

Appendix 3

Risk Assessment on operational aspects of the proposed new terminals at Whalsay

Introduction

This document is a comparative risk assessment, assessing the differing risks associated with two options for a new ferry terminal at Whalsay. One option (Whalsay STAG Option 2) is for a new pier and linkspan to be built at the southern end of the existing harbour at Symbister. The other option (Whalsay STAG Option 4) is to build a new ferry terminal in North Voe. This document only considers the operation of the ferry services to and from the mainland and also those parts of the Skerries service that are relevant.

As this is a comparative risk assessment, specific risks which are common to both options have been ignored. For example, there is a risk associated with having a single linkspan for both vehicular and foot traffic. As the risks are the same for both proposals, no heed has been taken of these risks, and a similar approach has been taken for all other common risks. Such risks will be dealt with in the same way for either option during detailed design.

Similarly, there are inherent risks in entering Symbister Harbour with existing vessels. This comparative risk assessment only looks at any changes to the existing risks. In addition it looks at risks on a macro scale. Using the same example, there are a number of different reasons why a vessel may lose control on entry, from personnel to electrical to mechanical, each of which should be the subject of a detailed risk assessment. This assessment only considers the primary risk, not the root causes.

Summary

Highest risks are associated with Symbister:

1. Conflict with marina users in Symbister
2. Use of larger vessels in existing Symbister harbour entrance
3. Size constraints in Symbister (commercial risk)
4. Construction in Symbister
5. Lack of lay-by berth in Symbister for larger vessels
6. Use higher powered vessels in confined area

There are no risks in the North Voe operation greater than the above.

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Part 1 – operation at Symbister with existing vessels, Linga and Hendra and potential relief vessel, Thora

Harbour entrance area – **no additional risks**

Berthing / linkspan area – **no additional risks** except:

a) *Conflict with marina users.*

Marina will be hidden behind new breakwater, especially with vessels with lower wheelhouses (Hendra and Thora). Requirement to turn on arrival or departure will still be needed. **Significant risk.** A control measure would be include a traffic light system, manually activated by the ferry on entry to Symbister (arrival) or on departure from berth – such traffic lights to show red to the marina for a fixed time (about 2 minutes should be sufficient) (see note). **Risk reduced to moderate.**

b) *Lay-by berth changed.*

Subject to appropriate mooring arrangements, **no additional risks.** Would probably require one or more bollards to allow for no linkspan to secure to. Fendering on outer end may need remedial work as this berth has not been used overnight for many years.

c) *New linkspan / pier primarily suitable for larger vessels.* Sufficient bollards would be needed to cater for smaller vessels, particularly Linga to lay-up on overnight and Thora to use for a spring when needed. Risk would be **commercial moderate** (delays in service) and **safety moderate** (damage to vessel etc) unless control measure implemented when both drop to **low**.

However, should be noted that locking mechanism at Toft / Ulsta is a mirror image of arrangements at the older piers (tooth on vessel rather than tooth on linkspan). This reduces the effectiveness on securing some vessels in the berth. **Risk is, therefore, moderate** if incompatible system.

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Part 2 – operation Symbister with proposed 32 car sized ferry – assumptions made are use of a B600 type double-ended vessel.

a). *Conflict with marina users.*

Marina will be hidden behind new breakwater, but larger vessel will have better visibility. Conflict time would be reduced if new vessel was double-ended. **Moderate risk**. A control measure would be to include a traffic light system, as above. **Risk reduced to low**.

b) *Entrance to harbour.*

1) B600 type vessel is 28% wider than Linga and 80% longer. Harbour entrance is not going to be enlarged. For about 80% of the time there is a significant north-going tide across the entrance. Accordingly, the sheer effect of coming out of this tide will be significantly higher than for smaller vessels. To balance this, the B600 type is far more controllable than Linga. Under normal conditions risk is higher than for Linga, but **still low risk**. To mitigate risk, some weather conditions may require cancellation at an earlier stage than with existing vessels – Masters would have appropriate guidelines issued. **Risk is commercially low, but still higher** than with existing vessels.

2) However, any control or main engine failure at this point will reduce manoeuvrability significantly. Linga has three powered points for control; B600s have only two so machinery failure at this critical point would be significantly greater than for existing vessels. However, to balance, B600s have proved reliable, but **risk is still moderate**.

3) Width of B600 type is greater and will allow less room for other harbour users to get past. Control measures are twofold, firstly the traffic light system mentioned earlier and secondly to gain agreement from harbour users to limit activity around ferry arrival / departure times, particularly the start times of regattas. With these controls in place and anticipated frequency **additional risks are low**.

4) noted that visibility from B600 type vessels is better than Linga – this will reduce near-miss potential below that of Linga.

c) *Swinging area*

1) Conflict with other harbour users. Risk is greater as the concentration of the Master and Mate will be on berthing and a small vessel exiting the marina may not be seen in time. This will be mitigated by the traffic light scheme, but only to an extent. Once this close into the harbour, room for manoeuvre will be very restricted. **Risk must remain as moderate** even with appropriate procedures in place.

d) *Berth, in service.*

1) If new berth to similar design to Toft / Hamarsness then **risks no greater than existing** once on berth.

2i) Noted that wash from thrusters at Ulsta is significant. This would pose a risk to any ferry berthed in old berth. Distance needs to be sufficient to allow wash to dissipate – existing plan should give adequate distance but ferry Masters on older vessels need to be aware to ensure moorings are appropriate. **Risk is considered to be low to laid up vessel safety** but see 2ii below.

2ii) Noted that wash from thrusters at Ulsta / Toft (open waters) reaches 2 x ships length even with engines at idle. Effects within a confined harbour will be greater –

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risk is substantial that there will be undermining of existing structures. In particular, the strength of the existing ferry pier is believed to be poor – significant costs may be incurred in future years keeping this pier under repair. It is also possible that laid up vessels will range to an extent that may damage the vessel. This **risk is moderate**, but could be reduced to low with appropriate fixed fendering – a significant cost.

3) New pier of solid construction. This will have the effect of reflecting thrust back to vessels when berthing, causing a “cushion” effect. See also 4 below.

4) New pier of solid construction. When vessels depart, especially in weather conditions requiring more power, wash will not be able to escape as at Ulsta / Toft. This wash will have to be dissipated by the slope under the linkspan and in the area between the new and old ferry piers. There will be **significant risks** to the structural integrity of the new pier, the ramp supports and other areas close to the linkspan.

Part 2A – operation Symbister with proposed larger ferry – but new vessel not double ended owing to fears over sea-keeping ability outside Symbister.

As part 2 above except:

a) *Swinging area*

A non-double ended vessel would require to swing, either on berthing or departure. Swinging area is restricted to a marginally larger area than at present. Accordingly, as Linga is already close to the limit, any new vessel would be significantly constrained in size. **Commercial risk is high** as STAG process indicates the need for future vessels to be in the B600 size range. **Safety risk is significant** of grounding (control failure, poor weather). This may be reduced by a high level of machinery / control redundancy but would still remain a significant risk owing to the speed that a failure can occur. This risk may be mitigated by having a tug available – this would be commercially unacceptable. The risk is still significant risk in relation to marina users, **possibly mitigated to low** if traffic light system is well policed.

It should be noted that a new EU B vessel may not be able to be built small enough to be able to turn within the proposed harbour. There are no other UK operators of EU B vessels less than about 50m. It should also be noted that SOLAS 2009 has been introduced recently, this new stability criteria, whilst new, does seem to be easier to comply with the bigger the vessel, thus mitigating against small vessels.

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Part 3 – operation at North Voe with existing vessels, Linga and Hendra and potential relief vessel, Thora

a). *Entrance to port area.*

1) Waves, sea.

These will reduce visibility of any small craft. However, entrance wide so **risk is low** (see also f below).

Mathematical modelling undertaken by Wallingford shows that 1 year waves at the entrance to North Voe are generally comparable to those at the entrance to Symbister. Variations are that waves at North Voe are less for north to east winds, the same round to south, marginally worse for south, SW to north the same.

Accordingly **risk is no greater** than Symbister.

Same modelling on the 100 year shows marginally greater wave height from SE to south and similar from SSW to west. In such winds it is unlikely that ferries would be operating **so effective risk is no greater**.

2) Waves, swell

As a above

Following swell will reduce manoeuvrability of vessels, but if risk is significant it is likely that ferries will not operating. **Risk is no greater than Symbister**.

3) Wind, short term with minimal wave effect

Potentially could affect vessels, particularly Linga with greater windage. However, entrance wider than Symbister so **risk is no greater**.

4) Other port users

It is known that some children use the North Voe for recreational sailing. Unlikely that these will go as far as the entrance, but they could be difficult to see in poor conditions, primarily fog/mist as they would be unlikely to be out in high winds. **Risk low**, but politically sensitive. **Risk can be further reduced** by laying some small buoys to the south of the dredged area to indicate safe waters and putting in place a direction to port users.

5) Fish farm activities

Existing southernmost two polar circles will impede easy access to North Voe. Agreement is believed to be in place to move or remove these. Assuming these are removed **risk is minimal**.

6) Control failure

There is minimal cross tide at the breakwaters. The entrance is far wider. Accordingly **risk is lower** than at Symbister.

b). *Berthing area*

1) Waves, sea.

a) Mathematical modelling shows worst direction for 1 year waves will be west to NW winds. These will still be well within operational limits. Even the 100 year directions modelled do not show wave heights outwith limits. The physical modelling shows that wave heights at the berth are marginally higher than Symbister (0.32m compared to 0.26m) although no modelling was done with northerly sector winds / waves. **Risks are no greater than Symbister**.

b) Wind – westerly winds are likely to be less attenuated than in Symbister, but northerly will be more attenuated. However, smaller vessels will have some protection from the breakwaters so **risk is only marginally higher than Symbister**.

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Part 4 – operation North Voe with proposed 32 car sized ferry – assumptions made are use of a B600 type double-ended vessel.

As Part 3 above, except that effect of wind waves and swell waves will be lessened ***the risk is lower than at Symbister.***

In respect of wind alone, larger vessels will have greater windage in the berth. However, mooring system can be made to suit so long as pier / bollards etc are of adequate strength. ***Risk marginally higher than Symbister.***

Part 5 – operation at Symbister with Skerries vessel, Filla

Concerns are as Parts 1 and 2 above except:

a) *Swinging area.* Filla still requires to swing in the harbour prior to berthing. Swinging area is marginally larger so grounding ***risk is slightly less*** than at present. However, risk of marina traffic not seeing Filla in time is ***increased to a moderate risk.*** This can be mitigated to a ***low risk*** with the installation of traffic lights.

Part 6 – operation at North Voe with Skerries vessel, Filla

As Part 1 above. Vessel will require to swing, but ***risk is minimal***, and certainly less than exists at Symbister (present or proposed).

Part 7 – operation during build process at Symbister

a) *Removal of existing marina.* Unless parts split away when being moved / taken ashore, minimal risk. If some floating parts foul ferries then risk is significant. Can be mitigated by appropriate time planning to a ***low risk.***

B i) *Dredging.* Depends upon method. If a fixed barge (spudded in or similar) then location can be kept as clear of ferry path as possible. Some time will require barge to be in vicinity of existing swinging area. This will require changed approach methods, involving greater time running astern. ***Risk will be increased,*** but can be mitigated against by ensuring dredging is done during better weather periods.

b ii) If dredging is done from an anchored barge or a free floating specialist dredger, then control of barge / dredger could be compromised by interaction. Can be mitigated by ensuring dredging done at night / in fair weather / timed to allow for ferry service. Other mitigation measures would be good communications, dredging plan known and agreed by all parties etc. ***Risk will be increased.*** Commercially it may be a consideration to tweak timetables to allow longer periods between ferries – ***commercial risk of alienating ferry users.***

c) *Pier construction.* Assuming pier will primarily be built from barges, then access to existing ramp will be compromised. Risks can be mitigated by works being done at night / in fair weather / timed to allow for ferry service. See b ii above. However, residual ***risk will be increased to moderate.***

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d) *Marina construction*. No effect on existing ferry service if undertaken after bulk of new pier built.

e) *Linkspan construction*. Will require significant plant. Only safe way to undertake this will be to undertake works when no ferry operating from old linkspan (suggest passenger service only allowing say 1900 Sat evening to 0700 Monday morning window for installation – if this is sufficient time span). **Otherwise the risk is significant.**

f) *Marshalling area construction*. Land reclamation will be close to existing linkspan and any error by contractors could damage the fragile foundations of the existing linkspan. **Significant commercial risk.** Reclamation area will encroach on existing car lanes. Good planning will be necessary and there will be times when existing marshalling area will be compromised. **Moderate commercial risk.**

Part 8 – operation during build process at North Voe

No significant additional risks to ferry services. It is noted that there may be additional sea-going traffic in the vicinity of Symbister Harbour entrance, but this is not believed to be a risk beyond normal operations.

Part 9 – overnight lay-by / lay-by for repairs - Symbister

a) *Old ferry pier, existing vessels*. Assuming old ramp removed, additional bollards will be required to ensure safe mooring at existing ferry berth. At outer berth additional bollards may be required, additional fendering may be necessary as this berth has not been used for years. **Additional risk is minimal** if appropriate works are undertaken.

b) *Old ferry pier, south face and new pier, north face*. Presently there is a commercial risk in that no berths are formally allocated for exclusive ferry usage. This **commercial risk could be reduced** by formally getting agreement from the Harbour Authority to allocate these to exclusive use of Ferry Services.

c) *New ferry pier, all vessels*. Design to be broadly per Toft / Ulsta – if so **minimal risk**. (see Part 1c above)

d) *Larger ferry repairs*. Not possible to use operating pier. Too long to use old ferry pier. Therefore would require to use a commercial pier in Symbister. This may well not be available. Alternate would be to take vessel to Vidlin / Toft / Sellaness. This may not be possible. **Significant commercial risk** as only safe berth is operational berth, thus blocking ferry service. To reduce this commercial risk, the only alternative would be to move the vessel to Lerwick or Sellaness, probably using a tug to give sufficient control. **This would still be a moderate risk** and have a commercial consequence.

e) *Larger ferry routine maintenance*. This is presently done on all routes by lying alongside on one day or part day a week. This would not be possible, resulting in no window for routine maintenance or in having larger windows and using Sellaness etc. **Moderate commercial risk.**

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Part 10 – overnight lay-by / lay-by for repairs – North Voe

a) *Existing vessels*. Proposal would be Hendra and Filla on north side of pier, Linga on south side. Construction would need to allow for suitable bollards to be fitted to match these vessels, and length of pier to cater for both vessels (as shown on existing plan). **Risks minimal** as berth well sheltered (see Wallingford report).

b) *New vessels*. Linga and Filla to berth on north side, running vessel on south. Again bollards and pier length to suit – *note Whalsay STAG Option 4 would require to be amended*. If so **risks minimal**.

Larger ferry requires repairs. Vessel can berth on north side of pier (bollards to allow for this eventuality as well). May require time to shift other vessels, but ferry service not significantly compromised. **Commercial risk minimal**.

c) *Exclusive use*. It is likely that these berths would only be used by ferries. However, there is a small commercial risk that an opportune vessel may use the new pier. The Harbour authority should be requested to allocate the pier, both sides, for exclusive use of Ferry Services.

Note: traffic light scheme mentioned above would only work if a Harbour By-law made compliance mandatory.

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