000	25.768	0.170	151.6	0.286	8.00	0.0	0.600	o	300	
S3.001	22.011	0.110	200.1	0.162	0.00	0.0	0.600	o	300	
S1.006	66.006	0.290	227.6	0.000	0.00	0.0	0.600	o	800	
S1.007	18.446	0.070	263.5	0.000	0.00	0.0	0.600	o	800	
S1.008	130.205	0.500	260.4	0.000	0.00	0.0	0.600	o	800	
S1.009	13.328	0.040	333.2	0.000	0.00	0.0	0.600	o	875	
S1.010	136.349	0.990	137.7	0.000	0.00	0.0	0.600	o	1000	
S4.000	129.886	0.795	163.4	1.173	8.00	0.0	0.600	o	525	
S5.000	69.831	0.520	134.3	1.085	8.00	0.0	0.600	o	600	
S4.001	43.224	0.198	218.3	0.077	0.00	0.0	0.600	o	600	
S4.002	6.272	0.132	47.5	0.405	0.00	0.0	0.600	o	600	
S4.003	44.802	1.990	22.5	0.000	0.00	0.0	0.600	o	600	
S6.000	99.776	0.500	199.6	0.246	8.00	0.0	0.600	o	300	
S7.000	51.619	0.258	200.1	0.398	8.00	0.0	0.600	o	375	
S7.001	64.724	0.324	199.8	0.000	0.00	0.0	0.600	o	375	

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)
S3.000	100.00	8.34	16.970	0.286	0.0	0.0	31.0	1.27	90.1«	108.4
S3.001	100.00	8.67	16.800	0.448	0.0	0.0	48.5	1.11	78.3«	169.9
S1.006	100.00	11.57	16.190	4.780	0.0	0.0	517.8	1.93	968.4«	1812.4
S1.007	100.00	11.75	15.900	4.780	0.0	0.0	517.8	1.79	899.6«	1812.4
S1.008	100.00	12.95	15.830	4.780	0.0	0.0	517.8	1.80	905.0«	1812.4
S1.009	100.00	13.08	15.255	4.780	0.0	0.0	517.8	1.68	1011.0«	1812.4
S1.010	100.00	13.88	15.215	4.780	0.0	0.0	517.8	2.85	2236.7	1812.4
S4.000	100.00	9.24	18.750	1.173	0.0	0.0	127.1	1.75	378.8«	444.7
S5.000	100.00	8.55	18.400	1.085	0.0	0.0	117.5	2.10	593.7	411.4
S4.001	100.00	9.68	17.880	2.335	0.0	0.0	253.0	1.64	464.9«	885.3
S4.002	100.00	9.70	17.682	2.740	0.0	0.0	296.8	3.54	1000.6«	1038.9
S4.003	100.00	9.85	17.550	2.740	0.0	0.0	296.8	5.15	1455.3	1038.9
S6.000	100.00	9.50	18.719	0.246	0.0	0.0	26.6	1.11	78.4«	93.3
S7.000	100.00	8.67	19.100	0.398	0.0	0.0	43.1	1.28	141.1«	150.9
S7.001	100.00	9.52	18.842	0.398	0.0	0.0	43.1	1.28	141.2«	150.9

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
S7.002	43.463	0.217	200.3	0.000	0.00	0.0	0.600	o	375	
S7.003	28.540	0.157	181.8	0.000	0.00	0.0	0.600	o	375	
S6.001	80.238	0.300	267.5	0.000	0.00	0.0	0.600	o	600	
S6.002	3.433	0.179	19.2	0.000	0.00	0.0	0.600	o	600	
S6.003	61.378	0.780	78.7	1.316	0.00	0.0	0.600	o	680	
S6.004	6.371	0.020	318.6	0.000	0.00	0.0	0.600	o	680	
S6.005	40.521	0.110	368.4	0.000	0.00	0.0	0.600	o	750	
S8.000	55.053	0.300	183.5	0.161	8.00	0.0	0.600	o	450	
S8.001	100.444	0.300	334.8	0.504	0.00	0.0	0.600	o	450	
S8.002	7.271	0.120	60.6	0.000	0.00	0.0	0.600	o	450	
S6.006	49.044	1.040	47.2	0.000	0.00	0.0	0.600	o	750	
S4.004	73.185	0.290	252.4	0.280	0.00	0.0	0.600	[]	1	
S4.005	126.298	0.400	315.7	0.000	0.00	0.0	0.600	o	1000	
S9.000	63.403	0.238	266.4	0.075	8.00	0.0	0.600	o	375	
S9.001	6.518	0.022	296.3	0.000	0.00	0.0	0.600	o	375	
S9.002	62.164	0.185	336.0	0.784	0.00	0.0	0.600	o	450	
S9.003	68.571	0.230	298.1	0.353	0.00	0.0	0.600	o	750	

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)
S7.002	100.00	10.08	18.518	0.398	0.0	0.0	43.1	1.28	141.0«	150.9
S7.003	100.00	10.44	18.301	0.398	0.0	0.0	43.1	1.34	148.1«	150.9
S6.001	100.00	11.34	17.919	0.644	0.0	0.0	69.8	1.48	419.7	244.2
S6.002	100.00	11.35	17.619	0.644	0.0	0.0	69.8	5.58	1577.0	244.2
S6.003	100.00	11.70	17.360	1.960	0.0	0.0	212.3	2.97	1078.6	743.1
S6.004	100.00	11.77	16.580	1.960	0.0	0.0	212.3	1.47	533.8«	743.1
S6.005	100.00	12.23	16.560	1.960	0.0	0.0	212.3	1.45	641.5«	743.1
S8.000	100.00	8.61	17.470	0.161	0.0	0.0	17.4	1.50	238.2	61.0
S8.001	100.00	10.13	17.170	0.665	0.0	0.0	72.0	1.11	175.8«	252.1
S8.002	100.00	10.17	16.870	0.665	0.0	0.0	72.0	2.62	416.0	252.1
S6.006	100.00	12.43	16.450	2.625	0.0	0.0	284.4	4.08	1803.1	995.3
S4.004	100.00	13.08	15.410	5.645	0.0	0.0	611.5	1.88	1292.6«	2140.3
S4.005	100.00	14.20	15.300	5.645	0.0	0.0	611.5	1.88	1473.8«	2140.3
S9.000	100.00	8.96	17.190	0.075	0.0	0.0	8.1	1.11	122.1	28.4
S9.001	100.00	9.06	16.952	0.075	0.0	0.0	8.1	1.05	115.7	28.4
S9.002	100.00	10.00	16.855	0.859	0.0	0.0	93.1	1.10	175.5«	325.7
S9.003	100.00	10.71	16.370	1.212	0.0	0.0	131.3	1.62	713.7	459.5

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
S10.000	86.241	0.287	300.5	1.118	8.00	0.0	0.600	o	450	
S10.001	23.031	0.085	271.0	0.000	0.00	0.0	0.600	o	450	
S9.004	40.000	0.130	307.7	0.244	0.00	0.0	0.600	o	750	
S9.005	81.776	0.495	165.2	0.000	0.00	0.0	0.600	o	750	
S9.006	65.659	0.265	247.8	0.000	0.00	0.0	0.600	oo	525	
S9.007	6.999	0.030	233.3	0.412	0.00	0.0	0.600	ooo	525	
S11.000	66.317	0.660	100.5	0.282	8.00	0.0	0.600	o	525	
S9.008	8.392	0.030	279.7	0.000	0.00	0.0	0.600	ooo	525	
S9.009	44.429	0.150	296.2	0.000	0.00	0.0	0.600	ooo	525	
S9.010	54.698	0.190	287.9	0.476	0.00	0.0	0.600	ooo	525	
S9.011	4.281	0.020	214.1	0.000	0.00	0.0	0.600	ooo	525	
S9.012	105.226	0.200	526.1	0.000	0.00	0.0	0.600	o	1000	
S12.000	77.655	0.311	249.7	1.969	8.00	0.0	0.600	o	750	
S12.001	104.843	0.200	524.2	0.000	0.00	0.0	0.600	o	1000	
S13.000	19.206	0.230	83.5	0.177	8.00	0.0	0.600	o	450	
S13.001	69.246	0.745	92.9	0.000	0.00	0.0	0.600	o	450	

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)
S10.000	100.00	9.23	16.812	1.118	0.0	0.0	121.1	1.17	185.7«	423.9
S10.001	100.00	9.54	16.525	1.118	0.0	0.0	121.1	1.23	195.7«	423.9
S9.004	100.00	11.13	16.140	2.574	0.0	0.0	278.8	1.59	702.5«	975.9
S9.005	100.00	11.75	16.010	2.574	0.0	0.0	278.8	2.17	960.7«	975.9
S9.006	100.00	12.52	15.740	2.574	0.0	0.0	278.8	1.42	614.1«	975.9
S9.007	100.00	12.60	15.520	2.986	0.0	0.0	323.5	1.46	949.5«	1132.2
S11.000	100.00	8.49	16.150	0.282	0.0	0.0	30.5	2.23	483.7	106.9
S9.008	100.00	12.71	15.490	3.268	0.0	0.0	354.0	1.33	866.5«	1239.1
S9.009	100.00	13.28	15.460	3.268	0.0	0.0	354.0	1.30	841.8«	1239.1
S9.010	100.00	13.97	15.310	3.744	0.0	0.0	405.6	1.32	854.0«	1419.6
S9.011	100.00	14.02	15.120	3.744	0.0	0.0	405.6	1.53	991.7«	1419.6
S9.012	100.00	15.23	15.100	3.744	0.0	0.0	405.6	1.45	1139.5«	1419.6
S12.000	100.00	8.73	15.200	1.969	0.0	0.0	213.3	1.77	780.4	746.6
S12.001	100.00	9.93	15.100	1.969	0.0	0.0	213.3	1.45	1141.6	746.6
S13.000	100.00	8.14	17.010	0.177	0.0	0.0	19.2	2.23	354.1	67.1
S13.001	100.00	8.69	16.780	0.177	0.0	0.0	19.2	2.11	335.5	67.1

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
S13.002	97.217	0.570	170.6	1.098	0.00	0.0	0.600	o	525	
S13.003	24.661	0.090	274.0	0.000	0.00	0.0	0.600	o	525	
S13.004	204.153	0.400	510.4	0.000	0.00	0.0	0.600	o	1000	
S14.000	25.044	0.039	642.1	0.697	8.00	0.0	0.600	o	525	
S14.001	146.187	0.426	343.2	1.313	0.00	0.0	0.600	o	1000	
S1.011	219.264	0.360	609.1	0.370	0.00	0.0	0.600	o	1000	
S15.000	72.359	0.449	161.2	1.079	8.00	0.0	0.600	o	450	
S16.000	56.376	0.606	93.0	0.232	8.00	0.0	0.600	o	300	
S15.001	7.451	0.075	99.3	0.000	0.00	0.0	0.600	o	525	
S1.012	231.624	0.390	593.9	0.658	0.00	0.0	0.600	o	1000	
S1.013	18.790	0.303	62.0	0.000	0.00	0.0	0.600	o	450	
S1.014	107.105	0.515	208.0	0.000	0.00	0.0	0.600	o	450	
S17.000	104.533	0.500	209.1	1.280	8.00	0.0	0.600	o	525	
S17.001	76.774	0.450	170.6	0.081	0.00	0.0	0.600	o	525	
S17.002	37.514	0.200	187.6	0.729	0.00	0.0	0.600	o	600	

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)
S13.002	100.00	9.64	15.960	1.275	0.0	0.0	138.1	1.71	370.7«	483.4
S13.003	100.00	9.94	15.390	1.275	0.0	0.0	138.1	1.35	291.9«	483.4
S13.004	100.00	12.25	15.300	1.275	0.0	0.0	138.1	1.47	1157.1	483.4
S14.000	100.00	8.48	15.370	0.697	0.0	0.0	75.5	0.88	189.7«	264.3
S14.001	100.00	9.83	15.330	2.010	0.0	0.0	217.7	1.80	1413.3	762.1
S1.011	92.31	17.94	13.300	19.793	0.0	0.0	1979.3	1.35	1058.4«	6927.4
S15.000	100.00	8.75	13.524	1.079	0.0	0.0	116.9	1.60	254.3«	409.1
S16.000	100.00	8.58	13.831	0.232	0.0	0.0	25.1	1.63	115.3	88.0
S15.001	100.00	8.81	13.000	1.311	0.0	0.0	142.0	2.25	486.5«	497.1
S1.012	84.23	20.77	12.940	21.762	0.0	0.0	1985.8	1.36	1071.9«	6950.3
S1.013	83.92	20.89	12.800	21.762	0.0	0.0	1985.8	2.59	411.2«	6950.3
S1.014	80.82	22.16	12.497	21.762	0.0	0.0	1985.8	1.41	223.6«	6950.3
S17.000	100.00	9.13	13.000	1.280	0.0	0.0	138.7	1.55	334.5«	485.3
S17.001	100.00	9.87	12.500	1.361	0.0	0.0	147.4	1.71	370.6«	516.0
S17.002	100.00	10.23	11.975	2.090	0.0	0.0	226.4	1.77	501.8«	792.4

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
S17.003	30.729	0.050	614.6	0.000	0.00	0.0	0.600	o	1000	
S17.004	4.539	0.020	226.9	0.000	0.00	0.0	0.600	o	300	
S1.015	14.656	0.142	103.2	0.000	0.00	0.0	0.600	o	600	
S1.016	8.662	0.040	216.5	0.000	0.00	0.0	0.600	o	600	
S1.017	12.722	0.040	318.1	0.000	0.00	0.0	0.600	o	1000	
S18.000	117.749	0.736	160.0	0.000	8.00	20.0	0.600	o	225	
S18.001	111.766	0.699	159.9	0.000	0.00	15.0	0.600	o	225	
S18.002	26.453	0.150	176.4	0.000	0.00	10.0	0.600	o	300	
S18.003	64.485	0.370	174.3	0.000	0.00	0.0	0.600	o	300	
S18.004	59.956	0.340	176.3	0.000	0.00	5.0	0.600	o	300	
S18.005	52.143	0.300	173.8	0.000	0.00	5.0	0.600	o	300	
S18.006	24.212	0.140	172.9	0.000	0.00	0.0	0.600	o	300	
S19.000	42.461	0.456	93.1	0.000	8.00	10.0	0.600	o	150	
S19.001	29.038	0.312	93.1	0.000	0.00	0.0	0.600	o	150	
S19.002	7.458	0.080	93.2	0.000	0.00	0.0	0.600	o	150	
S19.003	34.547	0.350	98.7	0.000	0.00	15.0	0.600	o	225	
S19.004	88.659	0.800	110.8	0.000	0.00	0.0	0.600	o	225	
S19.005	6.492	0.045	144.3	0.000	0.00	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)
S17.003	100.00	10.61	11.850	2.090	0.0	0.0	226.4	1.34	1053.6	792.4
S17.004	100.00	10.68	11.800	2.090	0.0	0.0	226.4	1.04	73.5«	792.4
S1.015	80.58	22.26	11.832	23.852	0.0	0.0	2082.1	2.40	677.7«	7287.2
S1.016	80.38	22.35	11.690	23.852	0.0	0.0	2082.1	1.65	466.8«	7287.2
S1.017	80.11	22.46	11.650	23.852	0.0	0.0	2082.1	1.87	1468.4«	7287.2
S18.000	100.00	9.90	18.140	0.000	20.0	0.0	8.0	1.03	41.0	28.0
S18.001	100.00	11.71	17.404	0.000	35.0	0.0	14.0	1.03	41.0«	49.0
S18.002	100.00	12.08	16.630	0.000	45.0	0.0	18.0	1.18	83.5	63.0
S18.003	100.00	12.99	16.480	0.000	45.0	0.0	18.0	1.19	84.0	63.0
S18.004	100.00	13.83	16.110	0.000	50.0	0.0	20.0	1.18	83.5	70.0
S18.005	100.00	14.56	15.770	0.000	55.0	0.0	22.0	1.19	84.1	77.0
S18.006	100.00	14.90	15.470	0.000	55.0	0.0	22.0	1.19	84.3	77.0
S19.000	100.00	8.68	17.523	0.000	10.0	0.0	4.0	1.04	18.4	14.0
S19.001	100.00	9.14	17.067	0.000	10.0	0.0	4.0	1.04	18.4	14.0
S19.002	100.00	9.26	16.755	0.000	10.0	0.0	4.0	1.04	18.4	14.0
S19.003	100.00	9.70	16.600	0.000	25.0	0.0	10.0	1.32	52.3	35.0
S19.004	100.00	10.89	16.250	0.000	25.0	0.0	10.0	1.24	49.4	35.0
S19.005	100.00	10.99	15.450	0.000	25.0	0.0	10.0	1.09	43.2	35.0

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
S18.007	128.495	0.740	173.6	0.000	0.00	0.0	0.600	o	300	
S20.000	85.961	0.530	162.2	0.000	8.00	5.0	0.600	o	225	
S20.001	74.193	0.370	200.5	0.000	0.00	0.0	0.600	o	225	
S20.002	11.170	1.655	6.7	0.000	0.00	0.0	0.600	o	225	
S18.008	105.664	0.610	173.2	0.000	0.00	15.0	0.600	o	300	
S18.009	48.123	0.280	171.9	0.000	0.00	5.0	0.600	o	300	
S18.010	38.176	0.220	173.5	0.000	0.00	5.0	0.600	o	300	
S18.011	67.097	0.305	220.0	0.000	0.00	5.0	0.600	o	300	
S18.012	169.773	0.850	199.7	0.000	0.00	10.0	0.600	o	375	
S21.000	99.686	0.670	148.8	0.000	8.00	10.0	0.600	o	225	
S21.001	7.183	0.050	143.7	0.000	0.00	5.0	0.600	o	225	
S21.002	41.289	0.280	147.5	0.000	0.00	0.0	0.600	o	225	
S21.003	51.231	0.340	150.7	0.000	0.00	0.0	0.600	o	225	
S22.000	96.242	0.650	148.1	0.000	8.00	15.0	0.600	o	225	
S22.001	114.435	0.770	148.6	0.000	0.00	10.0	0.600	o	225	
S21.004	72.684	0.490	148.3	0.000	0.00	10.0	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)
S18.007	96.43	16.70	15.330	0.000	80.0	0.0	32.0	1.19	84.1«	112.0
S20.000	100.00	9.40	17.220	0.000	5.0	0.0	2.0	1.02	40.7	7.0
S20.001	100.00	10.74	16.690	0.000	5.0	0.0	2.0	0.92	36.6	7.0
S20.002	100.00	10.78	16.320	0.000	5.0	0.0	2.0	5.07	201.6	7.0
S18.008	91.56	18.18	14.590	0.000	100.0	0.0	40.0	1.19	84.2«	140.0
S18.009	89.52	18.85	13.980	0.000	105.0	0.0	42.0	1.20	84.6«	147.0
S18.010	87.98	19.38	13.700	0.000	110.0	0.0	44.0	1.19	84.2«	154.0
S18.011	85.08	20.44	13.480	0.000	115.0	0.0	46.0	1.06	74.6«	161.0
S18.012	79.67	22.66	13.100	0.000	125.0	0.0	50.0	1.28	141.2«	175.0
S21.000	100.00	9.55	14.750	0.000	10.0	0.0	4.0	1.07	42.5	14.0
S21.001	100.00	9.66	14.080	0.000	15.0	0.0	6.0	1.09	43.3	21.0
S21.002	100.00	10.30	14.030	0.000	15.0	0.0	6.0	1.07	42.7	21.0
S21.003	100.00	11.11	13.750	0.000	15.0	0.0	6.0	1.06	42.3	21.0
S22.000	100.00	9.50	14.830	0.000	15.0	0.0	6.0	1.07	42.6	21.0
S22.001	100.00	11.28	14.180	0.000	25.0	0.0	10.0	1.07	42.6	35.0
S21.004	100.00	12.22	13.335	0.000	50.0	0.0	20.0	1.29	91.1	70.0

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
S23.000	101.423	2.480	40.9	0.000	8.00	0.0	0.600	o	225	
S23.001	154.404	0.430	359.1	0.000	0.00	0.0	0.600	o	375	
S23.002	4.870	0.020	243.5	0.000	0.00	0.0	0.600	o	375	
S21.005	134.423	0.520	258.5	0.000	0.00	0.0	0.600	o	375	
S18.013	63.087	0.250	252.3	0.000	0.00	0.0	0.600	o	375	
S18.014	5.657	0.340	16.6	0.000	0.00	0.0	0.600	o	375	
S1.018	17.396	0.019	915.6	0.000	0.00	0.0	0.600	o	1000	

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)
S23.000	100.00	8.82	15.850	0.000	0.0	0.0	0.0	2.05	81.6	0.0
S23.001	100.00	11.53	13.220	0.000	0.0	0.0	0.0	0.95	105.0	0.0
S23.002	100.00	11.60	12.790	0.000	0.0	0.0	0.0	1.16	127.8	0.0
S21.005	100.00	14.21	12.770	0.000	50.0	0.0	20.0	1.12	123.9	70.0
S18.013	77.63	23.58	12.250	0.000	175.0	0.0	70.0	1.14	125.5«	245.0
S18.014	77.58	23.60	12.000	0.000	175.0	0.0	70.0	4.46	492.7	245.0
S1.018	77.02	23.87	11.620	23.852	175.0	0.0	2082.1	1.10	861.5«	7287.2

Simulation Criteria for Storm

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

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.450		

Summary of Results for 30 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S1.000	S1	19.656	1.731	0.000	0.92		248.3	SURCHARGED
S1.001	S2	19.588	1.788	0.000	1.31		475.6	SURCHARGED
S2.000	S3	19.525	0.455	0.000	0.34		291.4	SURCHARGED
S2.001	S4	19.454	1.384	0.000	0.64		465.1	SURCHARGED
S2.002	S5	19.387	1.532	0.000	0.70		485.9	SURCHARGED
S1.002	S6	19.249	1.714	0.000	1.47		1013.1	SURCHARGED
S1.003	S7	18.893	1.543	0.000	1.22		999.9	SURCHARGED
S1.004	S8	18.564	1.444	0.000	1.55		997.0	SURCHARGED
S1.005	S9	18.255	1.203	0.000	1.59		992.7	SURCHARGED
S3.000	S10	18.225	0.955	0.000	1.03		82.8	SURCHARGED
S3.001	S11	18.119	1.019	0.000	1.97		135.9	SURCHARGED
S1.006	S12	17.946	0.956	0.000	1.28		1078.0	SURCHARGED
S1.007	S13	17.475	0.775	0.000	1.77		1077.7	SURCHARGED
S1.008	S14	17.114	0.484	0.000	1.27		1061.3	SURCHARGED
S1.009	S15	16.295	0.165	0.000	1.86		1060.1	FLOOD RISK
S1.010	S16	15.728	-0.487	0.000	0.52		1052.2	OK
S4.000	S17	19.957	0.682	0.000	0.94		339.2	SURCHARGED
S5.000	S18	19.417	0.417	0.000	0.58		312.9	SURCHARGED
S4.001	S19	19.240	0.760	0.000	1.67		666.6	SURCHARGED
S4.002	S20	18.688	0.406	0.000	2.05		745.3	SURCHARGED
S4.003	S21	17.885	-0.265	0.000	0.59		746.3	OK
S6.000	S22	19.031	0.012	0.000	1.02		77.5	SURCHARGED
S7.000	S23	19.397	-0.078	0.000	0.98		127.6	OK
S7.001	S24	19.133	-0.084	0.000	0.94		125.3	OK
S7.002	S25	18.811	-0.082	0.000	0.96		123.9	OK
S7.003	S26	18.590	-0.086	0.000	0.95		123.5	OK
S6.001	S27	18.225	-0.294	0.000	0.51		195.3	OK
S6.002	S28	17.905	-0.314	0.000	0.46		196.0	OK
S6.003	S29	17.765	-0.275	0.000	0.59		558.4	OK
S6.004	S30	17.494	0.234	0.000	2.07		549.5	SURCHARGED
S6.005	S31	17.310	0.000	0.000	1.03		542.7	OK
S8.000	S32	17.772	-0.148	0.000	0.23		50.6	OK
S8.001	S33	17.743	0.123	0.000	1.17		195.9	SURCHARGED
S8.002	S34	17.230	-0.090	0.000	0.99		194.1	OK
S6.006	S35	17.083	-0.117	0.000	0.48		722.1	OK
S4.004	S36	16.849	0.839	0.000	1.31		1479.7	SURCHARGED
S4.005	S37	16.347	0.047	0.000	1.11		1482.2	FLOOD RISK
S9.000	S38	17.625	0.060	0.000	0.21		23.8	SURCHARGED
S9.001	S39	17.603	0.276	0.000	0.55		42.2	SURCHARGED
S9.002	S40	17.597	0.292	0.000	1.61		260.5	SURCHARGED
S9.003	S41	17.066	-0.054	0.000	0.54		339.0	OK
S10.000	S42	18.401	1.139	0.000	1.92		336.1	SURCHARGED
S10.001	S43	17.343	0.368	0.000	2.07		335.0	SURCHARGED
S9.004	S44	17.018	0.128	0.000	1.24		712.6	SURCHARGED
S9.005	S45	16.852	0.092	0.000	0.78		667.4	SURCHARGED