

Report to the:-

Integrated Strategic Drainage Partnership – 12th May 2011

Planning Committee – 21st June 2011

Hull Flood Mitigation Investment Plan

Report Number: CDR/2011/035

**Report of the City Planning Manager on behalf of the Corporate Director
for Regeneration**

1. Purpose of the Report and Summary
 - 1.1 The purpose of this report is to brief members on the Hull Flood Mitigation Investment Plan (FMIP). The below document is a review of the document prepared by the Council's Flood Risk Planning Manager, it describes individual sections of the FMIP and can be used alone or as a guide when viewing the document. Recommended next steps are given in the options section.
 - 1.2 The FMIP has been developed as a requirement of the Hull City Council Integrated Strategic Drainage Partnership (ISDP). Halcrow consulting Engineers have been commissioned to prepare a single document detailing the work of all partners in reducing flood risk across the city and an appraisal of how all programmes of work can be developed further with an assessment of possible funding opportunities.
 - 1.3 The document provides essential information to support the Council's responsibilities as a Lead Local Flood Authority and has been used to develop the Preliminary Flood Risk Assessment, Hazard maps and Action Plans required as part of the Flood Risk Regulations (2009) and the Local Flood Risk Strategy required under the Flood and Water Management Act (2010). The information in the report will be used to inform programmes of work for all partners which will be monitored through the ISDP and where necessary lobby partners and their

supporting bodies to ensure funds are made available to continue to deliver flood risk management improvements across the city. A developer design guide has also been delivered as part of the project, this has built upon the draft surface water supplementary planning document (spd) developed as part of the Surface Water Management Plan and this will be used to inform the Hull City Council Flood risk standing advice and the development of a comprehensive flood risk spd.

2. Recommendations

It is recommended that Cabinet:

- 2.1 approves, subject to any amendments suggested by Planning Committee, the findings of the report and suggested next steps contained in paragraph 6.

This is a none key decision.

3. Introduction

- 3.1 The ISDP was established following the floods of 2007, the group comprises high level officers of HCC, Environment Agency, Yorkshire Water and East Riding of Yorkshire Council. The group, and its technical working group, have overseen the production of key work such as the SWMP. The group identified the need for a plan to consider city wide flood risks and the consequences on the public, key infrastructure and the future development of the city. The FMIP specification was developed by all members of the ISDP, Halcrow Group Ltd were awarded the commission following interviews attended by all partners.
- 3.2 The report considers the existing modelling, mapping and investigations of all agencies and has carried out further modelling work where necessary. An assessment of critical infrastructure and the consequences of flooding has been undertaken and all existing schemes planned by all partners to manage this risk.
- 3.3 Further work was undertaken to consider options to reduce the impacts of potential sewer flooding across the city, the capacity of the existing sewer system is shown to be compromised in several locations during the modelled events and further investigations may be necessary to reduce flood risk further. Yorkshire Water are currently undertaking more detailed modelling work which when combined with the FMIP may still show a need to carry out improvements to the sewerage system

capacity, Yorkshire Water have committed to begin discussions with their financial regulator, OFWAT, to investigate the feasibility of doing more in these locations, all discussions will be held in partnership with HCC. Options were considered to reduce the flood risks cost benefit analysis was then applied to those options that were feasible to determine the proposed option for each high priority flood risk area

- 3.4 All flood mitigation options were assessed using Multi-Criteria Analysis, this approach is based on a multi-criteria scoring and weighting system. To ensure that the process was as robust and transparent as possible, the criteria and the scoring and weighting system were agreed with all partners.
- 3.5 The outputs of the Multi-Criteria Analysis were then considered alongside factors such as the repair and maintenance cycle of existing defences, and funding source availability and the timing of existing partner investment and external funding cycles. The final output is an investment plan detailing all ongoing flood risk management actions in the city.

4. Main Body of Report

- 4.1 The Flood Mitigation Investment Plan (FMIP) was conceived as a requirement of the Hull City Council Integrated Strategic Drainage Partnership (ISDP). The ISDP Task Group developed the specification for the plan and commissioned Halcrow Group Ltd following group interviews.
- 4.2 The project team identified the following objectives for the FMIP:
 - To adequately understand the risk of flooding from all sources in Hull, encompassing estuarial, fluvial, pluvial and groundwater risks
 - To inform integrated long-term investment planning for measures to mitigate and manage flood risk and align with partner funding cycles for efficient use of resources
 - To inform and enable the development needs and aspirations of the City of Hull
- 4.3 The project was split into three stages:
 - Stage 1 – Information outcomes, collation and integration of existing partner datasets and agreement of proposed approaches for further analysis and the investment plan
 - Stage 2 – Intelligence outcomes, root causes of flood risk were identified and options to provide solutions, development and maintenance guides produced.
 - Stage 3 – Investment Plan, existing flood risk solutions and those identified in stage 2 are brought together into a prioritised investment plan

- 4.4 The Stage 1 process considered the existing information from EA flood risk management strategies (Rivers Humber and Hull), HCC SFRA and SWMP, EA flood maps and sewerage network modelling. An assessment was also made with regard to groundwater flooding, through the assessment of standard groundwater borehole and modelling data. Groundwater emergence flooding in Hull City Council was ruled out as a source of flood risk, all other sources were shown to be evident in the study area.
- 4.5 An assessment of existing flood defence assets was made and the potential benefits that would be realised from new or refurbished flood defence assets across the city. Critical infrastructure and highly vulnerable receptors in the city were identified and mapped.
- 4.6 To prioritise actions, levels of flood risk in the city were assessed, this was previously done as part of the SFRA. With the city predominantly covered by Flood Zone 3 the SFRA split this down into three hazard classifications:
- High Hazard – depth of flooding (fluvial or surface water) > 0.6m, areas that flood during the 4% (1 in 25 year) flood (with defences) or areas with a severe hazard from defence breach
 - Medium Hazard – surface water flooding depth 0.3-0.6m, areas that flood during the 1% fluvial or 0.5% tidal (1 in 100 or 1 in 200year) flood (with defences) or areas with a moderate flood hazard from breach
 - Low Hazard – surface water flooding depth 0.15-0.3m and all remaining flood zone 3 areas (without defences)
- 4.7 Following this assessment it was agreed that all high hazard areas were to be considered. Where flood risk measures were proposed – EA Strategies, Aqua Greens, Hull Tidal Surge Barrier, Pumping Station refurbishment etc – they were assumed to be viable and would be delivered. All partners agreed that this was unlikely given the existing financial climate but assumptions had to be made that at some stage feasible and cost beneficial schemes would be progressed. These ‘existing’ schemes were then said to provide protection to the city and modelling would concentrate on any residual risks where interventions are not currently planned.
- 4.8 The results of the modelling showed there to be a residual risk from surface water (pluvial) flooding which can result in drainage systems to be overwhelmed in Anlaby Park, Newland and Sutton Ings.

- 4.9 Stage 2 of the FMIP has considered the additional high risk areas identified in Stage 1, appraisals have been made and possible alleviation schemes have been developed following survey and modelling of surface water flow routes and sewer inundation modelling.
- 4.10 Flood risk at Anlaby Park was found to be a combination of surface water flows from the west and sewer inundation, options considered flood storage upstream of Kirk Ella, storage adjacent to Springfield Way and the retrofitting of Sustainable Drainage Systems (SuDs). SuDs were not found to be fully effective at this location and flood storage is required due to the flows from the west dominating the flood risk, of the storage options the storage by Springfield Way returned the best cost / benefit ratio of 13.04.
- 4.11 For Newland and Sutton Ings SuDs retrofitting was considered to manage the sewer inundation issues arising from the model results, a conceptual approach has been developed to show how SuDs approaches could be used to give benefits to a wider area. Yorkshire Water are currently modelling their sewerage system in detail, the results of this modelling combined with the FMIP outcomes may highlight the requirement to do more to prevent sewer inundation flooding. SuDs techniques could be complimentary to any options progressed by Yorkshire Water or could benefit from any joint funding approaches that the models may support.
- 4.12 The utilisation of water butts to remove surface water inputs to the sewerage system was modelled, to give a coordinated and joined up implementation of systems it was assumed that take up across the councils housing stock could be considered, this would yield significant economies of scale. Modelled sewer flows were considered with and without a network of water butts (two per property) removing roof water from the system.
- 4.13 To achieve favourable benefits SuDs need to be applied to the wider council housing stock away from the immediate areas of Newland and Sutton Ings, this does deliver good cost benefit returns of 17.93 and 9.08 respectively. Although water butts have been used for this assessment other options of swales, green roofs, detention basins etc could be possible and provide similar benefits.
- 4.14 The Stage 3 Investment Plan uses all existing schemes identified by all partners strategies and the emerging schemes for the additional high risk areas identified in Stage 2 and assesses their outputs using Multi Criterior Analysis (MCA). MCA looks at wider benefits that could be delivered by schemes aside for the usual 'tangible' outputs of reduced flood damages etc. The approach is consistent with DCLG guidance.

- 4.15 Project partners identified the following as MCA criterion: Potential to promote a balanced economy, Potential to act as a regeneration catalyst, Potential to contribute to policy themes, Potential to promote inward investment, Potential to reduce the costs of damage, Potential to prevent disruption to the economy, Potential to prevent disruption to social cohesion, Potential to improve open space and Potential to disrupt the transport network.
- 4.16 The MCA approach concluded that all of the schemes proposed in the city score highly, this considered to be due to a flat topography, densely populated areas and significant benefits throughout the area. It is therefore difficult to prioritise schemes using the MCA method as all schemes deliver key direct and intangible benefits across the city.
- 4.17 Funding options have been considered, the key issues surrounding funding options are the uncertainties in their timing or allocations – DEFRA funding is currently only confirmed for the existing financial year and future funding will be dictated by the emerging DEFRA Future FCERM Funding process (currently being consulted), Yorkshire Water’s funding works on a 5 year cycle, the current cycle will be in place until 2015 – this leads to a lot of uncertainty with regard to availability and timing of funds to progress the projects identified and these two funding sources are identified as vital to move schemes forward.
- 4.18 A detailed investment plan has been produced, the plan shows a required investment of £115.6M over the next 30 years to insure schemes are implemented to reduce the impacts of flooding in the city. The plan needs further work as emerging funding allocations and cycles are confirmed but it will be possible to input updated information when available and be used as a tool to plan long term investments or to lobby key decision makers.

5. Consultation

- 5.1 The FMIP has been produced in full support of all partners, workshops held at the end of each stage have been used to review stage outputs and steer the approaches required in the subsequent stages, and all partners have contributed to the workshops.
- 5.2 This report will be taken before the 12th May Integrated Strategic Drainage Partnership and the 21 June Planning Committee.

6. Options

- 6.1 The investment plan (Appendix 1) should be adopted by all partners and updated and monitored through the ISDP process. The plan will reflect funding opportunities as new information regarding funding approvals and allocations are confirmed. Where necessary the ISDP will lobby appropriate funding bodies to ensure all necessary steps are taken to support the schemes throughout the city.
- 6.2 The plan recommends the commencement of feasibility of the emerging schemes in Stage 2 of the report, the Council should consider the necessary approaches required. Partner working is required with ERYC for schemes in the East Ella area as they are developing options in this area. SuDs approaches should be considered for the HCC housing stock as identified in the report, the Council should consider how to progress such options.
- 6.3 The existing Aqua Greens options in Derringham and Orchard Park are supported in the FMIP, ongoing scheme development is taking place with ERYC through joint funding bids, details of the emerging partnership schemes should be fed into the investment plan.
- 6.4 The FMIP has produced an updated Development Guide, this should be considered and incorporated in to the existing Standing Advice and proposed Development and Flood Risk spd.
- 6.5 The FMIP has produced a draft Preliminary Flood Risk Assessment required for the Flood Risk Regulations, the draft version should be utilised by the Council and developed into the final version to be taken to Environment and Transport Overview and Scrutiny Commission and submitted to the EA for the 22 June deadline.
- 6.6 The FMIP provides a city wide assessment of schemes, scheme appraisal and funding opportunities, all are key elements of the Local Flood Risk Management Strategy required to be delivered by the Council as a Lead Local Flood Authority as part of the Flood and Water Management Act. The outputs of the FMIP should be used to progress the production of the Strategy.
- 6.7 The investment plan is not adopted. The recommendations of the ISDP to have a single investment plan to steer the flood risk management work of all partners in the city would not be

satisfied. Key financial information required for the Local Flood Risk Strategy would not be available.

7. Council Priorities

- 7.1 Flood Risk Management in Hull is a material planning concern and forms an important part of our Strategic Flood Risk Assessment and emerging Core Strategy.
- 7.2 As a Category 1 responder under the Civil Contingencies Act (2004) we have a duty to assess, plan and advise.
- 7.3 The Flood Risk Regulations (2009) and the Flood and Water Management Act (2010) enhance the role of the council as a Lead Local Flood Authority (LLFA) and bestow statutory duties and powers on us dictating the work that we need to undertake to manage flood risk in the city.
- 7.4 It is essential the city appropriately manages flood risk and ensures people, homes and businesses are protected as far as possible against the risk of flooding. The council's role in achieving these aims through working with other drainage authorities (Environment Agency, Yorkshire Water and the East Riding of Yorkshire Council) ensures a safe and high quality of life for the community.

8. Comments of the Head of Legal and Democratic Services, and Monitoring Officer

- 8.1 The Head of Legal and Democratic Services confirms that the Council has many duties imposed on it by the Flood Risk Regulations 2009 and Flood and Water Management Act 2010, as referred to in paragraph 1.3. The Council is the Lead Local Flood Authority for the area and is required to prepare maps, registers, assessments, action plans and strategies in order to manage flood risk and deal with flooding should it occur. The plan not only assists the Council in complying with these duties but also contributes to the SFRA and Core Strategy.

9. Comments of the Interim Section 151 Officer

- 9.1 The Interim Section 151 Officer notes the investment requirement of £115.6m over 30 years. As the report indicates there are some fundamental key uncertainties around the funding options both in terms of their timing and their source & ongoing lobbying of DEFRA, Yorkshire Water etc. will be needed to secure these resources.

10. Comments of Human Resources

10.1 The Head of HR notes the report.

11. Comments of Overview and Scrutiny

11.1 The Environment and Transport Overview and Scrutiny Commission recommend that the findings within the report be agreed and progress is made against the steps outlined.
Sc3010

12. Conclusions

12.1 The options are the observations and recommendations of the councils Flood Risk Planning Manager. They are recommended approaches and have been informed further by the views and comment of the City Planning Manager and wider council.

**Alex Codd, City Planning Manager,
on behalf of Pauline Davis, Corporate Director for Regeneration**

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Officer Interests: None

Background Documents: - Hull Flood Mitigation Investment Plan April 2011

Appendix 1

Cashflow Statement (£)	2011/12	2012/13	2013/14	2014/15
Income				
Hull City Council	£0	£0	£0	£0
East Riding of Yorkshire Council	£0	£0	£0	£0
Environment Agency	£0	£0	£0	£0
Defra	£0	£0	£0	£0
Yorkshire Water	£7,500,000	£7,500,000	£7,500,000	£7,500,000
Developer Based Contributions	£0	£0	£0	£0
EU Funding Sources	£0	£0	£0	£0
Grant aid	£0	£0	£0	£0
Donations	£0	£0	£0	£0
Other	£0	£0	£0	£0
Total income	£7,500,000	£7,500,000	£7,500,000	£7,500,000
Operating/maintenance expenditure				
<i>Total</i>				
Hull East (Victoria Dock Village)	£0	£0	£0	£0
Hull West	£37,354	£37,354	£37,354	£37,354
Total operating/maintenance expenditure (total)	£37,354	£37,354	£37,354	£37,354
<i>Fluvial</i>				
Upper and middle catchment	£0	£0	£0	£0
Lower catchment	£394,295	£396,718	£399,142	£401,566
Total operating/maintenance expenditure (fluvial)	£394,295	£396,718	£399,142	£401,566
<i>Surface water</i>				
Orchard Park	£0	£0	£0	£0
Derringham	£0	£0	£0	£0
East Ella	£0	£0	£0	£0
Total operating/maintenance expenditure (surface water)	£0	£0	£0	£0
<i>Surface water and sewer inundation</i>				
Newlands	£0	£0	£0	£0
Sutton Ings	£0	£0	£0	£0
Total operating/maintenance expenditure (surface water and sewer inundation)	£0	£0	£0	£0
Total operating/maintenance expenditure	£431,649	£434,072	£436,496	£438,919
Other expenditure				
<i>Total</i>				
Hull East (Victoria Dock Village)	£0	£0	£0	£0
Hull West	£0	£0	£0	£0
Other expenditure (total)	£0	£0	£0	£0
<i>Fluvial</i>				
Upper and middle catchment	£0	£0	£0	£0
Lower catchment	£0	£159,254	£159,254	£159,254
Other expenditure (fluvial)	£0	£159,254	£159,254	£159,254
<i>Surface water</i>				
Orchard Park	£0	£0	£0	£0
Derringham	£0	£0	£0	£0
East Ella	£0	£60,000	£0	£0
Other expenditure (surface water)	£0	£60,000	£0	£0
<i>Surface water and sewer inundation</i>				
Newlands	£0	£40,000	£0	£0
Sutton Ings	£0	£40,000	£0	£0
Other expenditure (surface water and sewer inundation)	£0	£80,000	£0	£0
Yorkshire Water's Flood Risk Management Infrastructure	£7,500,000	£7,500,000	£7,500,000	£7,500,000
West Hull SPS	£0	£0	£0	£0
East Hull SPS	£0	£0	£0	£0
Bransholme Surface Water Pumping Station	£0	£0	£0	£0
Bransholme Surface Water Lagoon	£0	£0	£0	£0
Public Sewer Networks	£0	£0	£0	£0
Hull Waste Water Treatment Works	£0	£0	£0	£0
Other expenditure (Yorkshire Water's Flood Risk Management Infrastructure)	£7,500,000	£7,500,000	£7,500,000	£7,500,000
Total other expenditure	£7,500,000	£7,799,254	£7,659,254	£7,659,254
ANNUAL SURPLUS / (DEFICIT) BEFORE INTEREST	£-5,142,040	£-1,529,598	£-1,392,021	£-1,394,445

Illustrative screen shots of investment plan spreadsheets. The full documents are available via the flood risk planning manager.

The spreadsheets provide a tool to manage long term needs-based investment to continue to manage flood risk in the city, as funding allocations and cycles are confirmed the spreadsheet will be populated in agreement with all partners to show where further funding is required and partners can take steps to decide who needs to be lobbied to financially support flood alleviation measures in the city