Flood Risk Assessment

Trinity South
Eldon Street, South Shields

Proposed 222 unit residential scheme

Keepmoat Homes Ltd.

Report ref	Issue	Prepared by	Date	Reviewed by	Date
11547	1	M Pearse	Jan 2013	S Hunter	Jan 2013

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Trinity South
Eldon Street, South Shields

For Keepmoat Homes Ltd

Contents

Appendices

1.00 Executive Summary

1.01 This report has been commissioned by Keepmoat Homes to examine the flood risk associated with the proposed redevelopment of land at Trinity South, South Shields. The site location plan can be seen in **Appendix A**. This Flood Risk Assessment is reviewed in accordance with the National Planning Policy Framework (NPPF) and its associated Technical Guidance. The proposed end use of the development is residential with associated infrastructure, gardens and driveways.

1.02 The nearest watercourse to the development site is the River Tyne which is located approximately 345m to the west. Online Environment Agency flood maps indicate that the site is located within a flood zone 1, which is deemed as low risk of flooding from sea or rivers. All other sources of flooding have been reviewed and the risk of flooding from each source can be deemed as low.

1.03 Ground conditions outlined within the site investigation report identify made ground around 2 to 4m thick overlying glacial till. As such, infiltration techniques for discharge of surface water will not be feasible.

1.04 Northumbrian Water have been consulted and their response dated 1st June 2011 states that should Sustainable drainage techniques not be feasible that surface water flows may discharge at a restricted rate of 200 l/s into existing manhole 9003 located in Eldon Street adjacent to the site. Alternatively an unrestricted discharge of 620 l/s could be accommodated at or downstream of manhole 9902 in Smith Street to the south west of the site.

1.05 Storm water should be managed in order that the sewers can accommodate the 1:30 year event without flooding and the 1:100 year event plus climate change should be retained on site without detriment to proposed units.

1.06 The proposed development will not exacerbate flood risk either on the site or downstream of it and the proposed development is not at risk of flooding. Development of the site is therefore considered appropriate.

2.0 Introduction

2.01 This document identifies risk to the proposed development from all sources of flooding. It also aims to set out the principles for the proposed surface water and foul water drainage disposal in order that the proposed development of the site does not exacerbate flooding elsewhere.

2.02 The site occupies an area of 6.5 hectares. It falls from 11.75m AOD in the north to 6.75m AOD in the south west and comprises open grass land in the western area of the development with existing houses/shops in the south east area with associated roads.

2.03 This report is based upon information received from the Environment Agency together with topographical survey information and various site investigation reports undertaken on the site by various consultants.

2.04 Section 3.00 of this report describes the site location, proposed development and topography. Section 4.00 identifies the existing watercourses and drainage. Section 5.00 identifies the various possible flood flow paths and flood zones. Section 6.00 discusses the surface and foul water drainage. Section 7.00 provides conclusions and recommendations.

3.00 Site Location, Proposed Development and Topography

3.01 The site is centred on National Grid Reference 435985, 566100 approximately 1.3km south west of South Shields town centre.

3.02 The development site covers approximately 6.5 hectares and is currently open grass land in the western area of the development with existing houses/shops in the south east area with associated roads. The topographical survey, shown in **Appendix B**, identifies that the site falls from 11.75m AOD in the north to 6.75m AOD in the south west.

3.03 The surrounding area consists of residential units to the north and south and commercial units to the west. An existing Medical centre is located within the eastern area of the site.

3.04 The proposed development will consist of 222 units together with associated highways and landscaping. The proposed development layout is shown in **Appendix C**.

4.0 Existing Watercourses and Drainage

4.01 The nearest named watercourse to the development site is the River Tyne which is located approximately 345m to the west. The River at this location is tidal.

4.02 Northumbrian Water Limited (NWL) have been consulted to confirm the location of any adoptable drainage systems within the vicinity of the site. An extract of NWL's Sewer records are shown in **Appendix D** which confirm that there are public sewers located in within and adjacent to the site.

4.03 An existing public 375mm public combined sewer is located within the north western area of the site which drains in a southerly direction where it then enters into a 600mm diameter public combined sewer.

4.04 An existing 600mm public surface water sewer is shown within the south west area of the site.

5.00 Flood Flow Paths and Flood Zones

5.01 The development site has been assessed for flood risk based on the Environment Agency flood maps, site investigation report and topographical survey. All sources of flooding have been reviewed including fluvial, tidal, ground water, land run-off, and sewers.

5.02 An extract of the Environment Agency indicative Flood Map is shown in **Appendix E**. The online flood map is based upon the latest flood modelling data and shows the site to be located wholly within Flood Zone 1 'Low Probability'. This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).

5.03 A Flood Risk assessment was undertaken previously by Mott MacDonald Limited in 2009 for the Outline application for the Trinity South Development. This report included information provided by the Environment Agency which stated that the Highest tide level with an inclusion for an Extreme Surge of 4.02m AOD based on a 1 in 200 year return Period.

5.04 Global sea level will continue to rise, depending on the sensitivity of the climate change. NPPF, Table 4, provides recommended net sea level rises to accommodate potential climate change up to 2115. The relevant sea level rise in England also includes the local vertical movement of the land, which is generally falling in the south-east and rising in the north and west. Applying these factors to the 1 in 200 year flood level above would result in a rise in the flood level of 0.72m which would result in a 1 in 200 year plus climate change level of 4.74mAOD.

5.05 The lowest ground level on the proposed development is 6.75mAOD some 2m above the 1 in 200 year plus climate change level. Based on the above it is considered that the risk of flooding from a watercourse or sea is low.

5.06 Groundwater was encountered during the site investigation works at varying depths between 1.8m to 4.0m below ground level. It was considered however that this could be perched ground water located within the made ground and glacial till deposits. Based on this evidence, the site is considered to be at low risk of flooding from groundwater.

5.07 A further source of flooding is as a result of excessive run-off from the development or over land run-off from adjacent land. It is important that the proposed ground levels are configured such that any flooding on site is directed away from the proposed units and towards the surface water facilities. It should also ensure that any overland flows resulting from run-off from the new development are retained on site within the development area up to the 100 year plus climate change event.

5.08 Overloaded sewer systems present a potential risk to the site in terms of flood risk. Therefore, the proposed surface water system should be designed to accommodate a 1 in 30 year storm event without flooding and the 1 in 100 year storm plus climate change event should be retained within the site in an area which will not affect the new units. This will reduce any potential flood risk within the proposed development and also to adjacent properties/land owners from overland flows.

5.09 Flood flow paths should be checked during the detailed design for good practice, to ensure that flooding of properties or adjacent land does not occur.

6.00 Surface & Foul Water Drainage

6.01 The proposed surface water drainage scheme should seek to meet the requirements of The National Planning Policy Framework (NPPF). Additionally the selection hierarchy for disposal of storm water within Building Regulations Part H should also be met. Consideration should be given firstly to infiltration techniques (to ground), to watercourse and then to sewer. Sustainable Urban Drainage Systems (SUDS) should also be used wherever possible to mimic as far as practicable the natural run-off regime, improve water quality and attenuate peak flows.

6.02 Several Site Investigation Reports have being undertaken on the site. The investigation showed made ground was present across the site to depths of 4m, generally comprising sandy gravels and sandy gravelly clays. The made ground is underlain by firm to stiff clays. Based on the ground investigation it is considered that the site is unsuitable for the disposal of surface water to ground via soakaways or other infiltration techniques.

6.03 The nearest watercourse to the development site is the River Tyne which is located approximately 345m to the west. Due to the distance to the River discharge of surface water flows to River have been discounted.

6.04 Northumbrian Water have being consulted and they have confirmed that if soakaways or discharge to a watercourse can not be accommodated, that surface water flows could be discharged into the existing public sewer network. They have confirmed that surface water flows could discharge at a restricted rate of 200 l/s into existing manhole 9003 located in Eldon Street adjacent to the site. Alternatively an unrestricted discharge of 620 l/s could be accommodated at or downstream of manhole 9902 in Smith Street to the south west of the site. A copy of their correspondence is in **Appendix D**.

6.05 All proposed public surface water systems should be designed to accommodate a 1 in 30 year storm event without flooding and the 1 in 100 year storm plus climate change event (in accordance with NPPF) should be retained within the site in an area which will not affect the proposed units

6.06 Foul water drainage discharge from the development should be to the existing public combined sewers located in Eldon Street or Reed Street. Northumbrian Water has confirmed that they can accommodate the proposed foul flow from the site into this public sewer. See **Appendix D** for a copy of the Northumbrian Water correspondence.

6.07 All public foul and surface water drainage should be designed in accordance with the relevant edition of Sewers for Adoption.

6.08 All private foul and surface water plot drainage should be designed in accordance with Document H of Building Regulations.

7.00 Conclusions and Recommendations

7.01 The site is shown to be in land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).

7.02 The proposed development is shown to be approximately 2m above the calculated 1 in 200 year plus climate change flood level on the River Tyne located approximately 345m to the west of the site.

7.03 Discharge of storm water should be to the public surface water sewer network at points agreed with Northumbrian Water

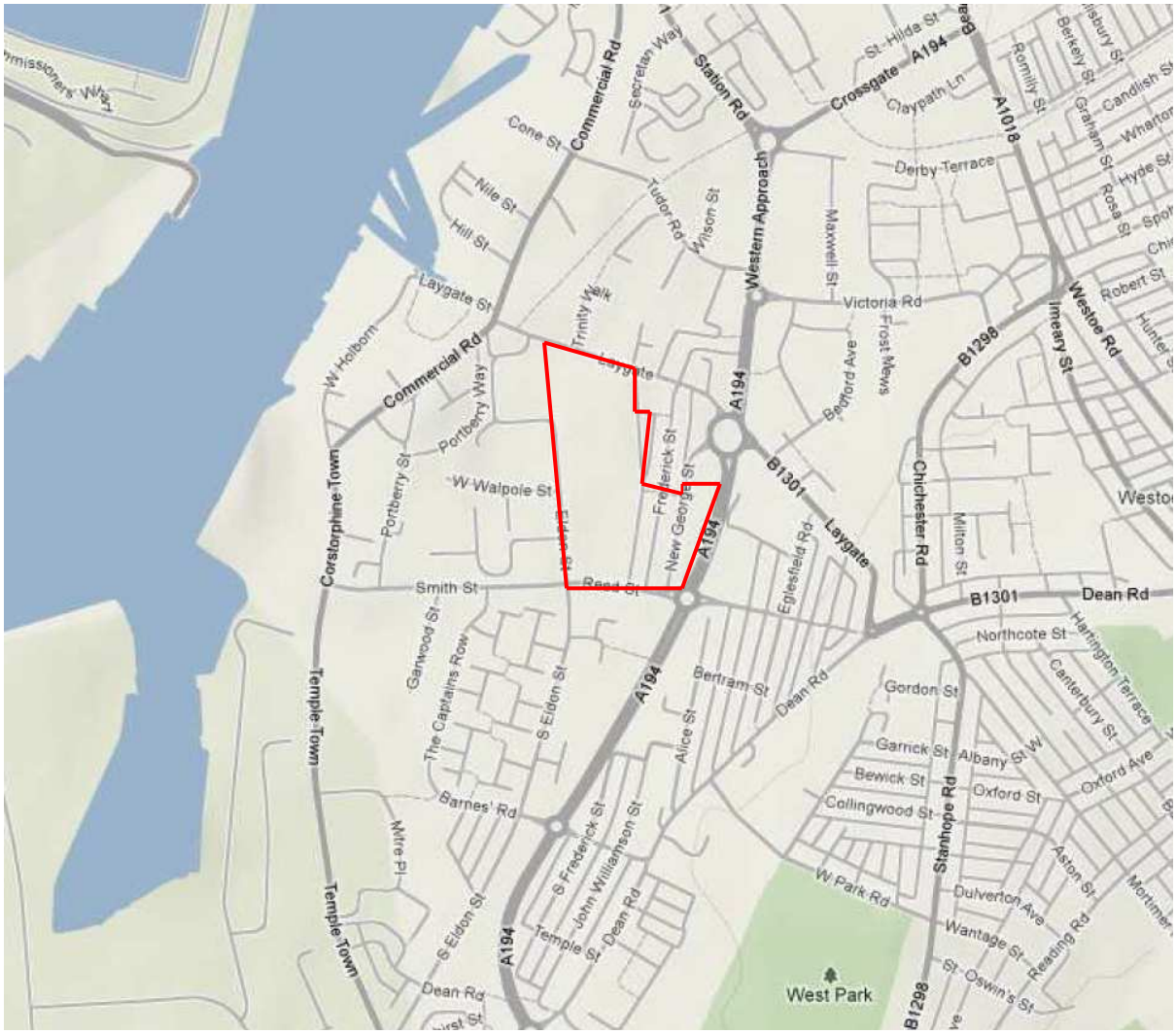
7.04 Discharge of foul water should be to the public sewer network at locations to be agreed with Northumbrian Water.

7.05 Storm water should be managed in order that the sewers can accommodate the 1:30 year event without flooding and the 1:100 year event plus climate change should be retained on site without detriment to proposed units.

7.06 Proposed ground levels should be configured such that any flooding on site is directed away from the proposed units and towards the surface water facilities.

Appendix A

Location Plan



SITE LOCATION PLAN

Appendix B

Topographical Survey


DIAL A CAB
LAYGATE
LAYGATE PLACE
BRUNSWICK STREET
NEW GREEN STREET
NO ACCESS
TARMAC
PAVING
BRICK SETTS
CONC
GRASS
ELDON STREET
ELEC SUB STN UNDER CONSTRUCTION
WEST WALPOLE STREET
SMITH STREET
REED STREET
FREDERICK STREET
NEW GEORGE STREET
DOCTORS SURGERY
WESTERN APPROACH
BUSHES / TREES
FLOWER BED
566300N
566200N
566100N
566000N
565900N
435900E
436000E
436100E
436200E
N

Appendix C

Development Layout

DO NOT SCALE
All dimensions to be checked on site and Architect to be notified of any discrepancies prior to commencement

DESIGNERS RISK ASSESSMENT
Construction (Design and Management) Regulations 2007

RESIDUAL RISKS

REF:	DESCRIPTION	DATE:

Housing Schedule

Trinity South Masterplan

Proposal for Keepmoat: Homes

GROSS INTERNAL AREAS (BLOCKWORK TO BLOCKWORK)

					ha	acres			
Site Area					6.50	16.06	07/01/13		
					5.66	13.99			
Housetypes	**Description**	**Storey**	**Bed/Per**	**No.**	**Total**	**Area sq/m**	**Area sq/ft**	**Total Area sq/m**	**Total Area sq/ft**
775	Terr/Semi	2st	2B/4P	52	52	72.62	782	3776	40664
968	Terr/Semi	2st	3B/5P	58	58	90.94	979	5275	56782
951	Terr/Semi	2st	3B/5P	16	16	88.38	951	1414	15216
1062	Terr/Semi	2.5/3st	3B/5P	42	42	102.90	1108	4322	46536
926	Wide Front	2st	3B/5P	9	9	87.76	945	790	8505
1135	Terr/Semi	2st	4B/6P	11	11	105.48	1135	1160	12485
1250	Semi	2st	4B/6P	10	10	115.36	1242	1154	12420
A Type 1	Apartment	3st	2B/3P	15	15	57.88	623	868	9345
A Type 2	Apartment	3st	2B/3P	9	9	57.92	623	521	5507
Sub Total									
TOTAL NEW					**222**			**19,280**	**207,560**
								19,280	**207,560**

Density		**Parking**	
Units/ha	39.2	Garages/Barns	
Units/acre	15.9	Spaces	
		Integral	
		VP's	
sq/metres per hectare	3,401	Total	
sq/ft per acre	14,812		
		Ratio	

Housing Type Breakdown	%
2 Bed	23.87
3 Bed	55.85
4 Bed	9.45
Apartment	10.81
Total	100

Rev H 17/01/13 Plot 47 handed, VP24 repositioned. Rear access gate positions amended following bin collection points study, collection points amended to correspond. Junction adjacent to plots 69-70 repositioned with 2.4x43m visibility splay shown as per STC engineers comments. Omission of 7no. visitor parking bays in total, 6no. along Elton Street in visibility splay & VP32 omitted adjacent to plot 70 driveway (VP's 22-23 & 32-34 omitted) as per STC engineers comments. 2no. Substation parking bays relocated to Elton Street.KT

Rev G 03/01/13 Plots 21-23, 25-26, 110, 114-15, 197-198 handed.KT

Rev F 23/10/12 Garages removed from plots 74-75 , SR

Rev E 11/10/12 Certain plots moved to accommodate affordable housing as per IP comments. SR

Rev D 10/10/12 Surgery parking amended. Disabled spaces added. SR

Rev C 27/09/12 Red line boundary amended due to the increase in parking provision for the Medical Ctr. Amendments to parking arrangements of Plots 194-196 and loss of vp. SR

Rev B 29/08/12 Visitor parking redistributed from Laygate to Elton street. Plots 157 & 158 repositioned to allow relocated access into courtyard

Rev A 26/04/12 Carparking arrangement repositioned & turning area omitted to medical centre at client request.KT

REVISION	DATE	DESCRIPTION	CHECKED

idp PARTNERSHIP
IAN DARBY PARTNERSHIP
NORTHERN
ST, JUDES, BARKER STREET, SHIELDFIELD, NEWCASTLE UPON TYNE, NE2 1AS
TEL (0191) 261 4442 FAX (0191) 261 1090 e-mail - info@idpartnership-northern.com

JOB / CLIENT: Trinity South for Keepmoat Homes Ltd

DRAWING TITLE: Proposed Site Layout Option B

PROJECT ARCHITECT	MM	DRAWN BY	KT/SR	CHECKED	
SCALE	1:500	PROJECT NO.	M90:136	DRAWING NO.	SL002H
DATE	March 2012				

DRWG. STATUS: DRAFT | CONSULTATION | TENDER | CONSTRUCTION | RECORD

Appendix D

Northumbrian Water Correspondence

and Sewer Records

NORTHUMBRIAN WATER

Ext: 36603
Direct Line: 0191 419 6603
Email: niki.mather@nwl.co.uk
Our Ref: 11NO20A617
Your Ref:

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Washington, Tyne & Wear, NE38 8LB, UK
Telephone: +44 (0) 845 604 7468
Fax: +44 (0) 191 419 6768
Website: www.nwl.co.uk

Wednesday, 01 June 2011

3E Consulting Engineers
First Floor
Block C
Holland Park
Holland Drive
Newcastle upon Tyne
NE2 4LD

Dear Mr. Joe Ryans,

Re: Pre-Development Enquiry – Eldon Street, South Shields

Further to your Pre-Development Enquiry regarding the above proposed development received at this office 12th April 2011. I have the pleasure in returning this response.

The following has been based upon the information in your completed application form and accompanying correspondence. Therefore, should any of the information now be different, please ensure that you inform Northumbrian Water Ltd of the changes as further Network Modelling may be required and our response may also change, leading to this response being invalid.

I have enclosed for your information a scaled extract showing the position of the existing wastewater networks and associated assets. Please note that the information shown in this plan should be regarded as approximate and is intended for guidance only. The actual position of any water mains or sewers shown on the plan must be established by taking trial holes in all cases.

Appropriate method statements and risk assessments must be provided to Northumbrian Water to gain approval for any trial hole investigations at least 5 working days in advance of starting any work onsite.

We have also carried out a review of your application and can confirm the following:

Sewerage and Sewage Treatment

Northumbrian Water would ask that you please separate the foul and surface water flows in accordance with Part H of the Building Regulations prior to the final connection to the public sewer.

- Foul Water Discharge

The foul flows generated by the proposed development can discharge without restriction into either of the existing combined public sewerage systems in Eldon Street and Reed Street, via one or more connections to suit topography and the proposed site layout. Any existing connections into manholes should be utilised where possible.

- Surface Water Discharge

No surface water flow from the proposed development will be allowed to connect into the existing public sewerage system unless it is proven that the alternative options which are listed within Part H of the Building Regulations 2003 are not available:

Rainwater from a system provided pursuant to sub-paragraphs (1) or (2) shall discharge to one of the following, listed in order of priority:

(a) an adequate soakaway or some other adequate infiltration system; or, where that is not reasonably practicable,

(b) a watercourse; or, where that is not reasonably practicable,

(c) a sewer.

If a surface water connection is the only solution for the discharge of surface water, then a restricted discharge of 200 l/sec is permitted into manhole 9003 with the remaining excess in flows having to be attenuated on site.

Alternatively an unrestricted discharge of up to 620 l/sec could be accommodated at or downstream from manhole 9902.

- Protection of Existing Sewerage Assets

We wish to draw your attention to the existing sewer which passes through the site. This sewer could be diverted, protected or accommodated within your site layout with an appropriate easement.

Part H of the Building Regulations also details the reasons why Northumbrian Water does not permit buildings to be built over or near to its sewerage network:

- Undue risk in the event of failure of the drain or sewer
- Maintaining access
- Protection of the drain or sewer during construction
- Protection form settlement
- Protection against piling

To discuss the diversion of this asset in further detail, please contact our Mr. Roger Perkins on 0191 419 6621.

To discuss the protection of this asset in further detail, please contact Mr. Niki Mather on 0191 419 6603.

- Sewage Treatment Capacity

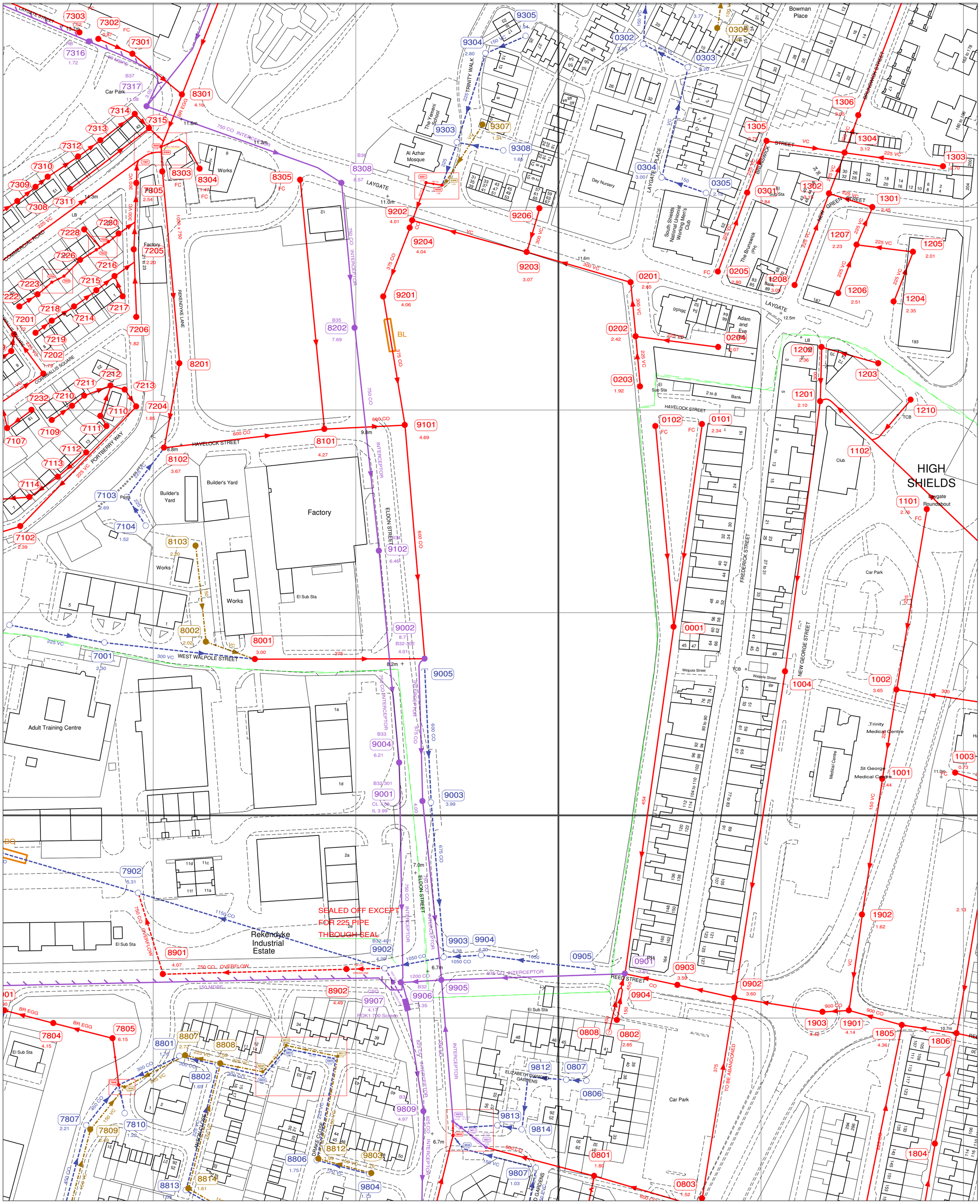
The Sewage Treatment Works to which this development finally discharges to is able to accept the additional flows.

Please note that this response is valid for 1 year only and you should resubmit your proposals should this period lapse prior to your development beginning.

Should you require any further assistance or information, then please do not hesitate to contact me at niki.mather@nwl.co.uk or alternatively on 0191 419 6603, please quote our reference number above in any future correspondence.

Yours sincerely,

Mr. Niki Mather
Technical Support Advisor
New Development



Author : MATHN

Date : 14-04-2011

Title :

Sheet: NZ3566SE

Centre Point : 435966,566105

Scale : 1:1250

NORTHUMBRIAN WATER

Appendix E
EA Online Flood Map

Environment Agency

Enter a postcode or place name: South Shields, South Tyneside Go

Other topics for this area... Risk of Flooding from Rivers and Sea

Risk of Flooding from Rivers and Sea

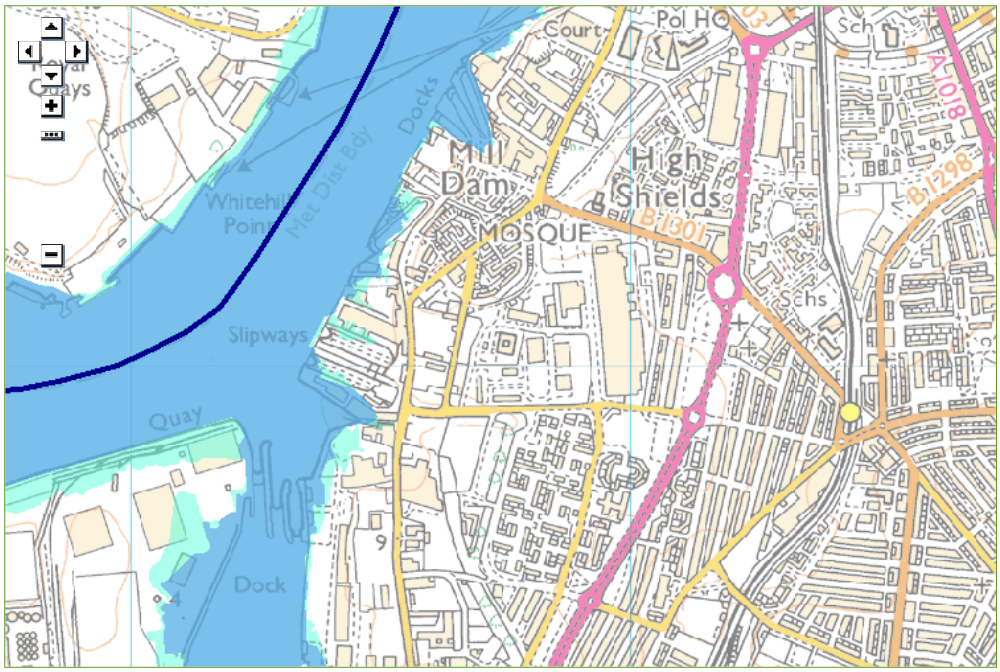
Map legend

Click on the map to see what is the Risk of Flooding at a particular location.

Flood Maps

- Flooding from rivers or sea without defences
- Extent of extreme flood
- Flood defences (Not all may be shown*)
- Areas benefiting from flood defences (Not all may be shown*)
- Main rivers

South Shields, South Tyneside at scale 1:10,000 Data search Text only version



Flood Map – Information Warnings

Manchester Ship Canal

Flood Mapping of the Manchester Ship Canal in Trafford, Salford and Warrington was updated 9 August 2012 as a result of a judgment of the High Court. The judgment concluded that the Ship Canal sluice gates should not be regarded as 'formal' flood defences and that our decision to map the Ship Canal flood zones as if the sluice gates were closed was unlawful. We have applied to the Court of Appeal to appeal against this judgment, and we will keep this caveat updated. For further information please contact the Environment Agency on 03708 506 506.

Llanyblodwel, Shropshire / Mickleton, Leeds / West Cowick, East Riding of Yorkshire

We are aware of issues with the Flood Mapping in the above locations. Corrections will be published in February 2013. For further information please contact us on 03708 506 506.

*** Legend Information:** Flood defences and the areas benefiting from them are gradually being added through updates. Please contact your local environment agency office for further details.

More about flooding:

Understanding the flood map

A more detailed explanation to help you understand the flood map shown above.

Current flood warnings

We provide flood warnings online 24 hours a day. Find out the current flood warning status in your local area.

Flood map - your questions answered

Answers to commonly asked questions about the flood map.

creating a better place

Author: The Environment Agency | WIYBYSUPPORT@environment-agency.gov.uk
Last updated: 8th November 2012