



CIVIL AND STRUCTURAL ENGINEERS

1 The Grove
Felpham
West Sussex
PO22 7EY

Flood Risk Assessment

for

Proposed New Dwelling

at

102 Ancton Way
Elmer
West Sussex
PO22 6JR

Project: F1861
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Author: MH
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Flood Risk Assessment

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Flood Risk Assessment

1. Introduction

- 1.1 We have been appointed by Mr David Aylott to provide a Flood Risk Assessment to accompany the proposed planning application for a replacement dwelling at 102 Ancton Way, Elmer, West Sussex, PO22 6JR.
- 1.2 The Flood Risk Assessment (FRA) study has been prepared for this site in accordance with the requirements of The National Planning Policy Framework (NPPF) (with particular reference to Chapter 10 "Meeting the challenge of climate change, flooding and coastal, the NPPF Technical Guidance on flood risk). It is also consistent with the latest guidance issued by the EA on the preparation of FRA's and follows guidance issued by the EA on the preparation of FRA's and Flood Evacuation Plans.
- 1.3 This FRA report assesses the risk of flooding to the site with reference to the types of potential flooding and the potential impact of the development on flood risk, allowing for climate change impact to 2115. The scale and nature of the FRA is considered appropriate to the scale and nature of the proposed development.
- 1.4 Flood risk maps and flood levels acquired from the Environment Agency (EA) have been used in the preparation of this report.

2. Existing Site Use

2.1 Site Setting

- 2.1.1 The site is situated at 102 Ancton Way, Elmer, West Sussex, PO22 6JR. A site location plan is shown in Appendix A.

2.2 Site Topography

- 2.2.1 A topographical survey has been carried out by Digital Terrain Surveys LLP in July 2014, as shown in Appendix A.
- 2.2.2 The site has been developed and currently has a residential dwelling, with associated concrete drive and paving, garage and outbuildings.
- 2.2.3 The northern boundary is adjacent to woodland and agricultural fields. The western and eastern boundaries of the site are adjacent to existing residential properties. The southern boundary of the site is adjacent to Ancton Way which forms part of an established residential estate within Elmer.
- 2.2.4 The survey has been undertaken based on OS Datum. The site generally falls from the northern boundary to the southern boundary, with highest and lowest measured boundary levels of 3.07m AOD and 2.58m AOD respectively. The lowest level on site is 2.58m AOD at the driveway entrance.
- 2.2.5 The existing dwelling has a finished floor level of 3.50m AOD, approximately 0.9m above existing ground levels.

2.3 Watercourses

- 2.3.1 The site is situated approximately 30m from a ditch/watercourse/drain that in turn is understood to discharge to the Elmer Rife, a tributary of the Ryebank Rife. This tributary, Elmer Rife, although connected to the Ryebank Rife also has a tidal outfall at Elmer beach. The Ryebank Rife is situated approximately 1000m to the north of the site. The Ryebank Rife discharges into the River Arun to the east and the Aldingbourne/Lidsey Rife to the west. In essence the Ryebank and Elmer Rife forms a land drainage system that drains the low lying land situated between the coast and the higher ground at Yapton, Barnham and Ford to the north,

2.4 Hydrology & Geology

- 2.4.1 The EA Groundwater Sources Map on the EA web site indicates that the site lies outside a ground water source protection zone.
- 2.4.2 Initial internet investigations would suggest that the site would appear to be situated over chalk bedrock formations, which in turn are overlain by superficial geology comprising raised marine deposits. The raised marine deposits can vary in nature from clay, silt, sand and gravel.
- 2.4.3 However, in our experience the soils in the Elmer area are generally cohesive in nature. In addition due to the relatively low lying land and its proximity to the sea the ground water levels beneath the site are anticipated to be very shallow. The cohesive nature of the soils and the high groundwater levels are therefore unlikely to support soakaways designed to current standards.
- 2.4.4 A detailed geotechnical site investigation should be undertaken to determine the actual soil encountered within the site and their properties.

2.5 Existing Drainage

- 2.5.1 The topographical survey shows an annotated foul drainage system serving the existing dwelling on site. Given the nature of the development it would not be uncommon for the dwelling to have a combined drainage system discharging to the foul/combined sewer which is assumed to be situated within Ancton Way.
- 2.5.2 The existing driveway, paving, garage and outbuildings within the site appear from inspection of the topographical survey to have no direct connections to a drainage system. Therefore, given the existing levels and falls on site it is envisaged that runoff from the site flows southwards away from the site and enters the highway drainage within Ancton Road. The runoff from Ancton Road is assumed to be discharged to the existing land drainage ditches within the estate that in turn flow into the Elmer Rife and Ryebank Rife.
- 2.5.3 Based on the anticipated geology and ground water levels within the site it is not envisaged that any runoff from site is currently discharged to soakaways.

3. Existing Flood Risk

3.1 River and Tidal Flooding

3.1.1 Flood data obtained from the Environment Agency, Appendix B, has been used to assess flooding from river and sea sources.

3.1.2 River Flooding

3.1.2.1 The flood risk map obtained from the EA on 6th August 2014 indicates that the site is within a Flood Zone 3 due to its proximity to the watercourse Elmer Rife to the east. This assessment is based on fluvial (river) modelling taken from 2009 JFLOW model data.

3.1.2.2 Data for three nodes within the site are indicated on the fluvial flood map, indicating that the flood level for a 0.1% AEP (1 in 1000 year event) would be between 2.86 and 2.89m AOD, equating to a Flood Zone 2.

3.1.2.3 A Flood Zone 2 site is defined as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1%-0.1%).

3.1.2.4 From examination of the site survey it is evident that the majority of the site would be regarded as being situated within a Flood Zone 2, ie areas situated at 2.86m AOD or lower.

3.1.2.5 The lowest level on site is 2.59m AOD which would correspond to a flood depth of 270mm. The existing dwelling would be unaffected by this flood level, being situated at 3.50m AOD, 0.61m above the highest modelled flood level. In addition the northern portion of the site is generally higher at a level of 2.80m AOD, and would therefore have a corresponding flood depth of 90mm.

3.1.2.6 No levels are available for the 1% AEP (1 in 100 year) event for the site, equating to a Flood Zone 3.

3.1.2.7 A Flood Zone 3 site is defined as having a 1 in 100 or greater annual probability of river flooding (1%AEP). Given that the site levels across the site only vary by 0.49m, and only 0.27m lower than Flood Zone 2 flood levels it is deemed unlikely that the site is situated within the fluvial Flood Zone 3.

3.1.2.8 In conclusion, the flood risk from fluvial sources for site is considered to be definitely medium, based on fluvial Flood Zone 2 modelled levels.

3.1.3 Sea/Coastal Flooding

3.1.3.1 Coastal flood data obtained from the EA on 6th August 2014 indicates that the site is within a Flood Zone 3 due to its proximity to the sea to the south. This assessment is based on TIDAL (sea) modelling taken from 2009 TUFLOW model data.

3.1.3.2 Current EA data indicates the following flood levels for the corresponding events:

Return Period	Water Level (mAOD)
0.5% 1 in 200 yr	4.13
0.1% 1 in 1000 yr	4.33
0.5% 1in 200 yr + CC	5.22

3.1.3.3 A Flood Zone 3 site is defined as having a 1 in 200 or greater annual probability of sea flooding (0.5%AEP).

3.1.3.4 A Flood Zone 2 site is defined as having between a 1 in 200 and 1 in 1000 annual probability of river flooding (0.5%-0.1%).

3.1.3.5 Based on the highest and lowest levels within the site of 3.07m and 2.59m respectively, the depth of flooding that the site would be subjected too during these flood events (0.5% with climate change allowance) is 2.15 m and 2.63m respectively.

3.1.3.6 In conclusion, the flood risk from sea/coastal sources is considered to be high, with the site situated within a tidal Flood Zone 3.

3.2 Flood Risk From Overland Flows

3.2.1 The area adjacent to the site is predominantly residential with rural areas to the north consisting of agricultural land.

3.2.2 The EA's definition is '*Surface water flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead.*'

3.2.3 EA flood maps showing the risk of flooding from surface water indicates that although the site is deemed to be at very low risk of flooding, the adjacent highway, Ancton Way is deemed to be at low risk of surface water flooding immediately adjacent to the site.

3.2.4 A low risk of surface water flooding is deemed to be less than 1 in 100 (1%) but greater than or equal to 1 in 1,000 (0.1%) chance in any given year.

3.2.5 A very low risk of surface water flooding is deemed to be less than 1 in 1000 (0.1%) chance in any given year. In conclusion the flood risk from overland flows is considered to be low to very low for the site.

3.3 Flood Risk from Groundwater

- 3.3.1 The ground water level is anticipated to be high due to the site's proximity to the Elmer Rife and Sea and the anticipated cohesive nature of the soils in the area.
- 3.3.2 In addition, the site is situated towards the lowest part of a wider area shallow depression in which groundwater could rise up in periods of extreme high groundwater, though the levels are likely to be regulated due to the site's proximity to the sea.
- 3.3.3 In conclusion, the flood risk from groundwater is considered to be low to medium.

3.4 Flood Risk from Infrastructure

- 3.4.1 There are no known flood defences, canals or reservoirs on higher ground close to the site that could cause flooding to the proposed site were they to fail.
- 3.4.2 The EA's website indicates that no flood risk is present in the locality.
- 3.4.3 In conclusion flood risk from infrastructure is considered to be low.

3.5 Flood History

- 3.5.1 From our discussions with the EA we are informed that they are not aware of any flooding incidents at the site. Furthermore, the current owner is not aware of any flooding issues regarding the site.
- 3.5.2 Enquiries will be made to the local authority, Arun District Council to check their records of any incidents at the site, though none are anticipated.
- 3.5.3 The only incidents known to the author are issues regarding flooding associated with the adopted pumping station within the Elmer Estate in which the site is situated. The adopted foul water pumping station has failed in the past during extreme weather conditions, due primarily to the combined system within the locality overwhelming the pumping station, resulting in localised flooding to the east of the site. However, it is unknown whether or not this flooding has affected the proposed site at all. If it has it is considered that the flooding impact would be minimal.

3.6 Overall Conclusion of Existing Flood Risk

- 3.6.1 The site is completely situated within a Flood Zone 3 with regards to coastal/sea flooding.
- 3.6.2 The site is also situated within a Flood Zone 2 with regards to fluvial flooding.
- 3.6.3 Given that the site is within a Flood Zone 3 for sea flooding, the overall flood risk to the site is considered to be high.

4. Proposed Development

4.1 Introduction

- 4.1.1 The proposal is to replace the existing dwelling and associated outbuildings with a new dwelling. The proposed site layout and dwelling are as detailed on AMDesign Ltd drawings, as shown in Appendix C.

4.2 NPPF Vulnerability Classification

- 4.2.1 The Flood Risk Vulnerability Classification as defined in NPPF Technical Guidance Table 2 for the proposed development, ie new dwelling, will have a 'More Vulnerable' classification.
- 4.2.2 The proposed use of the site to provide a new dwelling, ie 'More Vulnerable' classification is deemed as 'Exception Test Required' for a Flood Zone 3a, as indicated on NPPF Technical Guidance Table 3.
- 4.2.3 However, the proposed replacement dwelling is regarded as a Minor Development and as such is not subject to Exception Tests but will still have to meet the requirements for FRA's and flood risk reduction.
- 4.2.4 Minor development is defined as:
- 4.2.4.1 *'Alterations: development that does not increase the size of the buildings'*
- 4.2.4.2 *'Householder' development within the curtilage of the existing dwelling in addition to physical extensions to the existing dwelling itself. Excludes the creation of a separate dwelling within the curtilage of the existing dwelling.*
- 4.2.5 The proposed dwelling occupies approximately 236m², which is greater than the 137m² comprising the existing dwelling and outbuildings within the site. However, it should be noted that the existing dwelling would be permitted to be extended under a minor development flood risk perspective. In addition, the proposed dwelling is merely a replacement dwelling, not the creation of an additional dwelling.
- 4.2.6 In addition having discussed the aspect with the EA a replacement dwelling is regarded as posing no additional flood risk on the basis that betterment in terms of providing greater flood protection to all is provided with the replacement dwelling.

4.3 Proposed Development Flood Risk

4.3.1 Flood Plain Storage Displacement

4.3.1.1 The proposed replacement dwelling is located within a Flood Zone 3 for sea coastal flooding. Displaced flood plain storage is only required to be addressed within fluvial flood zones, not tidal flood zones.

4.3.1.2 No levels are currently available for Flood Zone 3 fluvial flooding. Flood Zone 2 fluvial flood levels are modelled at 2.89m AOD. The proposed site is within a fluvial Flood Zone 2 and is deemed unlikely to be situated within a Flood Zone 3. Although the proposed dwelling will increase the building footprint area from 139 to 236m² this is deemed acceptable/compatible within a fluvial Flood Zone 2.

4.3.2 Flood Depth & Finished Floor Levels

4.3.2.1 A 0.5% AEP coastal flood event taking climate change into account will result in a flood level of 5.22m AOD, which will result in a depth of flooding across the site of 2.15-2.63m.

4.3.2.2 It should be noted that during such tidal flooding events a surge tide created by severe low depressions will generally be the cause of the flooding. The modelled flood level does not take into account wave heights generated during such events. It is normal practice to make an allowance for wave heights during such extreme weather based on the exposure of the site to wave action, with a standard freeboard allowance of 600mm generally added to the maximum flood level.

4.3.2.3 Therefore the recommended minimum ground floor level in order to cater for a 0.5% AEP coastal flood, event taking climate change into account, is 5.82m AOD, 3.24m above existing ground level.

4.3.2.4 It is acknowledged that the current proposed dwelling would have difficulties in achieving this ground floor level based on the relative position and arrangement of the garage and front door accesses. In addition, the two storey dwelling raised to this degree would effectively be a 3 storey dwelling and may not be considered favourably when taking other planning considerations into account.

4.3.2.5 In order to achieve the recommended ground floor level of 5.82m AOD it is envisaged that the scheme would have to be significantly altered, with potentially the garage and other non-habitable rooms provided below the ground floor level of 5.82m AOD, with the habitable rooms provided at a ground floor level of 5.82m AOD.

- 4.3.2.6 As the proposed dwelling is a replacement dwelling the EA have advised that they would seek betterment from the existing situation.
- 4.3.2.7 The existing dwelling within the site has a ground floor finished level of 3.5m AOD, some 0.92m above the lowest on site level. On this basis the EA would accept a finished floor level above 3.5m AOD as betterment in this instance.
- 4.3.2.8 The client in discussion with the local planning authority needs to determine the proposed finished floor level to be provided above 3.50m and 5.82m AOD.
- 4.3.2.9 However, it should be noted that constructing a replacement dwelling with a ground floor level below 5.82m AOD will result in the dwelling being at risk of a 0.5% AEP coastal flood event, taking climate change into account.
- 4.3.2.10 The closer to 3.5m AOD that the proposed ground floor level is constructed the greater the corresponding risk of the dwelling being flooded in future. Any construction below 5.82m AOD should be made to be flood resilient, enabling the dwelling to be swiftly made habitable following a flood event. Advice on flood resilient construction techniques and methods are outlined on the Environment Agency and other flood forum websites.
- 4.3.2.11 In addition, a ground floor level below the recommended level of 5.82m AOD, to cater for the tidal flood risk, may result in house insurance with flood cover being difficult to secure or unobtainable, and/or reduce the property's value or its attractiveness to potential buyers in due course.

4.3.3 Flood Depths

- 4.3.3.1 As highlighted in the above sections, during a 0.5% AEP coastal flood, event taking climate change into account the site will be flooded to a depth of 2.64m.
- 4.3.3.2 FD2321 (Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purpose) gives an indication of flood water hazard for people.
- 4.3.3.3 It should be noted that the Hazard to People Classification is dependent on the actual flood flow velocity, depth of water and the level of debris within the flood water. Very shallow fast flowing water in some circumstances can represent a 'Danger for Some' Classification, such as children, elderly and the infirm. In addition flood depths of 200mm can also represent a 'Danger to Most' Classification, with includes the general public.
- 4.3.3.4 Given the depth of flooding across the site of up to 2.64m then the Hazard to People Classification will be 'Danger to Most', with includes the general public.

- 4.3.3.5 The depth of flooding within the site can only be reduced by increasing the site levels, though this is an impractical solution in this instance.
- 4.3.3.6 Flooding from coastal sources are likely to occur over a number of days, with high spring tides coinciding with inclement weather. Flood levels are likely to rise very quickly, though warnings of impending flood events should be able to be communicated with sufficient time concerned prior to the event occurring for residents to be evacuated.
- 4.3.3.7 It is advised that the property is linked to the EA flood warning system and that the residents have a flood evacuation plan in place prior to occupation. This is advised regardless of the level at which the ground floor is constructed at, based on the disruptive effect and extent that the tidal flooding event will have on the immediate area.

4.3.4 Storm Water Drainage

- 4.3.4.1 The proposed development will potentially result in an increase in the impermeable area from existing situations. The proposed storm water runoff, in terms of flow and volume should be mitigated as much as possible to existing flows and volumes. It is advised that Code for Sustainable Homes (CfSH) measures/requirements be implemented to achieve this, so that the flood risk to adjacent properties/neighbours are managed and mitigated.

4.3.5 Climate Change

- 4.3.5.1 It is generally accepted that climate change will result in more frequent, short duration, high intensity rainfall and more frequent periods of long duration rainfall. These factors have the potential to alter the flood risk of the proposed site.
- 4.3.5.2 The current modelled data from the EA takes into account climate change for the period up to the year 2115, in line with the recommendations of NPPF Technical Guidance, which equates to the estimated life of the development.
- 4.3.5.3 It should also be noted that these modelled levels may be altered in due course based on revised or improved assessments.

5. Summary

- 5.1 This report has found the following overall conclusions:
- 5.2 The site is situated within a Flood Zone 3 (0.5% AEP plus CC), which is deemed to have a High Probability of coastal flooding, with a flood level of 5.22m AOD.
- 5.3 The site is situated within a Flood Zone 2 (0.1-1% AEP), which is deemed to have a Medium Probability of fluvial flooding, with a 0.1% AEP flood level of 2.89m AOD.
- 5.4 The site is not considered to be situated within a Flood Zone 3 (1% AEP), which is deemed to have a High Probability of fluvial flooding, though the actual flood level for this event has not been modelled by the EA.
- 5.5 It should be noted that the EA do not have any records of any previous flood events affecting this location.
- 5.6 The proposed use of the site is to provide a replacement dwelling. As the development is a new replacement dwelling then the current EA requirements concerning these developments is understood to be betterment from existing situation.
- 5.7 A 0.5% AEP coastal flood event taking climate change into account will result in a flood level of 5.22m AOD, which will result in a depth of flooding across the site of 2.15-2.63m.
- 5.8 It should be noted that during such tidal flooding events a surge tide created by severe low depressions will generally be the cause of the flooding. The modelled flood level does not take into account wave heights generated during such events. It is normal practice to make an allowance for wave heights during such extreme weather based on the exposure of the site to wave action, with a standard freeboard allowance of 600mm generally added to the maximum flood level.
- 5.9 Therefore the recommended minimum ground floor level in order to cater for a 0.5% AEP coastal flood, event taking climate change into account, is 5.82m AOD, 3.24m above existing ground level.
- 5.10 It is acknowledged that the current proposed dwelling would have difficulties in achieving this ground floor level based on the relative position and arrangement of the garage and front door accesses. In addition, the two storey dwelling raised to this degree would effectively be a 3 storey dwelling and may not be considered favourably when taking other planning considerations into account.
- 5.11 In order to achieve the recommended ground floor level of 5.82m AOD it is envisaged that the scheme would have to be significantly altered, with potentially the garage and other non-habitable rooms provided below the ground floor level of 5.82m AOD, with the habitable rooms provided at a ground floor level of 5.82m AOD.

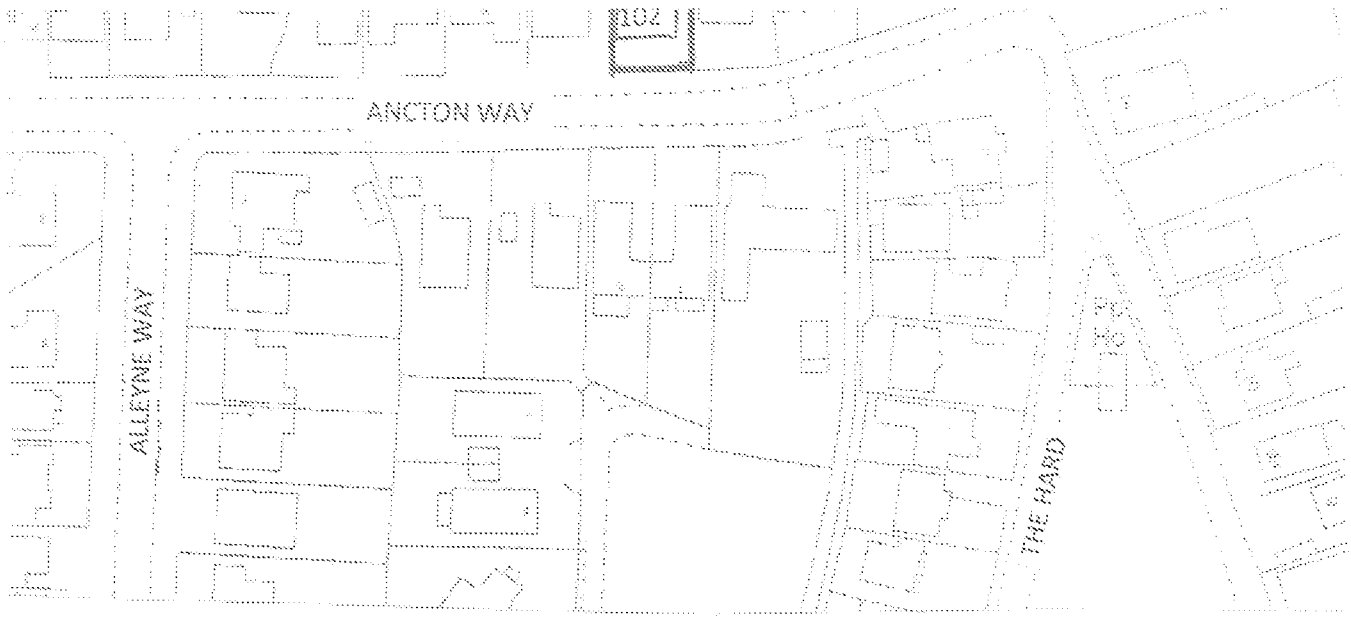
- 5.12 As the proposed dwelling is a replacement dwelling the EA have advised that they would seek betterment from the existing situation.
- 5.13 The existing dwelling within the site has a ground floor finished level of 3.5m AOD, some 0.92m above the lowest on site level. On this basis the EA would accept a finished floor level above 3.5m AOD as betterment in this instance.
- 5.14 The client in discussion with the local planning authority needs to determine the proposed finished floor level to be provided above 3.50m and 5.82m AOD.
- 5.15 However, it should be noted that constructing a replacement dwelling with a ground floor level below 5.82m AOD will result in the dwelling being at risk of a 0.5% AEP coastal flood, even taking climate change into account.
- 5.16 The closer to 3.5m AOD that the proposed ground floor level is constructed the greater the corresponding risk of the dwelling being flooded in future. Any construction below 5.82m AOD should be made to be flood resilient, enabling the dwelling to be swiftly made habitable following a flood event. Advice on flood resilient construction techniques and methods are outlined on the Environment Agency and other flood forum websites.
- 5.17 In addition, a ground floor level below the recommended level of 5.82m AOD to cater for the tidal flood risk may result in house insurance with flood cover being difficult to secure or unobtainable, and/or reduce the property's value or its attractiveness to potential buyers in due course.
- 5.18 Flooding from coastal sources are likely to occur over a number of days, with high spring tides coinciding with inclement weather. Flood levels are likely to rise very quickly, though warnings of impending flood events should be able to be communicated with sufficient time concerned prior to the event occurring for residents to be evacuated.
- 5.19 It is advised that the property is linked to the EA flood warning system and that the residents have a flood evacuation plan in place prior to occupation. This is advised regardless of the level at which the ground floor is constructed at, based on the disruptive effect and extent that the tidal flooding event will have on the immediate area.
- 5.20 The proposed development will potentially result in an increase in the impermeable area from existing situations. The proposed storm water runoff, in terms of flow and volume should be mitigated as much as possible to existing flows and volumes through the use of Sustainable Drainage techniques. It is advised that Code for Sustainable Homes (CfSH) measures/requirements be implemented to achieve this, so that the flood risk to adjacent properties/neighbours are managed and mitigated.

- 5.21 On the basis that the above measures relating to the finished ground floor level, storm water management and resident flood evacuation plans are implemented on site for the proposed replacement dwelling then the scheme can be regarded as betterment from existing scenarios.
- 5.22 On this basis it is acknowledged that the proposed development poses no additional flood risk to the site, its residents or the adjacent residents and property.
- 5.23 It is considered that these conclusions meet the requirements of The National Planning Policy Framework (NPPF) (with particular reference to Chapter 10 "Meeting the challenge of climate change, flooding and coastal, the NPPF Technical Guidance on flood risk).

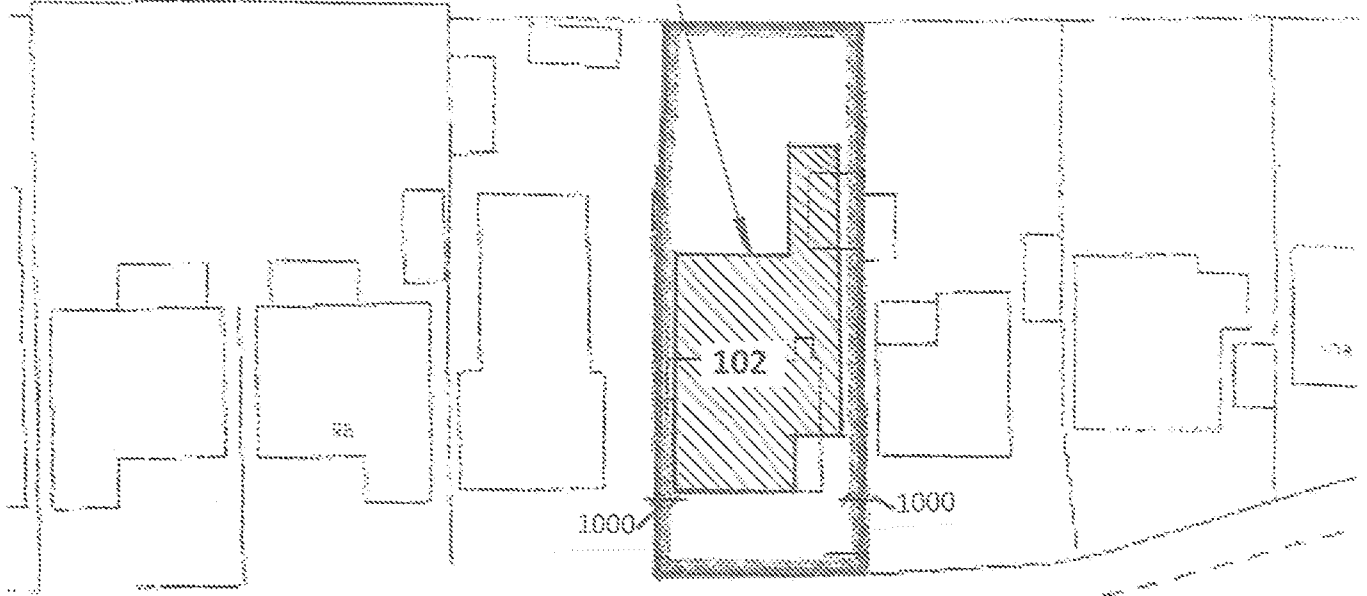
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Site Location Plan Topographical Survey

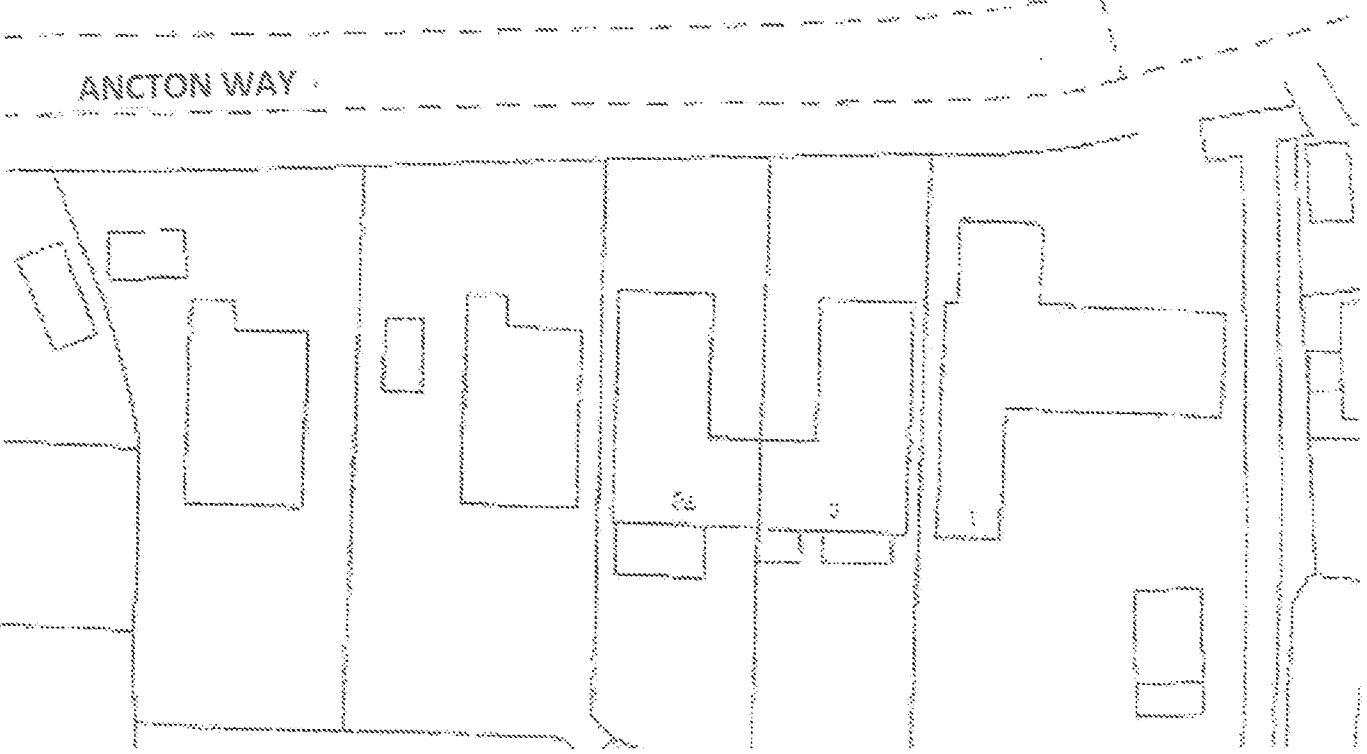
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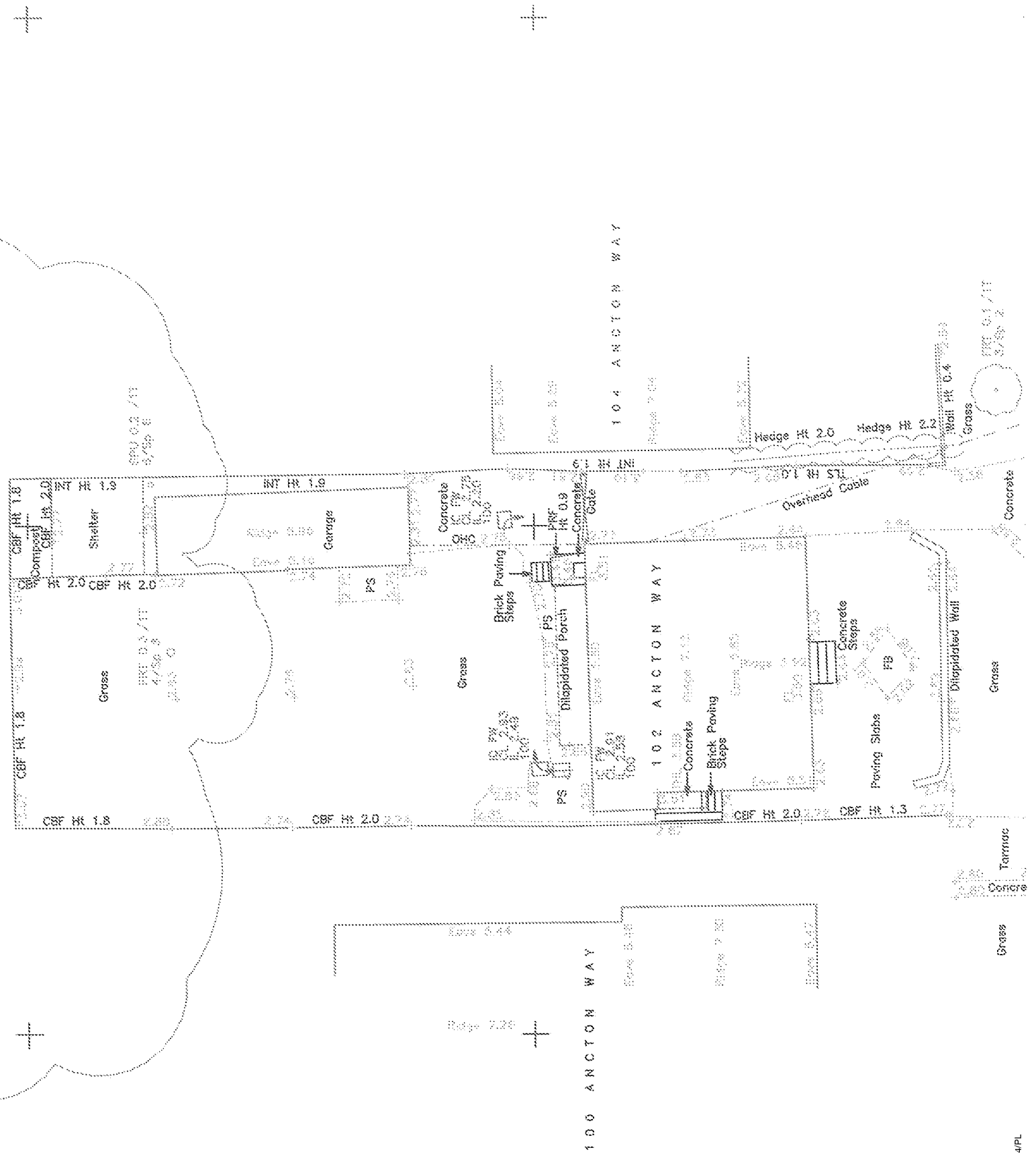


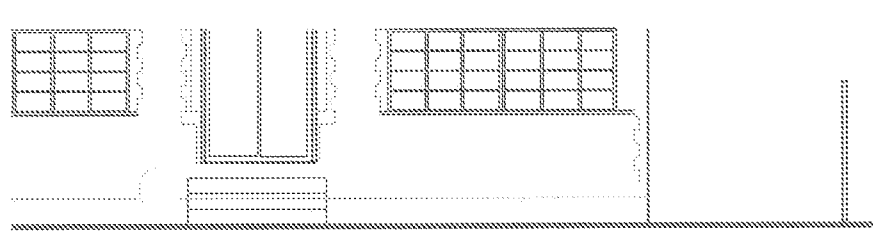
PROPOSED NEW DWELLING



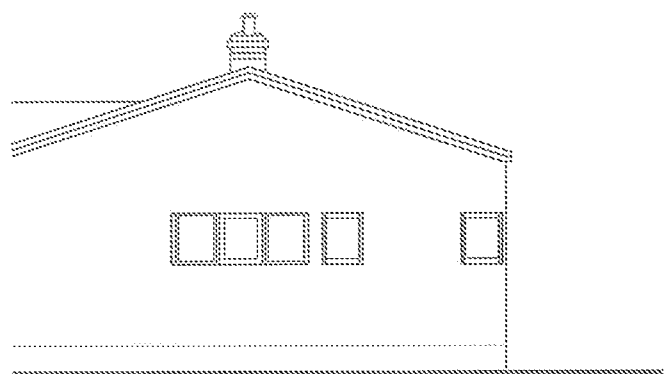
ANCTON WAY



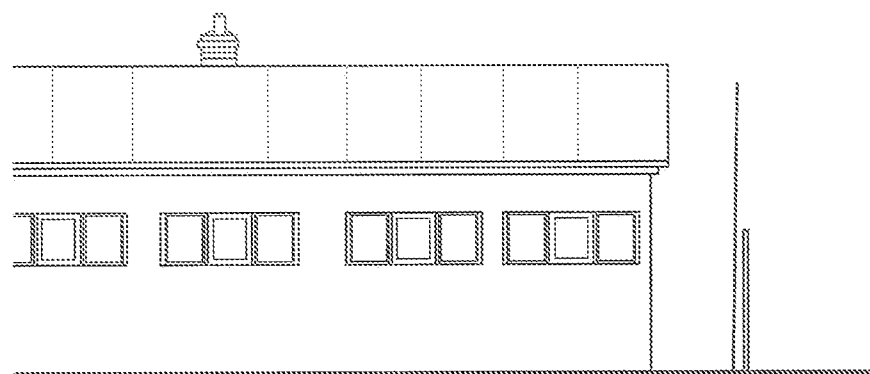




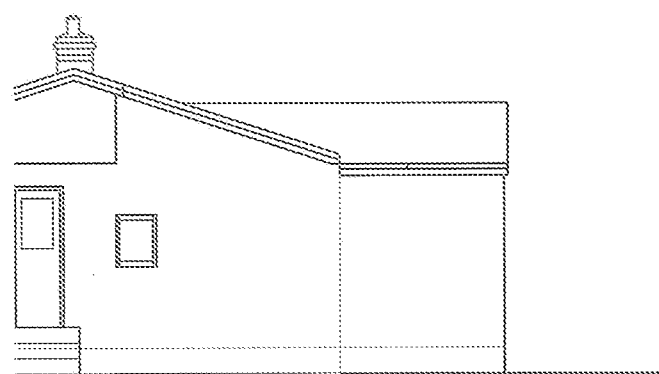
ELEVATION 1:100



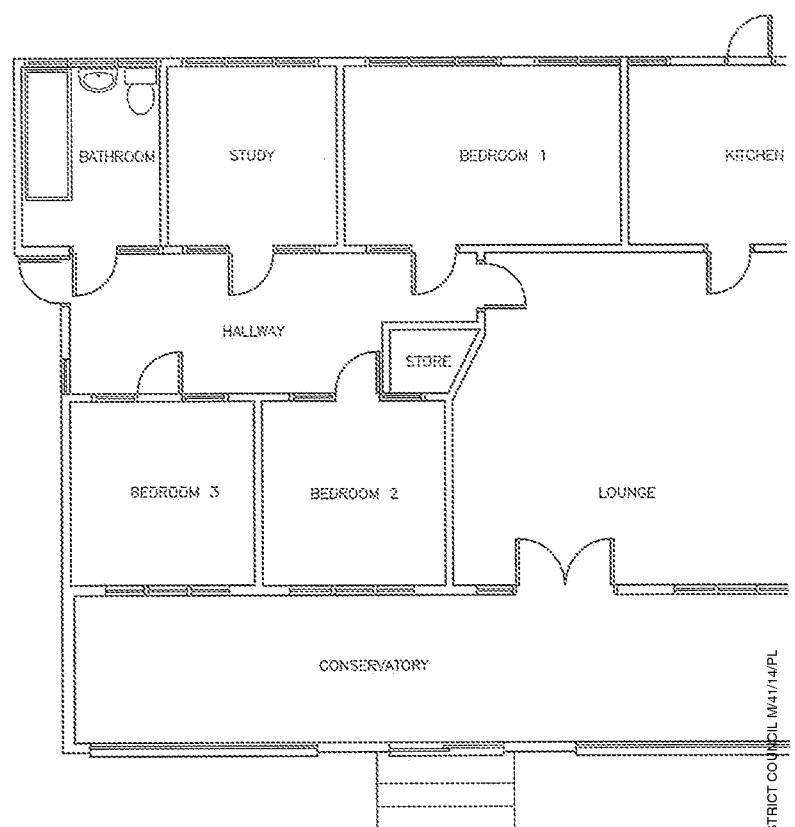
ELEVATION 1:100



ELEVATION 1:100



ELEVATION 1:100



EXISTING GROUND FLOOR PLAN 1:100

B

EA Flood Data & Maps dated 06/08/2014

Mark Hobbs
ABMH Ltd
1 The Grove
Felpham, Bognor Regis
PO22 7EY

Our ref: SSD/4476/PC
Your ref:
Date: 06/08/2014

Dear Mr Hobbs

Provision of Product 4 for 102 Ancton Way, Elmer, West Sussex PO22 6JR

Thank you for your request to use Environment Agency data. The information is attached.

If you have requested this information to help inform a development proposal, then you should note the detail in the attached advisory text on the use of Environment Agency Information for Flood Risk Assessments / Flood Consequence Assessments.

Supporting Information

This information is provided subject to the enclosed notice, which you should read.

Modelled Data

The tidal depths and levels provided were taken from the 2009 Arun to Pagham TUFLOW modelling study. The site falls outside of all defended tidal extents.

The fluvial depths and levels have been taken from 2009 JFLOW modelling.

Flood History

We do not have any records of previous flood events affecting this site. I would suggest contacting Arun District Council for a more comprehensive flood history check.

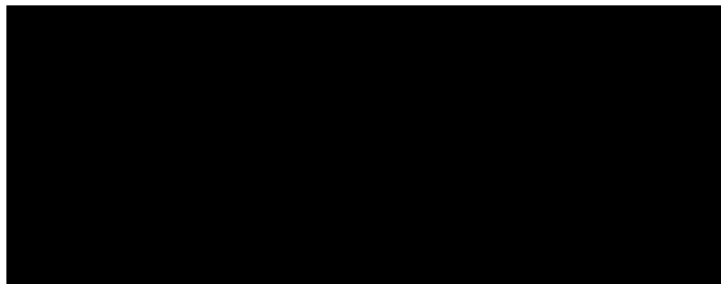


Flood Defences

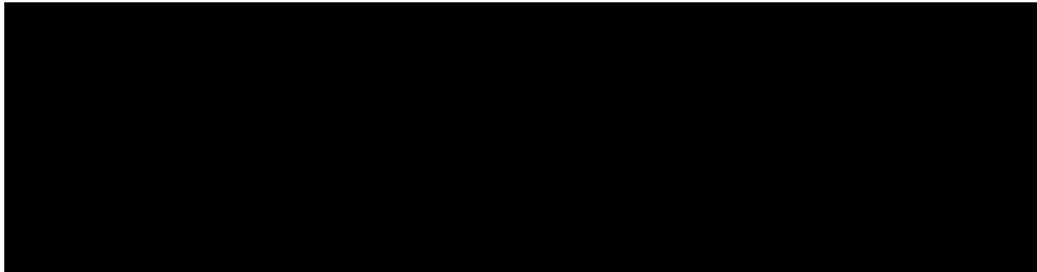
There are no formal raised flood defences to protect this area from river flooding. Coastal flood defences offer a standard of protection of approximately 1in200 (0.5%). Please see attached information.

If you have any queries or would like to discuss the content of this letter further please don't hesitate to contact me.

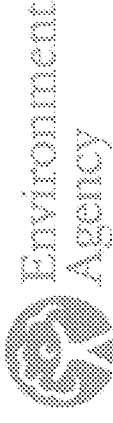
Yours faithfully



Jon Denman
FCRM Officer
Partnership and Strategic Overview Team – West Sussex



Modelled Flood Outlines Centered on 102 Ancton Way, Elmer, West Sussex, PO22 6JR -
Created 06/08/2014 [Ref: SSD/4476/PC]

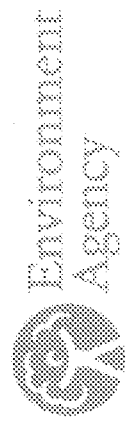
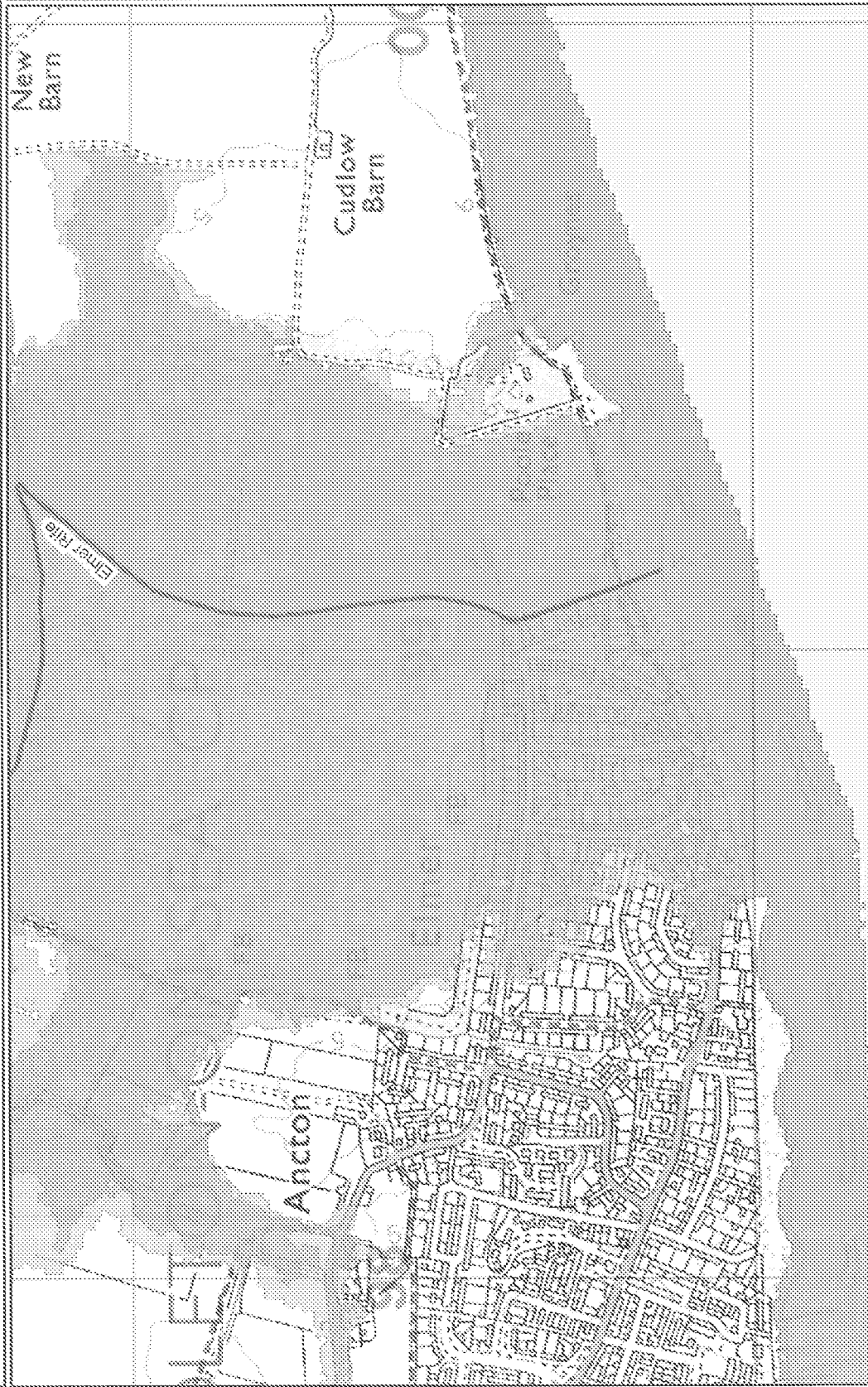


Legend

- Main River
- Fluvial 1in1000yr
- Tidal 1in100yr
- Tidal 1in200yr
- Tidal 1in1000yr
- Tidal 1in200yr + CC [2115]

1:10,000
*when printed at A4.





Legend

- Main River
- Flood Zone 3
- Flood Zone 2

Flood Map for Planning (assuming no defences)

Flood Zone 3

Shows the area that could be affected by flooding
 - from the sea with an 1 in 200 or greater chance
 of happening each year.
 - or from a river with a 1 in 100 or greater chance
 of happening each year.

Flood Zone 2

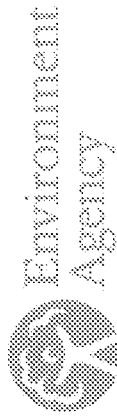
Shows the extent of an extreme flood
 from rivers of the sea with up to a 1 in 1000
 chance of occurring each year.

1:10,000



*when printed at A4.

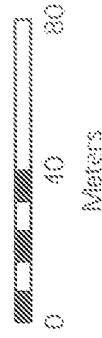




Legend

+ 1 Node Point

1:2,000
*when printed at A4.



		FLUVIAL Depths taken from 2009 JFLOW [m]		TIDAL Depths taken from 2009 TUFLOW model [m]					
Node Point	Easting	Northing	UNDEFENDED						
			0.1% AEP [1in1000yr]		0.5% AEP [1in200yr]		0.1% AEP [1in1000yr]		0.5% AEP [1in200yr] +CC [2115]
1	498929	100393	0.18	1.26	1.36	1.54	1.75	2.43	2.65
2	498932	100369	0.34	1.46	1.56	1.75	1.96	2.65	2.87
3	498932	100361	0.34	1.38	1.48	1.68	1.89	2.57	2.79
		FLUVIAL Levels taken from 2009 JFLOW [mAOD]		TIDAL Levels taken from 2009 TUFLOW model [mAOD]					
Node Point	Easting	Northing	UNDEFENDED						
			0.1% AEP [1in1000yr]		0.5% AEP [1in200yr]		0.1% AEP [1in1000yr]		0.5% AEP [1in200yr] +CC [2115]
1	498929	100393	2.89	4.03	4.13	4.33	4.54	5.22	5.44
2	498932	100369	2.86	4.03	4.13	4.33	4.54	5.22	5.44
3	498932	100361	2.94	4.03	4.13	4.33	4.54	5.22	5.44

Elmer Coastal Defences

Legend

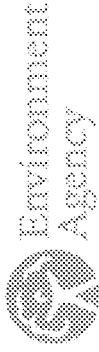
 Extreme Flood Outline

0 50 100
 Meters

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Risk of flooding from Surface Water



Scale 1:10,000



Likelihood of flooding from Surface Water

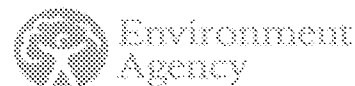


Likelihood of flooding from Surface Water

- High: Greater than or equal to 1 in 30 (3.3%) chance in any given year
- Medium: Less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance in any given year
- Low: Less than 1 in 100 (1%) but greater than or equal to 1 in 1,000 (0.1%) chance in any given year
- Very Low: Less than 1 in 1,000 (0.1%) chance in any given year

This information is shown on the Risk of Flooding from Surface Water map on our website.

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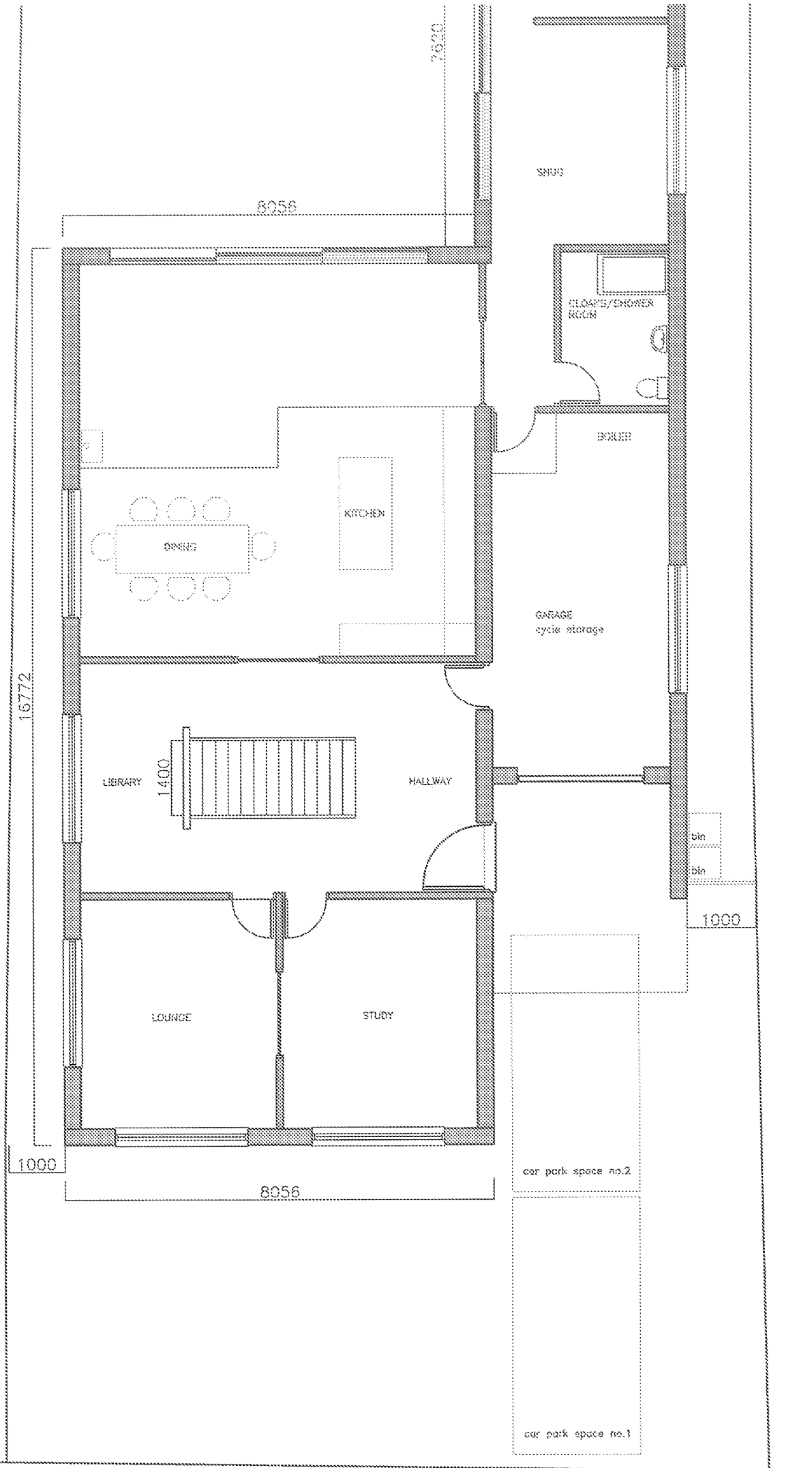
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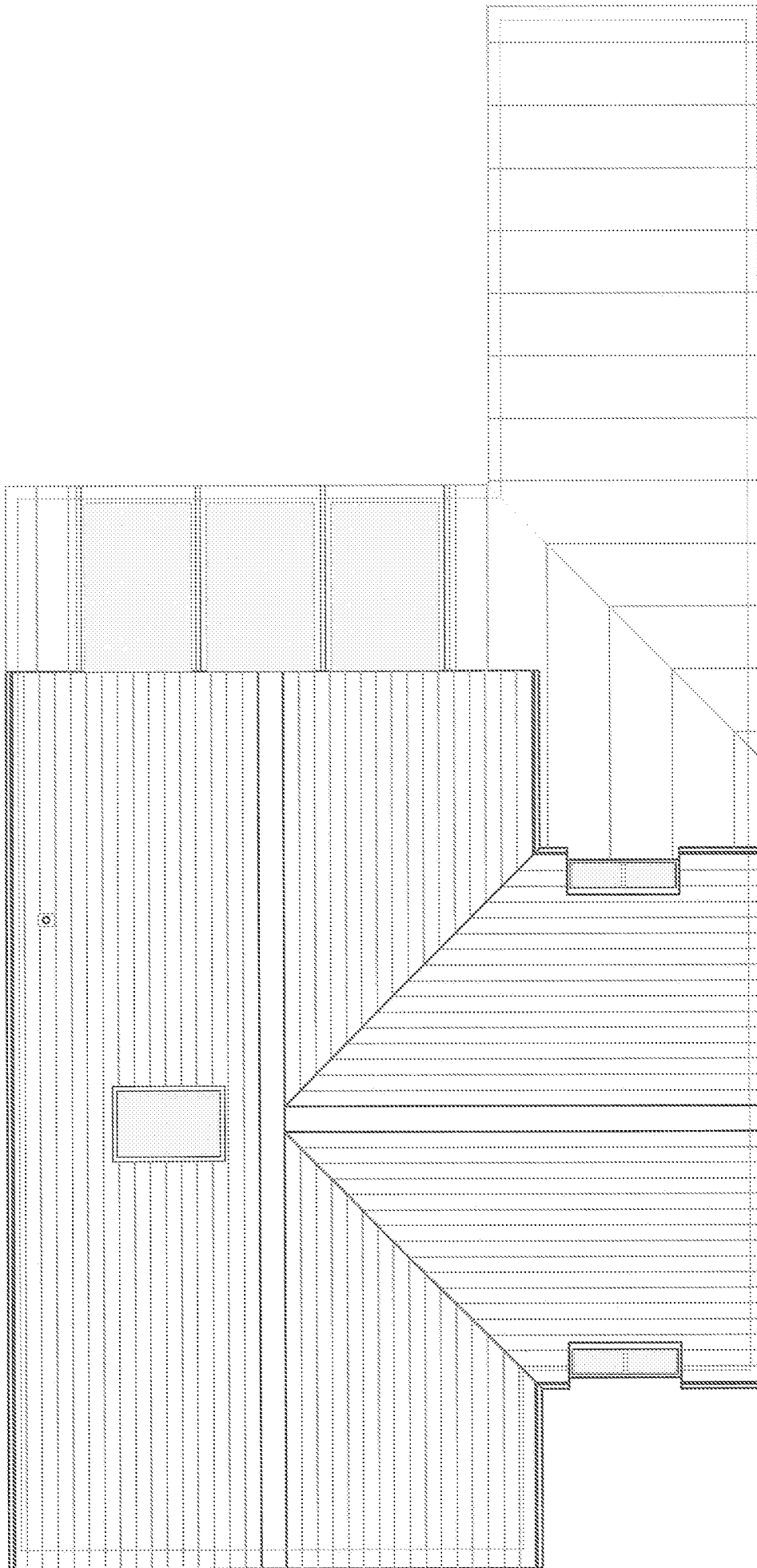
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Proposed Development proposals
AM Design Drawings



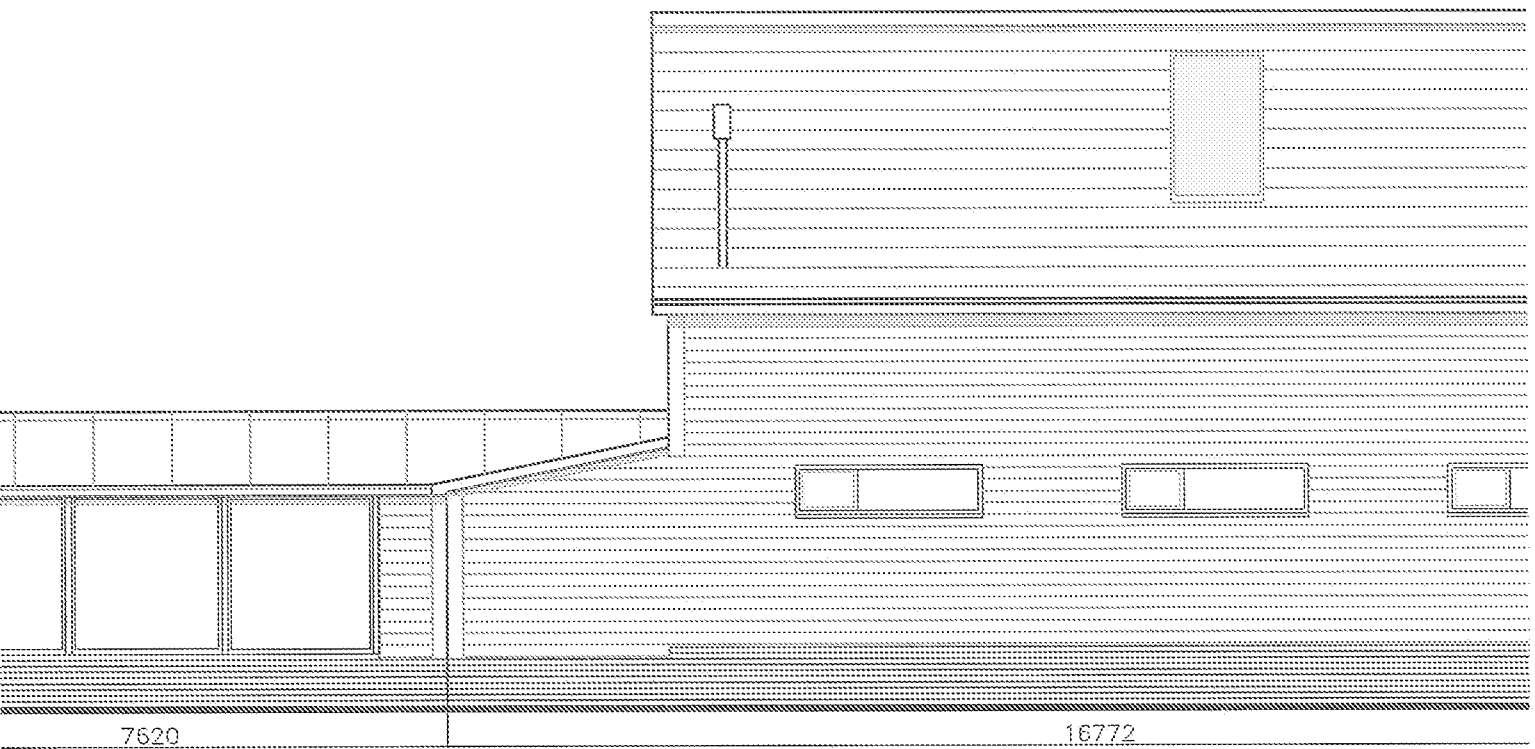
PROPOSED GROUND FLOOR PLAN 1:100



PROPOSED ROOF PLAN 1:100



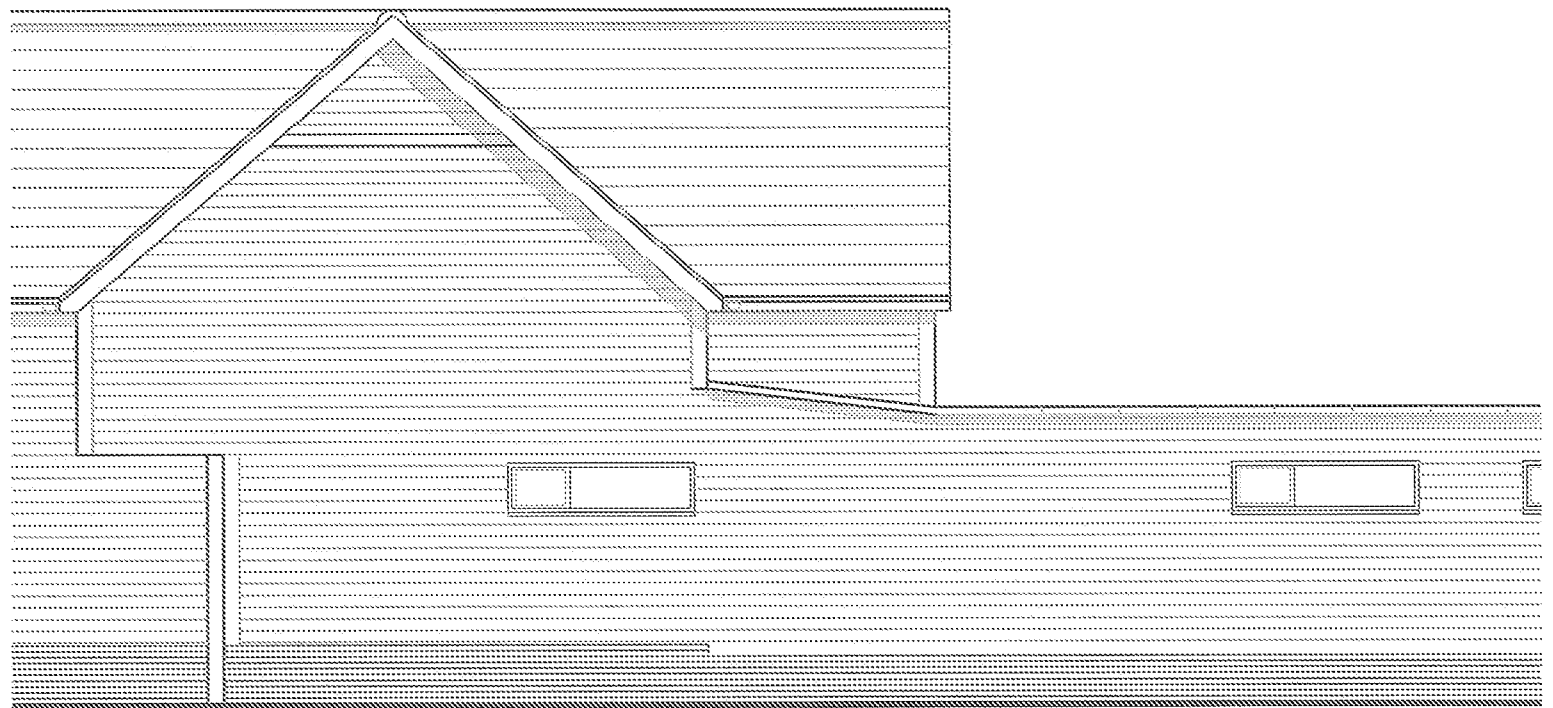
PROPOSED SOUTH ELEVATION 1:100



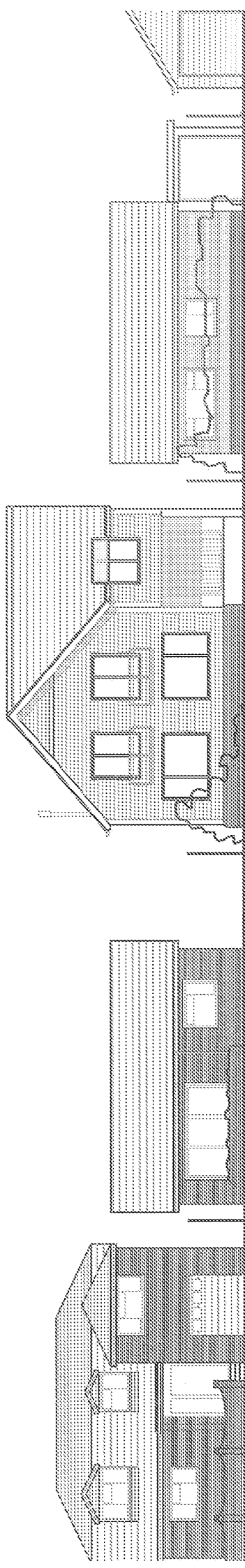
EAST ELEVATION 1:100



PROPOSED NORTH ELEVATION 1:100



ST ELEVATION 1:100



NEW DWELLING
102 ANCTON WAY