richard JACKSON plc

RICHARD JACKSON PLC

ADDENDUM FLOOD RISK ASSESSMENT

PROPOSED NEW DWELLING,
LAND ADJACENT TO NO.1 BEACHY DRIVE,
ST LAWRENCE BAY, SOUTHMINSTER, ESSEX

JOB NO: 25686 JULY 2006

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CONTENTS:-

1. SITE LOCATION AND PROPOSALS

1.1 This report should be read in conjunction with the Flood Risk Assessment Report previously produced for this site. It is proposed to erect a single dwelling of two storeys on the current site at No. 1 Beachy Drive, St Lawrence Bay, Southminster, Essex.

1.2 The works will comprise the infilling of area of land within an existing high density residential area. A copy of the site location plan is included as Appendix A to this report.

1.3 This report relates to a breach analysis undertaken in support of the Flood Risk Assessment previously completed for the site (reference Richard Jackson plc Report Dated August 2003), and responds to comments made by the Environment Agency in their letter dated June 2005, reference FUL/MAL/05/00411.

2. BREACH ANALYSIS

2.1 A full breach analysis has been completed using the program developed by the Environment Agency and the results are contained within Appendix B to this report. A range of areas/volumes for the flood cell has been considered for the appropriate breach width (i.e. 50m for an earth embankment) and a summary of the results for a range of flood cell sizes is included below.

Breach Width [m]	Catchment Area [km^2]	Peak Flood Level [m AODN]
50	0.5	4.13
50	1.0	3.85
50	1.5	3.70
50	2.0	3.61

Summary of Breach Analysis Results

2.2 The proposed finished floor level for the development for the occupational space will be set at 3.300m AODN, (see previous report). This means that potentially this could be up to 813mm below the breached flood level based upon worst case scenarios. This level would reduce to 310mm in the event that the flood cell is taken as 2.0km^2 and is removed completely if the flood cell would be greater than 2.5km^2.

2.3 Given the topography of the area, it is considered that the flood cell could indeed extend to 2.5km^2. However, there is always a potential that the existing developed areas could cause a restriction in the size of the flood cell and therefore there could be a residual risk to a proposed development as a result of flooding in the event of a failure or breach of the existing defences.

2.4 Given the potential residual risks to the site from flooding by overtopping of the existing defences and/or in the event of a breach, consideration of how to minimise the risks needs to be given. This is both in terms of the risks directly to the occupants and indirectly to others.

2.5 Firstly, the form and likely timescales for any potential flooding needs to be considered. From inspection of the results, the site can be shown to be at risk from a breach of the flood defences only after a significant time period, (the results for each size of flood cell are summarised below). From these, it can be seen that the time for flood waters to directly effect the property range from 26 hours to in excess of 36 hours. In the event of the worst case scenario occurring (i.e. a breach of the existing defences and the restriction of the flood cell size), the risk to life would be minumal. This is because the property would only be flooded in the second tide cycle and hence inhabitants would have ample time to evacuate before any flood waters reached the property.

Catchment Area [km^2]	Time for Flood Level to exceed Proposed FFL [hours]
0.5	26
1.0	38
1.5	38
2.0	38

2.6 The above confirms, however, that there remains a residual risk to the property in such an event and measures to minimise this risk also needs consideration. As the finished floor levels cannot practically be raised further due to the boundary conditions, the possible alternative solutions available would be to provide a further flood wall for the site or to prevent water ingress to the property through the use of waterproof/water resistant construction techniques.

2.7 Given the size and location of the proposals, the introduction of a further flood wall is considered to be inappropriate. This is because the site constitutes an infill plot and is located in an area already substantially developed for residential use.

2.8 The option of using flood resistant construction techniques is, however, considered a feasible solution and would help to minimise the residual risks. Such measures would include :-

the provision of de-mountable flood barriers at all potential points of entry (i.e. doorways, windows, vents etc);

the use of water resistant construction techniques for external walls up to 300mm above the proposed flood level and internal floorings etc. (i.e. solid concrete block wall construction for external walls suspended floor slabs etc);

the siting of all service entries above the proposed flood level, where practical.

2.9 With regard to the affects to others, whilst the building does marginally reduce the volume of the storage within the flood plain, the loss in volume is small (i.e. less than $80m^3$) when compared to the volume of the flood cell, (estimated to be a minimum of $600,000m^3$).

2.10 It should also be noted that such a reduction will only have an effect on others in the event of either an extreme flood event occurring or if the existing defences fail and the flood cell is restricted due to existing buildings. The chances of such an event occurring are considered small.

2.11 The effect on flood flows for such a small area would also be considered to be negligible given the location is in area which is already substantially developed.

2.12 Furthermore, it is reasonable to presume that such events would be preceded by Environment Agency (EA) early flood warning advice in areas at risk and the EA website confirms that the site is located in a flood warning area. To help reduce risk levels further, steps would be taken to ensure that the occupiers are registered with the Environment Agency such that they enjoy the benefits of the Environment Agency's early flood

warning advice. Also, advice would be given to residents regarding any special procedures to be followed in the event of a flood.

3. SUMMARY

3.1 The original Flood Risk Assessment report has concluded that there is no significant risk to the proposed development or to others as a result of development from fluvial flooding.

3.2 There is also no significant risk to other parties from the run off likely to be generated (eg. roof drainage and driveway drainage) by the proposals.

3.3 The existing site benefits from protection from an earth bank which is maintained by the Environment Agency.

3.4 A breach analysis for a range of flood cells sizes has been completed which shows that the site could be at risk of flooding in the event of a 50m long breach occurring during an extreme storm event. The depth of flooding would be a maximum of 813mm above proposed finished floor level if onerous parameters are adopted. This would reduce to zero if more realistic parameters for the flood cell size are considered.

3.5 Regardless of the parameters used, the time for flooding to affect the property would be at least 2½ hours after the breach of the defences occurred. As such it is considered that there would be sufficient time to evacuate any affected people leaving the residual risk to be to property only.

3.6 Taking into account the setting within an existing developed residential area and the degree of flood risk, it is considered that this risk could be reasonably mitigated by the use of appropriate flood resistant material within the construction. The alterations of raising floor levels further or the introduction of a further defence as considered impractical given the site constraints.

3.7 Steps should be taken to register the owner and occupier with the Environment Agency Flood Warning Scheme to ensure early flood warning advice is available and evacuation or emergency procedures are understood.

4. LIMITATIONS

This report has been produced for the sole use of Mr & Mrs Hamilton in connection with their current planning application, and its contents should not be relied upon by others without the written authority of Richard Jackson plc. If any unauthorised third party makes use of this report they do so at their own risk and Richard Jackson plc owe them no duty of care or skill.

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Mark Jones
HNC, TMICE, AMIHT
SENIOR ENGINEERING TECHNICIAN

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APPENDIX A

LOCATION PLAN

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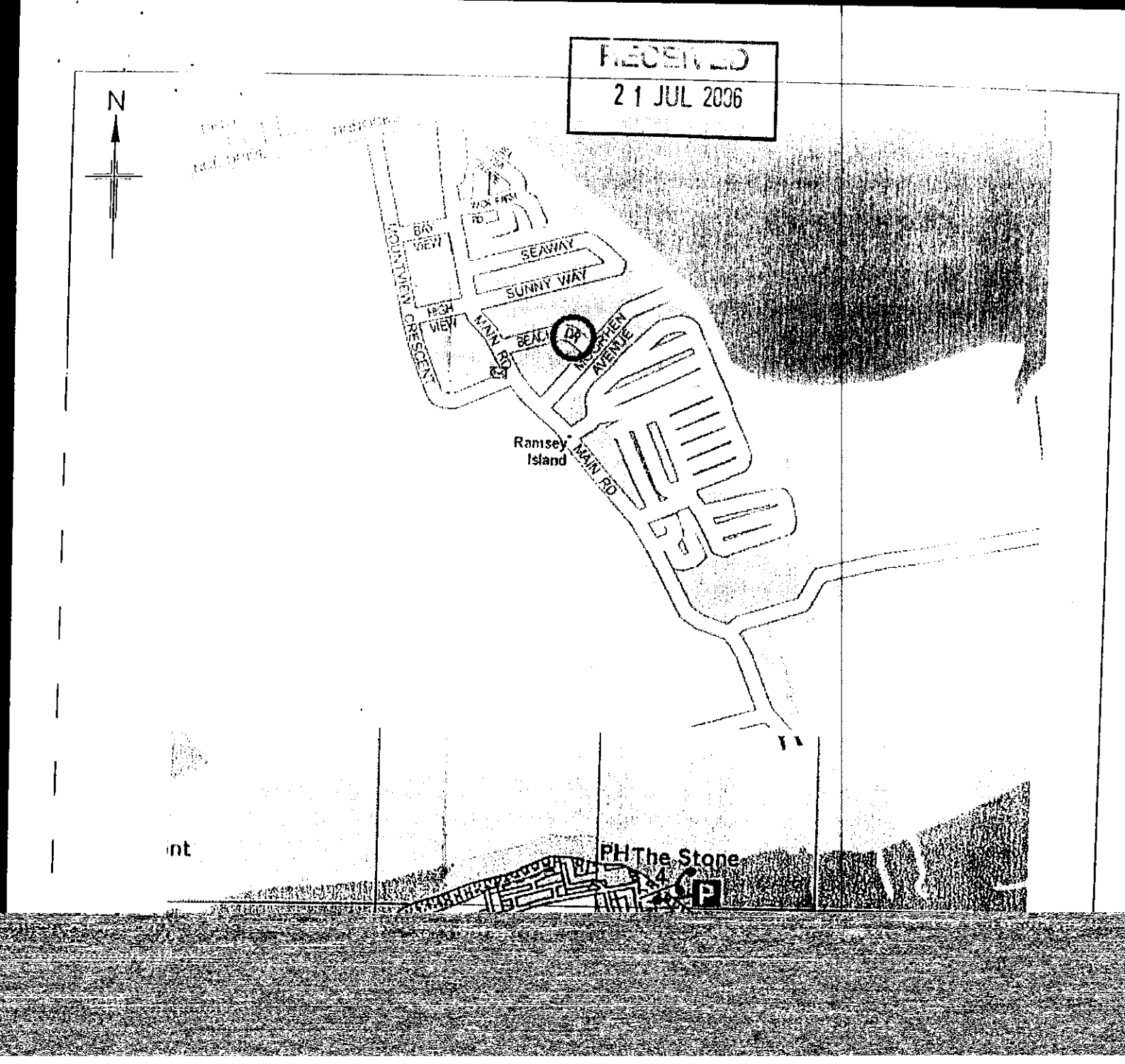
APPENDIX B

BREACH ANALYSIS CALCULATIONS



Cambridge 01223 314794
Hadleigh 01473 825300
London 020 7448 9910
Norwich 01603 219797

JACKSON plc
CONSULTING ENGINEERS

CONTRACT: Beachy Drive, St. Lawrence
ELEMENT: Breach Analysis

REF: 25686
SHEET:
DATE: July 05

Breach Analysis

A full breach analysis will be completed for the scheme adopting the Environment Agencies own breach analysis software and the following parameters:-

1: 200yr tidal flood level	= 4.90m AODN	
Breach width	= 50m	(soft earth bund defences)
Breached invert level	= 3m	Site levels taken 2003 — " —
Island base level	= 2.76m	

Hard cell.

A range of Hard cell values will be considered from 0.5km² to 2.0km². This will allow consideration of the effects to the proposed property in the event that obstacles are raised the size of the cell in an extreme event.

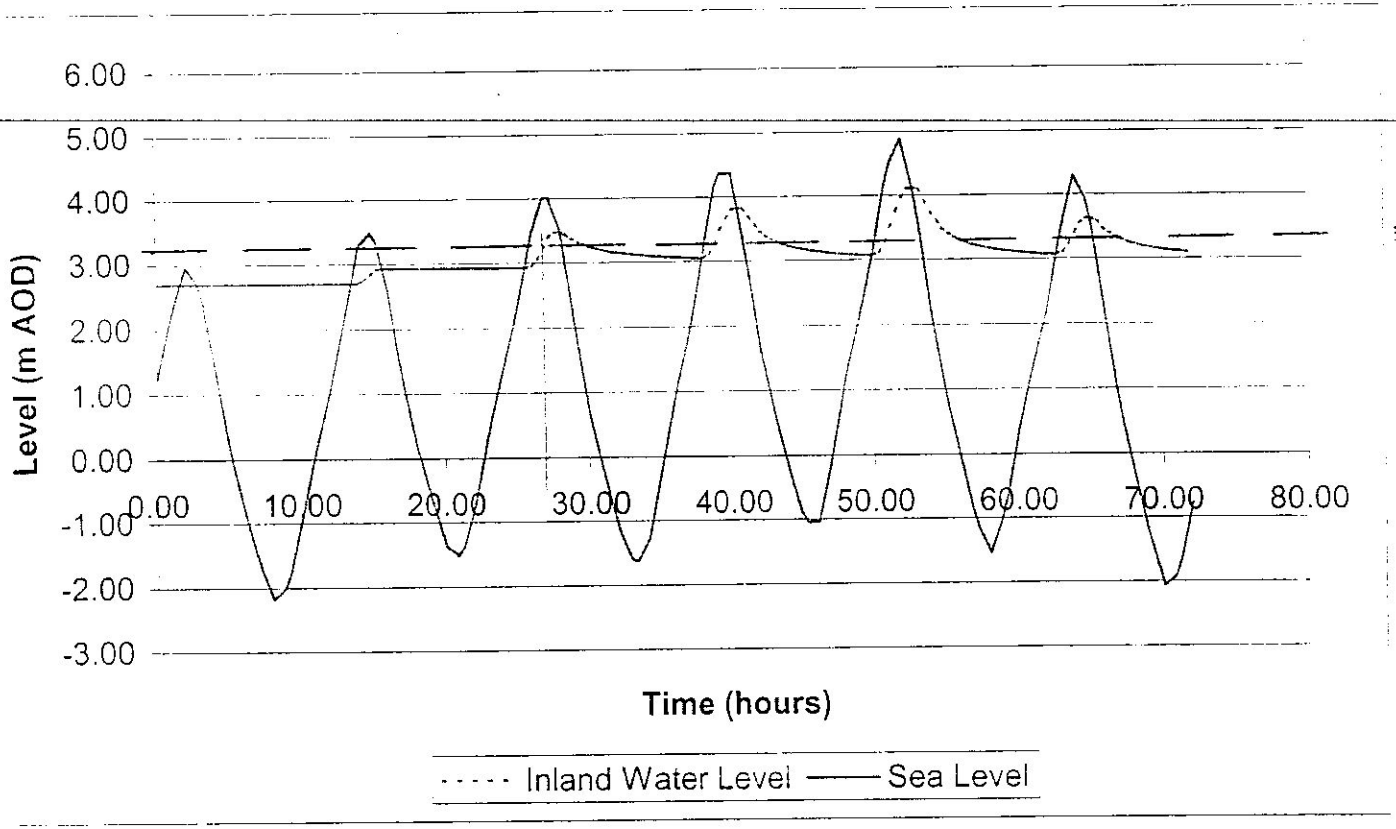
No.	Station
1	Immingham
2	Skegness
3	Tabs Head
4	King's Lynn
5	Hunstanton
6	Wells
7	Cromer
8	Winterton-on-sea
9	Lowestoft
10	Aldeburgh
11	Felixstowe Pier
12	Clacton-on-sea
13	Ipswich
14	Brightlingsea
15	Bradwell Waterside
16	Burnham-on-Crouch
17	Southend-on-sea
18	Tilbury

INSTRUCTION:

1) Select the nearest tidal station listed on the left and type in the highlighted cell (C25)
2) Type in the 1 in 200 year tidal level in the highlighted cell (C26)
3) Type in the start time and the end time of the breach of the seawalls if the performance of the breach function is required
4) Type in the width of the breached seawalls, the base level and the area of the flood Compartment.
5) Press the "Run" button to perform calculation.
6) The predicted tide levels can be found on the "Predicted 1 in 200 Year Tide" sheet
7) The results of the breach function (total volume and peak level) appear on the "Flood Compartment" sheet

INPUT FOR TIDE PREDICTION	
Nearest Station	15
1:200 Year Tidal Level (m AOD)	4.90
INPUT FOR BREACH FUCNTION	
Start Time (hour) (>0)	0
End Time (hour) (<239)	72
Breach Width (m)	50
Breached Seawall Invert Level (m AOD)	3
Inland Base Level (m AOD)	2.7
Area of Compartment (km^2 >0.01, default=1.0e9)	0.5

RESULTS	
Peak Net Volume of Inflows (m3)	713986.07
Peak Level (m AOD)	4.13



3.300m PROPOSED GROUND FLOOR LEVEL

25650 : Branch 1

No.	Station
1	Immingham
2	Skegness
3	Tabs Head
4	King's Lynn
5	Hunstanton
6	Wells
7	Cromer
8	Winterton-on-sea
9	Lowestoft
10	Aldeburgh
11	Felixstowe Pier
12	Clacton-on-sea
13	Ipswich
14	Brightlingsea
15	Bradwell Waterside
16	Burnham-on-Crouch
17	Southend-on-sea
18	Tilbury

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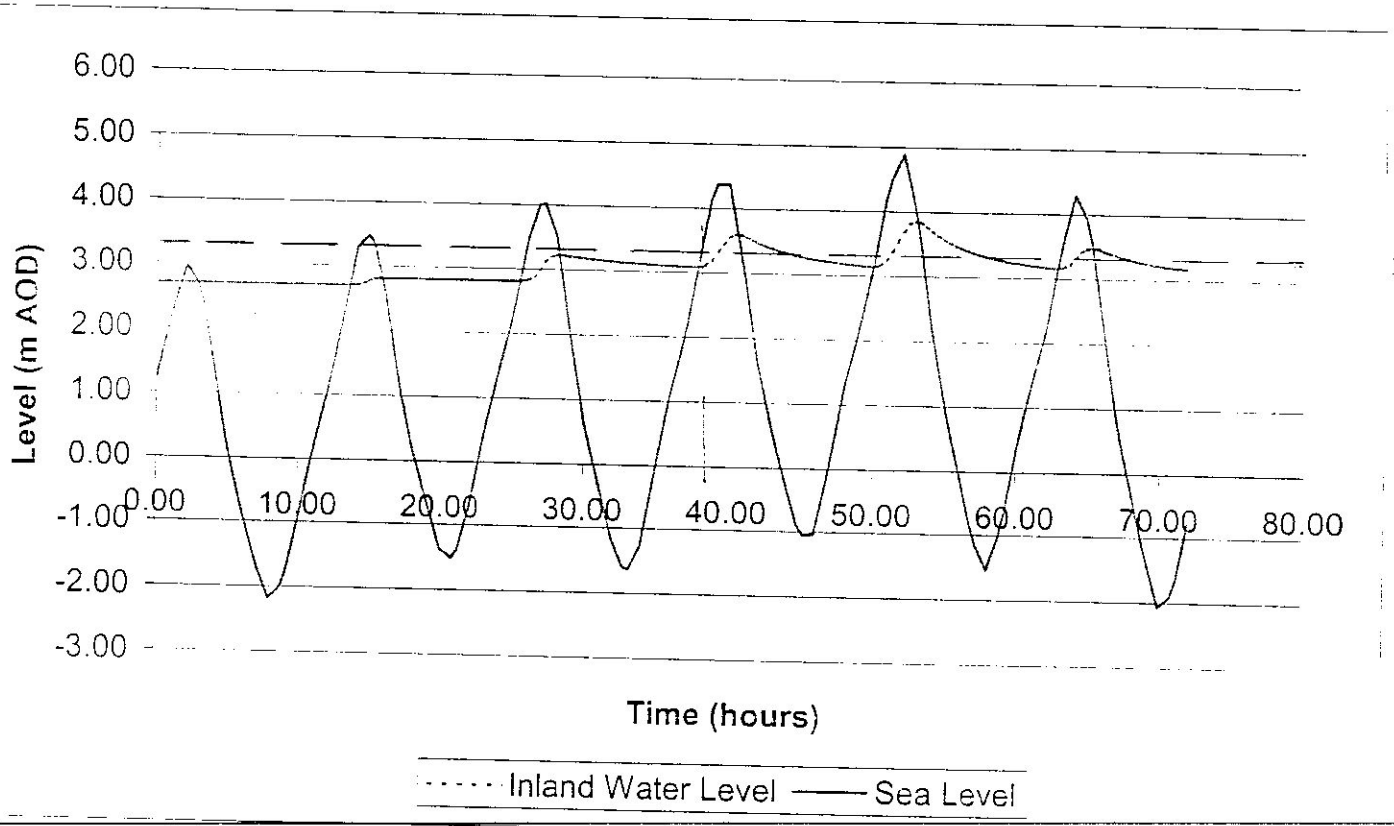
5) Press the "Run" button to perform calculation.
6) The predicted tide levels can be found on the "Predicted 1 in 200 Year Tide" sheet
7) The results of the breach function (total volume and peak level) appear on the "Flood Compartment" sheet

INPUT FOR TIDE PREDICTION	
Nearest Station	15
1:200 Year Tidal Level (m AOD)	4.90
INPUT FOR BREACH FUCNTION	
Start Time (hour) (>0)	0
End Time (hour) (<239)	72
Breach Width (m)	50
Breached Seawall Invert Level (m AOD)	3
Inland Base Level (m AOD)	2.7
Area of Compartment (km^2 >0.01, default=1.0e9)	1

25666 DEDHAM 2

RESULTS	
Peak Net Volume of Inflows (m3)	1146489.66
Peak Level (m AOD)	3.85



3.30m Reduced Ground level

No.	Station
1	Immingham
2	Skegness
3	Tabs Head
4	King's Lynn
5	Hunstanton
6	Wells
7	Cromer
8	Winterton-on-sea
9	Lowestoft
10	Aldeburgh
11	Felixstowe Pier
12	Clacton-on-sea
13	Ipswich
14	Brightlingsea
15	Bradwell Waterside
16	Burnham-on-Crouch
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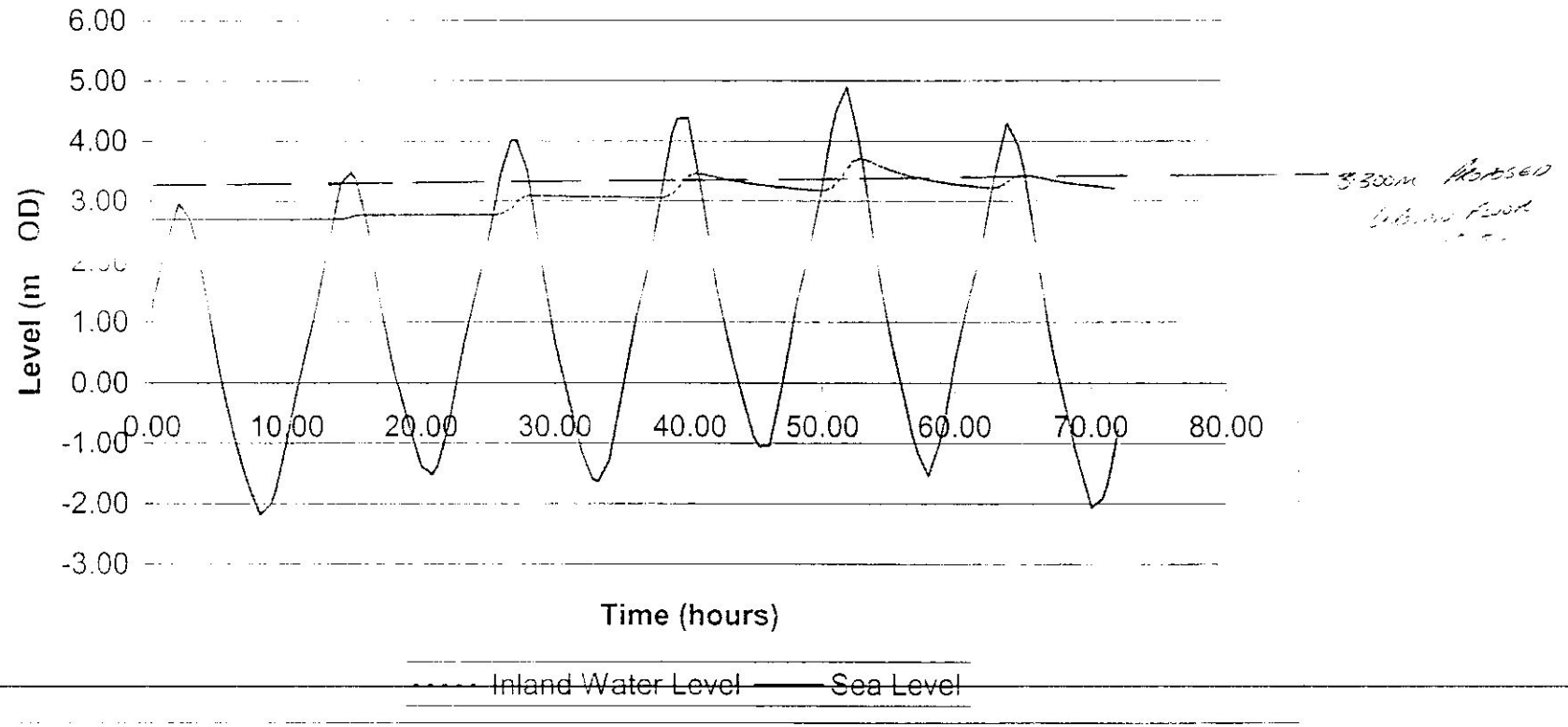
INSTRUCTION:

1) Select the nearest tidal station listed on the left and type in the highlighted cell (C25)
2) Type in the 1 in 200 year tidal level in the highlighted cell (C26)
3) Type in the start time and the end time of the breach of the seawalls if the performance of the breach function is required
4) Type in the width of the breached seawalls, the base level and the area of the flood Compartment.
5) Press the "Run" button to perform calculation.
6) The predicted tide levels can be found on the "Predicted 1 in 200 Year Tide" sheet
7) The results of the breach function (total volume and peak level) appear on the "Flood Compartment" sheet

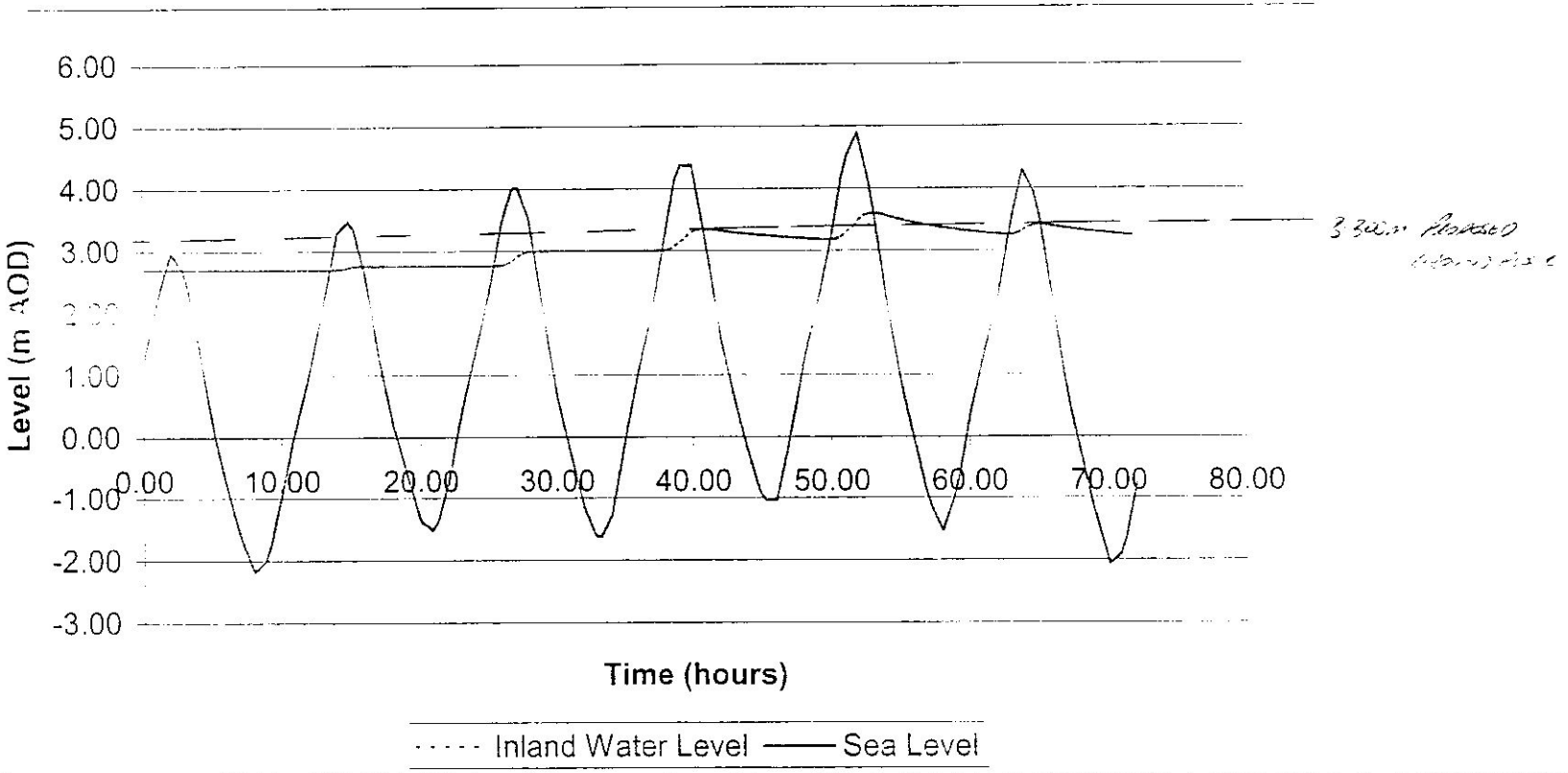
INPUT FOR TIDE PREDICTION	
Nearest Station	15
1:200 Year Tidal Level (m AOD)	4.90
INPUT FOR BREACH FUCNTION	
Start Time (hour) (>0)	0
End Time (hour) (<239)	72
Breach Width (m)	50
Breached Seawall Invert Level (m AOD)	3
Inland Base Level (m AOD)	2.7
Area of Compartment (km^2 >0.01, default=1.0e9)	1.5

25656 - Breach 3

RESULTS	
Peak Net Volume of Inflows (m3)	1505521.46
Peak Level (m AOD)	3.70



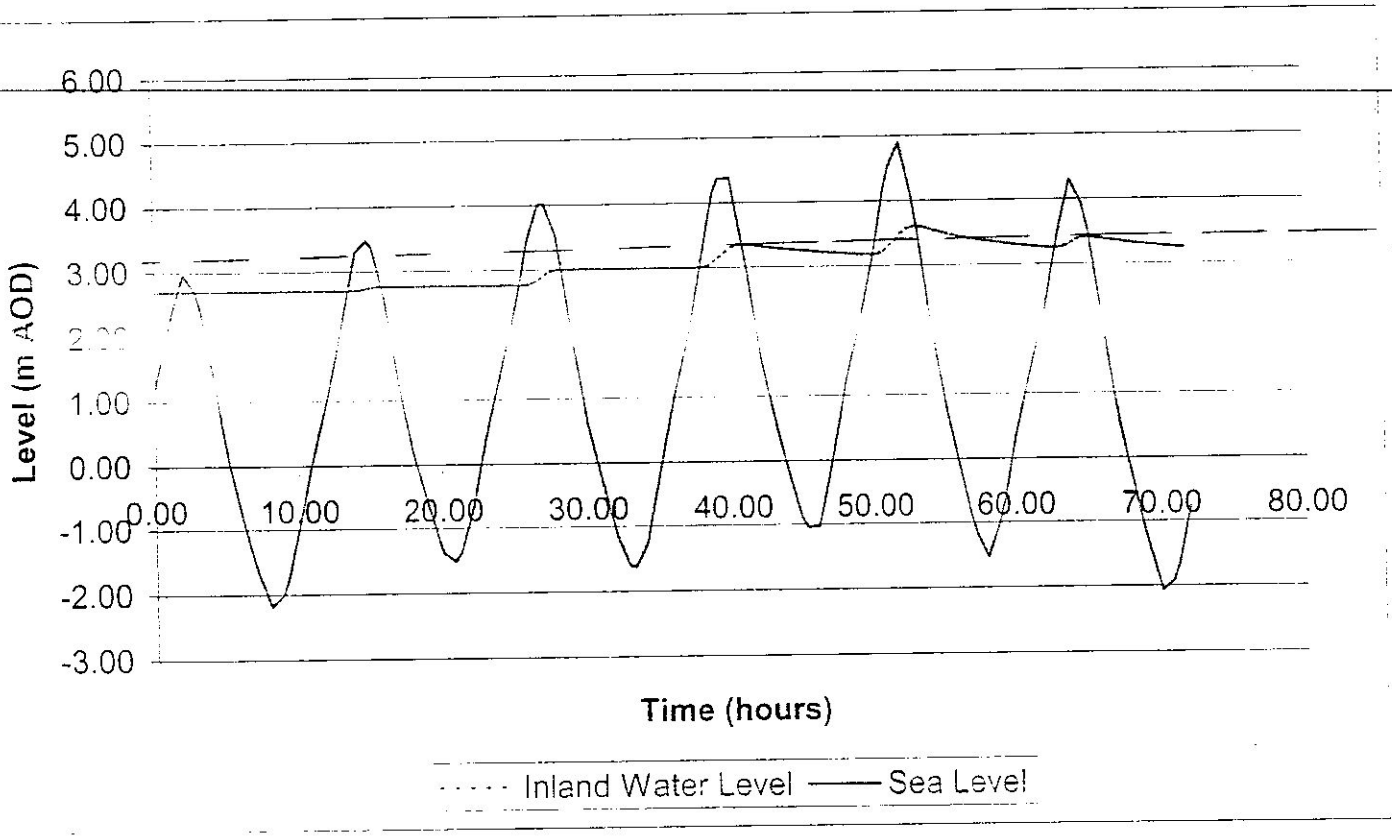
RESULTS	
Peak Net Volume of Inflows (m3)	1817124.97
Peak Level (m AOD)	3.61



3.30m Adopted

16656 Annex 4

RESULTS	
Peak Net Volume of Inflows (m3)	1817124.97
Peak Level (m AOD)	3.61



3.300m Proposed