

ENGINEERING REPORT

DA#:	SA 2020 / 0009
Applicant:	Nick Griggs & Co
Proposal:	Subdivision (11 lots)
Address:	66 Alma Road, Orford
Zone:	Low Density Residential
Report completed by (Name & date):	Leigh Wighton 14 August 2020

Brief Description	
General	<p>Development involves the subdivision of a parcel of land at 66 Alma Road into 11 Lots. Lot 11 contains an existing dwelling and outbuilding.</p> <p>The subject land is bisected by a watercourse running east west through the property.</p> <p>It is proposed to redefine and formalise the watercourse through the subdivision with the watercourse contained within a parcel of land designated as Public Open Space.</p>
Roadworks and access	<p>The land has frontage to Alma Road which is a Council maintained road. Alma Road is constructed to an urban standard from the Tasman Highway to Fieldwick Lane, which is located partway along the frontage of the subdivision, with a carriageway width of 8.5m from face of kerb to face of kerb. Alma Road, south of Fieldwick Lane has kerb and channel both sides. There is concrete footpath on the western side of Alma Road, from Fieldwick Lane south to Holkham Court. There is currently no kerb and channel nor footpath north of Fieldwick Lane.</p> <p>All lots gain access from Alma Road. Lots 4, 5, 7, 8, 9, 10 are all internal lots.</p> <p>Lots 4 and 5 will have a single shared driveway. Lots 7, 8, 9 & 10 will also have a single shared driveway.</p> <p>Sealed driveways will need to be provided for the full length of the access strips for internal lots.</p> <p>Kerb and channel should be extended along the eastern side of Alma Road across the full frontage of the subdivision. A reinforced concrete footpath should also be provided across the entire Alma Road frontage.</p> <p>A Bushfire Hazard Report was submitted with the application. Fire fighting access is required to lots 8 & 9.</p> <p>A Traffic Impact Assessment (TIA) was not submitted with the application.</p> <p>It is not expected that the increase in traffic generated by the subdivision will result in any safety issues and is well within the capacity of Alma Road.</p>

<p>Stormwater</p>	<p>The proposed subdivision is located within a small catchment of an unnamed minor ephemeral watercourse. The catchment runs from Rudds Hill to an outfall at Raspins Beach, and is generally referred to as the Holkham Court Catchment. The lower portion of the catchment comprises residential land, a caravan park, a golf course and the Tasman Highway. Some of these areas have been subject to inundation in recent, large rainfall events.</p> <p>As a result of proposed and potential development within the catchment, and a history of inundation, Council commissioned the Holkham Court Stormwater Assessment, and associated modelling. The report examines the existing conditions, identifies issues and areas of interest, models possible scenarios and provides some insight into possible solutions.</p> <p>A draft of the Holkham Court Stormwater Assessment along with a Draft Implementation Strategy Draft Implementation Strategy was presented to Council at the August 2019 Ordinary Council Meeting and the following resolutions were made:</p> <ul style="list-style-type: none"> A Council accept and notes the draft Holkham Court Stormwater Assessment from Anna Wilson at Brighton Council marked as for review 2/10/2018 (or as amended) (the Report) and as presented in this Agenda. B Council has regards to allocating funding from its Annual Budget from 2020/2021 to 2022/2023 inclusive and places approved funding to a reserve titled Holkham Court Orford Stormwater Development Works (the Reserve). C Council adopts an infrastructure contribution charge of \$3,500 per new lot created or multiple dwelling permit issued within the Holkham Court Orford Stormwater Catchment area and places these contributions to the Reserve. D Works are implemented in accordance with the table shown on page 19, 20 and 21 of the Report subject to sufficient funds being held in the Reserve. E Council directs the General Manager to write to the Minister for Infrastructure to advise the identified priority works for the Tasman Highway as listed in the Report and requests the works are designed, costed and constructed as soon as possible. <p>The report has subsequently been finalised and a copy of the final report (Holkham Court Stormwater Assessment, Glamorgan Spring Bay Council 2019, revision 3, prepared by Anna Wilson, dated 10/9/2019) and summary of the variations between the draft and the final report is attached.</p> <p>Proposal</p> <p>The applicant proposes to direct stormwater from the subdivision to the existing watercourse, which generally runs from the west to the east through the land. This watercourse currently drains stormwater from Alma Road and the catchment above.</p> <p>It is proposed to redefine and shape the watercourse through the subdivision to near the eastern boundary of the subject land.</p> <p>A Stormwater Management Design Report (Revision 3) prepared by Ross Cumming Engineering, dated 27 July 2020 was submitted with the application.</p> <p>The report included the following:</p> <p><i>“3.2 STORMWATER</i></p> <p><i>The proposal for control of stormwater is as follows:</i></p>
-------------------	---

- 1) *The creek channel profile is to be formalized as a trapezoidal rock-lined channel with a depth of 1.2m, a floor width of 3m and a maximum top width at natural ground surface level of 7.8m. This cross-section will provide flow capacity of 9m³/sec at a flow depth of 550mm with 650mm vertical (1.35m horizontal) freeboard that can be grassed and vegetated.*
- 2) *Lots and driveways are to be provided with a DN150 to DN300mm piped connections for at least the AEP 5% storm event and there will be two DN225/300 outfalls to a 27m³ detention pond incorporated into the new creek channel.*
- 3) *The on-stream detention storage/infiltration pond will be created by increasing the channel from 7.8m to 11.8m wide over a distance of 10m. The detention volume will be created by shallowing the channel depth from 1.2m to 900mm over a distance of 6m and this will create a detention volume of between 27m³ at spill depth and up to 46m³ during discharge. Surface area will be approx. 100m².*
- 4) *The nature of the ground at the creek is compacted dolerite rock wash bound in a sandy/silty fine-grained matrix. This has medium to high permeability (20mm to 50mm/hr) and will facilitate infiltration of detention runoff from the ponds and achieve WSUD principles. The ponds will function as infiltration basins for low level flows less than AEP20% (Q5) that don't spill due to the medium/high permeability.*
- 5) *Two lots will discharge directly to the new channel upstream from the detention storage.*

The channel design is preliminary only to provide a workable concept design. The final design will consider ways to reduce the channel depth and width whilst maintaining public safety, provision for in excess of recently occurring flood flows and for ease of Council ongoing maintenance.

By adopting the above approach to stormwater control and because the area modified by the subdivision only amounts to 2.4Ha of the total 30Ha upstream catchment and the provision of detention storage there will be no change to the peak runoff flows from this catchment."

Whilst the stormwater management controls specified in the report and the resultant outcome of limiting stormwater runoff to pre-existing meets the acceptable solution in the Planning Scheme, there are some discrepancies between the hydrological assessment undertaken by the applicant and the report commissioned by Council "Holkham Court Stormwater Assessment, Glamorgan Spring Bay Council 2019, revision 3, prepared by Anna Wilson, dated 10/9/2019.

It is recommended that the stormwater system for the proposed subdivision be generally in accordance with the principles in section 3.2 of the Stormwater Management Design Report (Revision 3) prepared by Ross Cumming Engineering, dated 27 July 2020 but designed in accordance with Holkham Court Stormwater Assessment, Glamorgan Spring Bay Council 2019, revision 3, prepared by Anna Wilson, dated 10/9/2019 and Australian Rainfall and Runoff 2019 (ARR2019), in particular, with reference to Book 6, Chapter 7: Safety in Design Criteria and Book 9, Chapter 6: Modelling Approaches'.

A condition requiring an amended Stormwater Management Design Report prior to the approval of engineering plans is recommended.

Water Sensitive Urban Design

The application involves more than 5 lots. As such, Water Sensitive Urban Design (WSUD) principles are required for the treatment and disposal of stormwater. The applicant proposes the use of swale drains and a detention/infiltration pond to provide treatment. A

MUSIC model was provided with the applicants stormwater report demonstrating that the treatment targets stipulated in the planning scheme can be met.

A condition requiring the subdivision implement WSUD principles is recommended.

Stormwater Infrastructure Contribution

A condition requiring payment of the \$3500 Infrastructure Contribution per new lot created, as per the earlier resolution of Council, is recommended.

Subdivision Development Standards

The subdivision development standards for the Low Density Residential zone in the Planning Scheme require that:

12.5.4 Services A3 Each lot must be connected to a stormwater system able to service the building area by gravity.

The proposed stormwater line through Lot 5 cannot service the entirety of the lot. A condition requiring a building area be defined on this lots is recommended to limit future development of impervious areas to within the building area.

Inundation Prone Areas Code

E15.8.3 Subdivision within a Riverine Inundation Hazard Area

The code is considered applicable as the subdivision involves land subject to risk of flooding of 1% AEP or more.

Total Overland Flow Area. 1% Low Density Residential Result

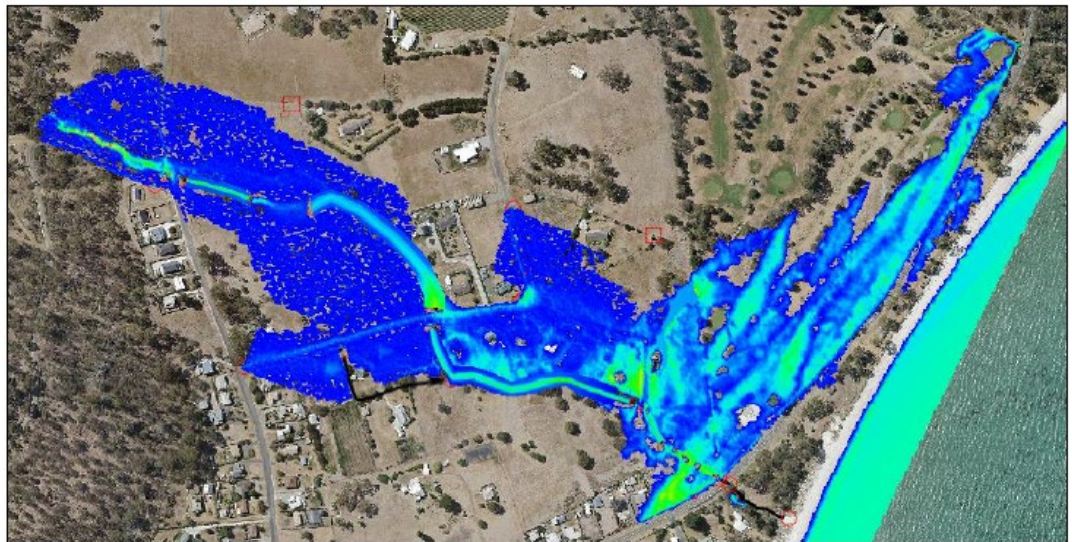


Figure 7.7 1pct 4.5hr Climate Change Low Density Residential model results. Max Water Depth. Map showing all depths for comparison.

The proposal does not meet the acceptable solution, being:

Each lot, or a lot proposed in a plan of subdivision, within a Riverine Inundation Hazard Area must:

- (a) be able to contain a building area, vehicular access and services, that are wholly located outside a Riverine Inundation Hazard Area;

the performance criteria is:

Each lot, or a lot proposed in a plan of subdivision, within a riverine inundation hazard area, must not create an opportunity for use or development that cannot achieve a tolerable risk from flood, having regard to:

- (a) any increase in risk from flood for adjacent land;
- (b) the level of risk to use or development arising from an increased reliance on public infrastructure;
- (c) the need to minimise future remediation works;
- (d) any loss or substantial compromise by flood of access to the lot, on or off site;
- (e) the need to locate building areas outside the riverine inundation hazard area;
- (f) any advice from a State authority, regulated entity or a council; and
- (g) the advice contained in a flood hazard report.

In order to address the risk a condition requiring the developer to provide a Flood Hazard Report, prepared in accordance with section E15.0 Inundation Prone Areas Code of the Planning Scheme for approval by Councils General Manager. Once approved the Report will form part of the endorsed documents.

Any measures required by the report to ensure that a tolerable risk for the development from flooding is achieved and there is no increase in risk from flood for adjacent land must be included in the engineering design drawings and implemented prior to the sealing of the Plan of Survey for any stage of the subdivision.

Risk and Cost Implications

The formalisation of the watercourse and the intensification of development into an urban area is forcing council to increase its management of this watercourse which is likely to include entering private property to do works. It is likely council will need to enter the following properties to undertake works:

- 59 Holkham Court
- 23 Holkham Court
- 20 Holkham Court
- 26 Holkham Court

This is likely to create conflict between council and some existing landowners which could result in extended costly legal proceedings.

The cost to council in implementing all the recommendations of the report prepared by Anna Wilson, dated 10/9/2019 down stream has not been determined. The cost of these works could absorb the majority of the councils 2020/2021 stormwater budget, not leaving funding for other stormwater works.

Summary

Several representations objecting to the approval of the subdivision based on stormwater issues have been received. It is clear from the Holkham Court Stormwater Assessment and the representations that there are substantial issues within the Holkham Court catchment relating to both adequacy of the existing stormwater system and inundation.

The payment of an infrastructure contribution alone is insufficient for any one development within the catchment to fund the upgrades required to the downstream stormwater infrastructure.

Council is actively progressing remedial works identified within the Holkham Court Stormwater Assessment and has a general stormwater budget allocation for the current

	<p>financial year. Until detail design is undertaken it is unclear how much work Council can undertake.</p> <p>The applicant, through the Stormwater Management Design Report, has demonstrated a methodology for stormwater disposal that is able to meet the acceptable solutions in E7.7.1 Stormwater Drainage and Disposal of the Planning Scheme.</p> <p>Whilst there are discrepancies between the applicant's report and the Holkham Court Stormwater Assessment commissioned by Council the applicants engineer has advised that they can still limit runoff from the subdivision to pre-existing conditions.</p> <p>The applicant has not addressed the Inundation Prone Areas Code, particularly demonstrating that the development will not result in any increase in risk from flood for adjacent land. It is reasonable that the applicant provide a report addressing this and be required to implement any measures prior to council sealing the final plan for any lot within the subdivision.</p> <p>Recommended conditions reinforce the requirement to meet the acceptable solution based on the Holkham Court Stormwater Assessment, Glamorgan Spring Bay Council 2019, revision 3, prepared by Anna Wilson, dated 10/9/2019.</p>
Sewer and Water	Sewer and water services are available to the land. The application was referred to TasWater who have imposed conditions.
Power, Telco, etc	Power should be provided underground. NBN is available in the area.
Codes	<p>E5 Road and Railways Assets</p> <p>Alma Road has no posted speed limit and the default urban speed limit of 50km/h would apply. Preliminary investigations indicate that sight distances from the proposed new subdivision road intersection would be in excess of the minimum required by the scheme.</p> <p>E7 Stormwater Management See above</p> <p>E15 Inundation Prone Areas Code See above</p>

Representations	
<p>Rep 1</p> <p>Representation "on the basis that it would put further unacceptable pressure on the already overloaded Alma Road and Holkham Court storm water system."</p> <p>"The proposed subdivision is also out of character from that which exists on the western side of Alma Road."</p> <p>Our property, and that of several of our neighbours, has recently been subjected to flooding causing many</p>	<p>The applicant has demonstrated that the proposal is capable of meeting the acceptable solutions within code <i>E7.7.1 Stormwater Drainage and Disposal</i> of the Planning Scheme. Essentially the subdivision itself, through the use of stormwater detention, will result in no increase in pre-existing runoff. The recommended conditions ensure compliance with <i>E7.7.1 Stormwater Drainage and Disposal</i> of the Planning Scheme.</p> <p>Whilst the applicant did not directly address <i>E15.8.3 Subdivision within a Riverine Inundation Hazard Area</i> it is considered that via the recommended conditions any</p>

thousands of dollars damage. The latest being on the 2nd April 2020. This has been due to the inadequate infrastructure in Holkham Court and beyond to the storm water outlet at Raspin's Beach. As a result we, along with our long suffering neighbours, are anxious try to ensure additional developments do not add to the existing problems.

The GSB Council commissioned a study to model existing and future conditions of storm water flows to establish an appropriate pattern of development and an infrastructure plan. This resulted in the "**Holkham Court Storm Water Assessment**" (**HCSWA**) (Anna Wilson, Brighton Council – October 2018). This report highlighted the serious flooding issues especially in the lower areas of the catchment. None of the recommendations of the report have been carried out to date.

We make the following observations relative to the published documents:

1. The proposal contains no mention of the above **HCSWA** and the issues it highlighted or the effect this proposal would have on the already overloaded storm water system in the area. The documents totally disregard the observations of this report and the effect on the downstream residents in Holkham Court. In addition, the data upon which the flows have been calculated (ARR 2016) are known to have a relative accuracy within +/- 50% of the true flow values, and in some of cases the error may be exceeded by a factor of two or more. This has been amply demonstrated during our many recent flood events in less than twenty years!

2. There appears to be a miscalculation on the provided subdivision plan which shows the storm water paths for blocks 1, 2, 4 & 5 emptying into the detention pond. It is believed the geological contours would require these unassisted flows to defy gravity!

3. As shown in the hydrology report, the additional run-off created by this proposal is substantial. The claimed flows are calculated to go from 41 L/sec undeveloped, to 110 L/sec developed for a 5% AEP which is an increase of around 168%! A similar escalation is apparent for flows in a 1% AEP event, shown as increasing from 61 L/sec to 164 L/sec developed (+168%). The detention pond is admitted to be of limited value to attenuate rain events lasting more than 10 minutes and will be virtually useless after 30 minutes. The increases shown would create considerable issues for down-stream residents.

intolerable risk of flooding to the subdivision and any increase in risk from flood for adjacent land will be identified and mitigated prior to Council sealing the Plan of Survey for any stage of the subdivision.



Council has a current budget allocation for stormwater and flood mitigation works. Works within the Holkham Court catchment have been identified in accordance with the "Holkham Court Storm Water Assessment" and council is currently progressing the design of those solutions.

4. Whilst it is not necessarily within the remit of the developer to consider downstream effects of their proposal and its increased flows on the infrastructure, **it is the Council's responsibility to do so**. This deliberation should include reference to all available information - not just that included by the proposer. The opinions, evidence and issues raised by local residents are of paramount importance. There are many storm water issues around the Orford area which have been exacerbated by unfortunate approval of improperly researched development proposals. We don't need another one.

5. Council should also be mindful of the scientifically accepted concept of sea level rise and its consequences. (Reference is made to the "GSBC Corporate Adaption Plan of April 2012") Storm surge and tidal level dramatically influence the ability of storm water to escape to the sea at Raspin's Beach regardless of the size of the culvert under the Tasman Highway. This problem cannot be solved by larger pipes and drainage ditches.

6. The photograph below shows Holkham Court during an event in January 2016, which graphically depicts the inadequacy of the Alma Road and Holkham Court storm water infrastructure. The "creek" into which the proposed subdivision storm water would flow, is just beyond the paling fence in the foreground and has been beyond capacity for many years. The flows over the paddocks in the middle distance have inundated the area of the proposed subdivision, exactly as predicted in Figure 1 on page 6 of the "Holkham Court Stormwater Assessment". These conditions are not 5% or 1% storm events being much more regular in spite of our long dry spells.

7. The following photo was taken of the lower part of Holkham Court on the 2nd April 2020, after the maximum flows had subsided. There was severe damage to several of the homes on the right and also to the Caravan Park. Our driveway was washed away for the second time in four years. The engineers will say these events are 5% or once in twenty year floods, but this has now occurred three times in the last eleven years!

<p>Rep 2  Representation raises concerns due to stormwater and flooding issues.</p>	<p>See above</p>
<p>Rep 3  The representation raises concern in relation to:</p> <ul style="list-style-type: none"> • flooding, • “increased unregulated development in the catchment area and more frequent flood events.” • requests flood mitigation works be undertaken • and “approval of the above subdivision application be deferred until the existing stormwater infrastructure is upgraded to accommodate current flows and any increases that may result if the subdivision” 	<p>See above</p>

Recommended Conditions:

General

1. Prior to works commencing or the submission of engineering plans the developer must submit an amended proposal plan with the Public Open Space (Lot 1000 included in stage 1. Once approved the amended plan will form part of the endorsed documents.
2. The subdivision layout or development must be carried out substantially in accordance with the application for planning approval, the endorsed drawings and with the conditions of this permit and must not be altered or extended without the further written approval of Council.
3. Prior to Council sealing the final plan of survey for each stage, security for an amount clearly in excess of the value of all outstanding works and maintenance required by this permit must be lodged with the Glamorgan Spring Bay Council. The security must be in accordance with section 86(3) of the Local Government (Building & Miscellaneous Provisions) Council 1993. The amount of the security shall be determined by the Council’s General Manager in accordance with Council Policy following approval of any engineering design drawings.

Advice: The minimum bond amount required during the maintenance and defects liability period is to be no less than 5% of the agreed value of the works. The developer is to enter into a formal Maintenance Bond Deed of Agreement with Council.

4. All conditions of this permit, including either the completion of all works and maintenance or payment of security in accordance with this permit, must be satisfied before the Council seals the final plan of survey for each stage. It is the subdivider’s responsibility to notify Council in writing that the conditions of the permit have been satisfied and to arrange any required inspections.

5. The development must be in accordance with the Bushfire Hazard Report (v2) prepared by Jim Mulcahy (PDA Surveyors), dated 30 June 2020, and submitted with the application, or as otherwise required by this permit, whichever standard is greater.
6. Prior to sealing the final plan of survey an accredited bushfire practitioner must provide certification that the completed subdivision works are in accordance with the endorsed Bushfire Hazard Report.
7. Prior to sealing the plan of survey for any stage the developer must pay an Infrastructure Contribution to the Glamorgan Spring Bay Council for stormwater upgrades in the amount of \$3,500 per new lot, or as otherwise specified in Council's Schedule of Fees.
8. All land noted as roadway, footway, open space or similar must be transferred to Council. Complete transfer documents that have been assessed for stamp duty, must be submitted with the final plan of survey.
9. The final plan of survey must include easements over all drains, pipelines, wayleaves and services to the satisfaction of Council's General Manager.
10. A building area must be shown on the final plan of survey for any lot where the entirety of the lot cannot be serviced by gravity to the stormwater property connection.
11. A restrictive covenant, to which Council is to be made a party, must be created on all lots containing building areas prohibiting the creation of any impervious surface outside the defined building area.

Part 5 Agreements

12. An agreement pursuant to Part 5 of the *Land Use Planning and Approvals Act 1993* must be entered into prior to the sealing of the final plan of survey to the effect that:
 - a. "owners agree to manage the entirety of their lot as 'low threat vegetation' and/or 'non-vegetated land' (as defined by Clause 2.2.3.2 of AS3959-2009) in order to provide bushfire hazard management areas for dwellings on adjoining lots."
13. Agreement(s) made pursuant to Part 5 of the Land Use Planning and Approvals Act 1993 must bind the current owner and his/her successors in title and must be prepared on a blank instrument form and registered with the Recorder of Titles in accordance with Section 78 of the Land Use Planning and Approvals Act 1993 by the applicant at no cost to Council.

Landscaping

14. The public open space must be landscaped by trees or plants in accordance with a landscape plan prepared by a landscape architect or other person approved by Council, and submitted to Council for endorsement with the engineering drawings. The landscape plan must show the areas to be landscaped, the form of landscaping, and the species of plants and estimates of the cost of the works.

Advice: The landscaping of the public open space must include provision for maintenance access to the watercourse and future pathway.

Engineering

15. The subdivision must be carried out in accordance with the *Tasmanian Subdivision Guidelines October 2013* or as otherwise agreed by Council's General Manager or required by conditions of this permit.

16. Engineering design drawings to the satisfaction of the Council's General Manager must be submitted to and approved by the Glamorgan Spring Bay Council before development of the land commences.
17. Engineering design drawings are to be prepared by a qualified and experienced civil engineer, or other person approved by Council's General Manager, and must show -
 - (a) all existing and proposed services required by this permit;
 - (b) all existing and proposed roadwork required by this permit;
 - (c) measures to be taken to provide sight distance in accordance with the relevant standards of the planning scheme;
 - (d) measures to be taken to limit or control erosion and sedimentation;
 - (e) any other work required by this permit.
18. Approved engineering design drawings will remain valid for a period of 2 years from the date of approval of the engineering drawings.

Services

19. Property services must be contained wholly within each lots served or an easement to the satisfaction of the Council's General Manager or responsible authority.
20. The Subdivider must pay the cost of any alterations and/or reinstatement to existing services, Council infrastructure or private property incurred as a result of the proposed subdivision works. Any work required is to be specified or undertaken by the authority concerned.
21. Property services to internal lots must be extended to the lot proper to the satisfaction of Council's General Manager.

Drainage

22. Prior to the approval of Engineering Design Drawings the developer must submit a Flood Hazard Report, prepared in accordance with section E15.0 Inundation Prone Areas Code of the Glamorgan Spring Bay Interim Planning Scheme 2015 for approval by Council's General Manager. Once approved the Report will form part of the endorsed documents.

Any measures required by the report to ensure that a tolerable risk for the development from flooding is achieved and there is no increase in risk from flood for adjacent land must be included in the engineering design drawings and implemented prior to the sealing of the Plan of Survey for any stage of the subdivision.

Advice: This may include works downstream as the upgrade to the watercourse including the culvert does concentrate the flow of flood water from a broad overland flow to a concentrated discharge on the property directly downstream.

23. Stormwater management must be generally in accordance with the principles set out in Section 3.2 of the document "66 Alma Road Orford Subdivision, Application SA 2020/009, Stormwater Management Design Report, Revision 3" prepared by Ross Cumming Engineering, dated 31 October 2019, or as otherwise required by conditions of this permit, and to the satisfaction of Council's General Manager.
24. The stormwater system for the development must be designed in accordance with
 - a. the "Holkham Court Stormwater Assessment, Glamorgan Spring Bay Council 2019, revision 3, prepared by Anna Wilson, dated 10/9/2019;

- b. Australian Rainfall and Runoff 2019 (ARR2019), in particular, with reference to Book 6, Chapter 7: Safety in Design Criteria and Book 9, Chapter 6: Modelling Approaches’;
 - c. or as otherwise required by conditions of this permit,
 - d. and to the satisfaction of Council’s General Manager.
25. Unless determined otherwise by the approved Flood Hazard Report, the developer is to upgrade the existing stormwater culvert under Alma Road and associated channel works at the proposed subdivision intersection. The culvert is to be sized to accommodate a design flow rate of 5.1m³/s for the 5% AEP (and require a floodway across Alma Rd for the additional flows in the 1%AEP), or alternatively sized for the full 1% AEP 10m³/s.
26. The developer is to provide a piped stormwater property connection to each lot capable of servicing the building area of each lot by gravity in accordance with Council standards and to the satisfaction of Council’s General Manager.
- Advice: Lot 5 cannot be serviced in its entirety and will require a building area defined on the final plan of survey.*
27. The developer is to provide a piped stormwater drainage system capable of accommodating a storm with an ARI of 20 years, when the land serviced by the system is fully developed.
28. The minor stormwater drainage system must be designed to comply with all of the following:
- (a) be able to accommodate a storm with an ARI of 20 years, when the land serviced by the system is fully developed;
 - (b) stormwater runoff will be no greater than pre-existing runoff or any increase can be accommodated within existing or upgraded public stormwater infrastructure.
29. The developer is to provide a major stormwater drainage system designed to accommodate a storm with an ARI of 100 years.
30. Water Sensitive Urban Design Principles must be incorporated into the development. These Principles will be in accordance with, and meet the treatment targets specified within, the Water Sensitive Urban Design Procedures for Stormwater Management in Southern Tasmania and to the satisfaction of the Council’s General Manager.
31. Prior to the approval of Engineering Design Drawings the developer must submit an amended Stormwater Management Design Report, including detailed calculations in accordance with Australian Rainfall and Runoff 2019, clearly demonstrating compliance with the conditions of this permit, for approval by Council’s General Manager. The report must be prepared and certified by an experienced and practicing Civil Engineer. Once approved the amended report will form part of the endorsed documents.
32. Upon completion of works the engineer certifying the Stormwater Management Design Report must provide certification that the stormwater system has been constructed in accordance with the approved report.

Tas Water

33. The development must meet all required Conditions of approval specified by Tas Water Submission to Planning Authority Notice, TWDA 2020/00657-GSB, dated 13 July 2020.

Telecommunications and electrical reticulation

34. Electrical and telecommunications services must be provided to each lot in accordance with the requirements of the responsible authority and to the satisfaction of Council's General Manager.
35. Street Lighting must be provided in accordance with the requirements of the responsible authority and to the satisfaction of Council's General Manager.
36. New electrical and fixed line telecommunications services must be installed underground to the requirements of the responsible authority unless approved otherwise by Council's General Manager.
37. Prior to sealing the final plan of survey the developer must submit to Council:
 - (a) A "Provisioning of Telecommunications Infrastructure – Confirmation of final payment" or "Certificate of Practical Completion of Developer's Activities" from NBN Co.
 - (b) Written advice from TasNetworks confirming that all conditions of the Agreement between the Owner and authority have been complied with and/or that future lot owners will not be liable for network extension or upgrade costs, other than individual property connections at the time each lot is further developed.

Roads and Access

38. Roadworks and drainage must be constructed in accordance with the standard drawings prepared by the IPWE Aust. (Tasmania Division) and to the requirements of Council's General Manager.
39. Unless approved otherwise by Council's General Manager roadworks must include -
 - Alma Road upgrades
 - a) Fully paved, sealed and drained carriageway widening where required to achieve an alignment consistent with the southern section and an ultimate carriageway width (face of kerb to face of kerb) of 8.9m;
 - b) Concrete kerb and channel along the entire frontage of the subdivision on the eastern side of Alma Road;
 - c) Concrete footpath 1.50 metres wide across the entire frontage on the eastern side;
 - d) Underground stormwater drainage
40. All carriageway surface courses must be constructed with a 10 mm nominal size hotmix asphalt with a minimum compacted depth of 35 mm in accordance with standard drawings and specifications prepared by the IPWE Aust. (Tasmania Division) and the requirements of Council's General Manager.
41. Kerb ramps must be provided to accommodate the needs of people with disabilities in accordance with standard drawings prepared by the IPWE Aust. (Tasmania Division) and to the requirements of Council's General Manager.

Vehicular Access

42. A vehicular access including concrete driveway apron and kerb crossover must be provided to each lot from the road carriageway to the property boundary, in accordance with Council's Standard Drawings and to the satisfaction of Council's General Manager.
43. To the satisfaction of Council's General Manager, shared vehicular accesses must be constructed for the entire length of the access strips to the lot proper. The driveways must be provided in accordance with *Standards Australia (2004): Australian Standard AS 2890.1 - 2004 – Parking Facilities Part 1: Off Street Car Parking; Standards Australia, Sydney*, Council standards, and must include:
 - (a) 5.5 metre min. width carriageway to provide 2 way access located at least 0.3m from any side boundary
 - (b) Constructed with a durable all weather pavement
 - (c) Sealed Surfaced (The surfacing material must be concrete, asphalt, pavers or other equivalent approved material.)
 - (d) Stormwater drainage; and
 - (e) As required by an Approved Bushfire Hazard Management Plan.

Water quality

44. A soil and water management plan (here referred to as a '**SWMP**') prepared in accordance with the guidelines Soil and Water Management on Building and Construction Sites, by the Derwent Estuary Programme and NRM South, must be approved by Council's General Manager before development of the land commences.
45. Temporary run-off, erosion and sediment controls must be installed in accordance with the approved SWMP and must be maintained at full operational capacity to the satisfaction of Council's General Manager until the land is effectively rehabilitated and stabilised after completion of the development.
46. The topsoil on any areas required to be disturbed must be stripped and stockpiled in an approved location shown on the detailed soil and water management plan for reuse in the rehabilitation of the site. Topsoil must not be removed from the site until the completion of all works unless approved otherwise by the Council's General Manager.
47. All disturbed surfaces on the land, except those set aside for roadways, footways and driveways, must be covered with top soil and, where appropriate, re-vegetated and stabilised to the satisfaction of the Council's General Manager.

Construction

48. The subdivider must provide not less than forty eight (48) hours written notice to Council's General Manager before commencing construction works on-site or within a council roadway.
49. The subdivider must provide not less than forty eight (48) hours written notice to Council's General Manager before reaching any stage of works requiring inspection by Council unless otherwise agreed by the Council's General Manager.
50. Subdivision works must be carried out under the direct supervision of an approved practising professional civil engineer engaged by the subdivider and approved by the Council's General Manager.

'As constructed' drawings

51. Prior to the works being placed on the maintenance and defects liability period an “as constructed” drawing of all engineering works provided as part of this approval must be provided to Council to the satisfaction of the Council’s General Manager. These drawings and data sheets must be prepared by a qualified and experienced civil engineer or other person approved by the General Manager in accordance with Council’s *Guidelines for As Constructed Data*.

Maintenance and Defects Liability Period

52. The subdivision must be placed onto a twelve (12) month maintenance and defects liability period in accordance with Council Policy following the completion of the works in accordance with the approved engineering plans and permit conditions.
53. Water Sensitive Urban Design elements provided as part of the subdivision (including the works on the watercourse) are to be placed on an extended maintenance and defects liability period to be determined at the detailed design stage, but not less than twenty four (24) months.
54. Prior to placing the subdivision onto the maintenance and defects liability period the Supervising Engineer must provide certification that the works comply with the Council’s Standard Drawings, specification and the approved plans.

THE FOLLOWING ADVICE APPLIES TO THIS PERMIT: -

- A. The owner is advised that an engineering plan assessment and inspection fee must be paid to Council in accordance with Council’s fee schedule.
- B. All approved engineering design drawings will form part of this permit on and from the date of approval.