



Fisheries and Oceans Pêches et Océans
Canada Canada

Arctic Bay Harbour Development

Community Consultations

20 December 2019




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**Project No. 307071-01306-00-PM-REP-0002 - Arctic Bay Harbour Development:
Community Consultations**

Rev	Description	Originator Approval	Reviewer Approval	Project Manager Approval	Date
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1. Introduction

This report summarizes the community feedback received during three community consultation visits conducted for the Lancaster Sound Harbour Study for Fisheries and Oceans Canada, Small Craft Harbours (DFO-SCH) (the Project).

Harald Kullmann (Project Manager and marine infrastructure engineer, Advisian) and Diane Pinto (Consultation Lead, Advisian) traveled to Arctic Bay, Grise Fiord, Resolute Bay and Clyde River from November 9-22, 2018 to conduct initial consultations to develop a rapport with the communities, inform the design team of the specific community needs and desires and support the development of harbour concepts. Mr. Kullmann and Ms. Pinto again traveled to Clyde River, Grise Fiord, Resolute Bay and Arctic Bay from May 23-June 11, 2019 to present and discuss the harbour concepts developed based on input and Inuit knowledge provided by community members in collaborative meetings held during the previous round of consultations in November 2018. The final round of community consultations was conducted from November 4th-8th 2019 in Clyde River, Arctic Bay, Grise Fiord, and Resolute Bay. Mr. Kullmann and Ms. Pinto were joined by representatives from DFO-SCH, the Government of Nunavut -Department of Economic Development and Transportation (EDT), Transport Canada (TC), and the Qikiqtani Inuit Association (QIA) for the final community consultations visit.

This report provides a summary of feedback received during consultation activities with the community of Arctic Bay.

Separate meetings were conducted with the Hamlet and the Ikajutit Hunters and Trappers Association (HTA). The QIA Community Director and Community Liaison Officer (CLO) were invited to join the Hamlet meeting in November 2019. Jack Willie, the CLO, was able to attend. The QIA community director, Levi Barnabas, was attending a meeting out of town and was unable to attend. A drop-in meeting was also held with the RCMP followed by the Northern Store during the first consultation visit in November 2018.

Hamlet meetings began with Advisian presenting a brief overview of the feasibility study followed by open discussion. A list of questions was used to guide the dialogue, but information was allowed to flow in a manner that was natural for participants and not restricted or bound to any strict process.

Presentation slides were provided in English and Inuktitut and local interpreters were hired from the community as required. The presentations covered the following topics:

- Project Schedule
- Bathymetric and Topographic surveys
- Summer Field Program 2019
- Geophysical Survey Planned
- Existing Facilities and Operations (based on feedback from summer 2018 consultation)
- Potential Quarry Locations
- Suggested Disposal Sites for dredged sediments including disposal at sea (DAS)
- Summaries of feedback received
- Harbour Concepts (three options)

- Results from the Summer Field Program 2019
- Next steps and tentative detailed design and construction schedule provided by DFO-SCH for harbour development

Copies of each presentation are provided, starting in Appendix 1.

Meetings with the HTA followed a design workshop format. An open dialogue between HTA members and Advisian was facilitated using maps, surveys and photographs for all three design workshops. Large-scale drawings of the harbour concepts were presented during the second and third design workshops to allow HTA members to see how their suggestions and local knowledge had been directly considered in the design of the concept options and provide their feedback on any changes needed and any preferred options.

Information was noted and marked on maps during discussions in both design workshops on topics such as: wind direction and strength; currents; seasonal changes to ice; water and ice access; potential aggregate sources; DAS sites; suggested changes to concept options and current conditions for boat launching and storage. A local interpreter was hired to support the HTA design workshops.

We are grateful to the residents of Arctic Bay who graciously shared their time, knowledge and unique insights during our consultations. Collaborating with the community allowed the design team to gain an understanding of the local conditions and specific needs and priorities in Arctic Bay that was critical to the development of the harbour concepts.

2. Consultation Activities

The following table details the consultation activities conducted on November 9, 2018 and on June 4–5, 2019. A list of the community members that participated in these events is provided in Table B.

Table A Consultation Activities for Arctic Bay

Community	Group	Method	Date
Arctic Bay	Hamlet Council	Presentation followed by open discussion	November 9, 2018
	Ikajutit HTA	Design Workshop	November 9, 2018
	RCMP	Brief introduction - drop in	November 9, 2018
	Northern Store	Brief introduction - drop in	November 9, 2018
	Hamlet Council	Presentation followed by open discussion	June 5, 2019
	Ikajutit HTA	Design Workshop	June 4, 2019
	Hamlet Council	Presentation followed by open discussion	Nov 5, 2019
	Ikajutit HTA	Design Workshop	Nov 6, 2019

Table B Participants

Community	Organization	Participant
Arctic Bay (November 2018)	Hamlet – 7 participants	<ul style="list-style-type: none"> Frank May (Mayor) Geela Arnauyumayuq Sakiasie Qaunaq Susanna Barnabas Leonie Eecheak Matthew – Environmental Officer Deborah Johnson (SAO)
	Ikajutit HTA – 6 participants	<ul style="list-style-type: none"> Joeli Qamanirq Sakiasie Qaunaq Jonah Oyukuluk Roland Taqtu Jason Issigaitok Jennifer Pauloosie (HTA manager)

Community	Organization	Participant
	RCMP	<ul style="list-style-type: none"> Cst. Jesse Byer
	Northern Store	<ul style="list-style-type: none"> John Mackenzie (store manager)
Arctic Bay (June 2019)	Hamlet – 5 participants	<ul style="list-style-type: none"> Frank May (Mayor) Geela Arnauyumayuq Susanna Barnabas Leonie Eecheak Sheena Qaunaq
	Ikajutit HTA – 6 participants	<ul style="list-style-type: none"> Joshua Kango Sakiasie Qaunaq Jonah Oyukuluk Paul Ejangiaq Kunnak Enoogoo Jennifer Pauloosie (HTA manager)
Arctic Bay (November 2019)	Hamlet and QIA – 6 participants	<ul style="list-style-type: none"> Moses Oyukuluk (Mayor) Susanna Barnabas Sheena Qaunaq Kigutikarjuk Shappa Matthew Akikulu (Conservation Officer)
	Ikajutit HTA – 7 participants	<ul style="list-style-type: none"> Jack Willie (CLO) Joshua Kango (Chair) Sakiasee Qaunaq (also on Hamlet council) Joelie Qamanirq Jonah Oyukuluk Paul Ejangiaq Kunnak Enoogoo Jennifer Pauloosie (HTA manager)

3. Community Feedback

3.1 Hamlet of Arctic Bay November 2018

3.1.1 Project Expectations

- The community is very excited at the possibility of having a small craft harbour.
- The current harbour area is too small, and many boats get damaged. Community very much looking forward to this project.

3.1.2 Local Conditions and Water/Ice Access

- Shale and Sediment Infilling - current "harbour" requires dredging every couple of years but hasn't been in dredged in over 5-6 years.
- Boats ground out at low tide now due to infilling, the entire harbour area dries up.
- Many boats are overturned in the summer when it gets dark (stronger storms) and the protected area is too small. The boats are packed in too tightly.
- There are too many mooring ropes in the bay near the shoreline causing many ropes to criss cross.
- Those with trailers launch from the sealift side. Launching during low tide (lunar/full moon) requires having to go really far out with trucks often ending up in the water and getting stuck. Other areas are too steep to launch and the area in the harbour is too shallow.
- Those without trailers pull up above the water line.
- Sealift blocks access for 4-5 days causing congestion and safety issues (lots of kids, front end loaders etc.).
- There is talk of Sealift being moved out to the industrial area near the tankfarm to increase safety and decrease congestion.
- Wave action makes loading boats on to trailers very difficult with south winds.
- There is erosion along the shoreline in some areas (area near Susanna's house).

3.1.3 Harvesting

- Very few people cast nets along the shoreline. One would be lucky to catch one or two fish in 2-3 days that way.
- Fishing is done very far away from the community.

3.1.4 Community Facilities

- Has been at least 10-12 years since the food processing plant was operational.
- Fish would come in on qamutiks in the winter for processing and mostly mattaaq (whale skin) by skidoo from the floe edge in June/July.
- Caribou were around at that time also, but they have now gone.
- If plant was reopened fishers could sell fish year-round.

- A new electric community freezer (45 x 9 ft) is due to arrive next year. New freezer shouldn't be placed in the harbour area, too crowded.

3.1.5 Design and Field Program Input

- CCG are considering having a SAR vessel at Arctic Bay. Need to design for that.
- QIA are considering having a fishery research vessel at Arctic Bay. Need to accommodate.
- Arctic Bay Ventures has a Boston Whaler that should be accommodated.
- Rocks are constantly rolling off the old breakwater. They are too small. Best to get rid of the old breakwater.
- A large float (20 x 30 ft) for fishing trawlers, pleasure craft, cruise ships and general equipment maintenance (fish nets etc.) would be useful.
- No concerns were raised when the proposed geophysics program was described and discussed.

3.1.6 Quarry and Aggregates

- Mud shale is taken from the "mountain" for building. It's easy to dig and doesn't require crushing.
- The glacial till/gravel deposit near the airport is for roads and general maintenance. It is screened only. The Hamlet does not have a crusher however Kudlik currently has a crusher in town.
- The hardest rock is up near Victor Bay close to cabins.
- No concerns with developing a quarry as long as it's far enough away from cabins. "Nature will regenerate it over time."
- Roads are too narrow to Victor Bay area, road will require upgrading if used for hauling.
- The community's back up water supply is contained within the area of one of the potential quarry sites presented (about mid-way between Arctic Bay and Victor Bay). This lake is fed by the one closest to town (Dead Dog Lake).
- The road to Victor Bay is heavily travelled during the proposed construction / open water season.

3.1.7 Disposal at Sea (DAS) Sites

- Will require results from studies to determine sea bottom. Concern with sea bottom animals.
- Clams and mussels are not harvested in those areas, it's too deep.
- Potential DAS sites shown are too deep for seal hunting. If a seal sinks, it's too deep to try and retrieve it. Hunters prefer shallower areas.
- The Hamlet can think of ways to use the dredge material if study shows it being suitable for use on land.

3.1.8 Environmental Concerns

- The breakwater area (bottom near shore) may be contaminated. There used to be a weather station (~1950s) at the breakwater. Batteries and other materials were dumped into the water there. "I remember when they poured liquid and there was bubbling, smoke and fish floated to the surface".
- If results show contamination, it might be best to bury the sediments, rather than dredge any further.

3.1.9 Future Consultations and Communications

- Most residents are out on the land and Narwhal hunting from Victoria Day weekend (May) until July.
- Local radio, Facebook, and posting around town are best for informing the public of any events or project activities.
- Please keep Hamlet informed of next visit, looking forward to the study.

3.1.10 Public Safety

- May need to consider building an alternate road to Victor Bay to separate local traffic from quarry and hauling for safety. The road is very busy all summer. (Costs ~ \$1M/km to build a road in the area).
- Deal with congestion and safety risks (kids, traffic, front end loaders etc.) caused by sealift.

3.2 Ikajutit HTA November 2018

3.2.1 Project Expectations

- A larger harbour is needed. Employment from BIM has resulted in an increase in boats in the community. Many people are buying boats with their income. Many now own trailers and/or two boats.
- Hunters want larger boats but not feasible with the current facilities available.
- Grateful for the opportunity to share knowledge and local needs to support the design work.

3.2.2 Local Conditions and Water/Ice Access

- There are likely ~50 boats that would be in the harbour at any given time in the community, but that number is growing quickly.
- Those with trailers tend to park their boats beside their homes.
- Hunters have lost a lot of equipment from boats capsizing in the harbour. Many boats get tipped over.
- There is no access to the harbour for hunters when the sealift is in. It fills the entire area and blocks the ramp. Those with trailers are able to go all the way down the shore to launch.
- The road is very busy during sealift, there is too much congestion, and many kids playing around heavy equipment.
- Ice access is not a problem. There are no boulders and ice tend to be nice and flat. This is the first year to see multi-year ice in the area. The ice is usually very flat.
- Arctic Bay is almost like a lake - smooth.
- The existing breakwater was built in the late 1980s/early 90s by GNWT. It doesn't meet the needs of the community. Started off as a spit (without the curved part).
- Some boats use lines to shore to hold the boat in place. This is good in the winds but causes problems with lines crossing.

3.2.3 Quarry and Aggregates

- Blasting very close to shore at Victor Bay is a concern for marine mammals.
- An alternate potential quarry site was identified for geologist's field study. A knowledgeable person should accompany our geologist when looking for potential sites.

3.2.4 Design and Field Program Input

- Preferred locations for a dedicated launch ramp at Victor Bay were marked on the map.
- Design should accommodate larger vessels that some hunters would likely purchase if harbour is built (24-32 ft).
- AFA vessels (30m) need to be accommodated in the design (AFA vessels come in annually to supply communities with food and hunting supplies).
- No concerns were raised when the proposed geophysics program was described and discussed.

3.2.5 Harvesting

- Boats are critical for subsistence harvesting. Most hunting and fishing is done far from the community and requires boats and skidoos to access.

3.2.6 Future Consultations and Communications

- Coordinate with HTA manager (Jennifer Pauloosie) for IQ workshop and for support with local hires and equipment for field program.



Photo A **Workshopping harbour concepts with HTA members in Arctic Bay**

3.3 RCMP November 2018

- BIM's recent surge in hiring has resulted in a 30% increase in calls.
- More money being earned tends to result in an increase in crime and delinquency.
- Would expect that project construction will result in an increase in social issues.
- The detachment is strained with just two officers.
- Expect lot of support from the community for a small craft harbour.
- Current constable will be in charge for the next 1.5 years.

3.4 Northern Store Manager November 2018

- Recent sealift shipment for the Northern included 15 seacans and six skidoo crates.
- No problem if sealift is moved to tank farm area.
- Although convenient to have sealift in front of the store, it is not critical as the amount of cargo is not much.

3.5 Hamlet of Arctic Bay June 2019

3.5.1 Project Expectations

- Expect an increase in number and size of boats once the SCH is built.
- *"This is a very big benefit to the community"* and once built and there are safer boating operations, more people may invest in boats and equipment.
- The sealift. laydown area in Pangnirtung is very big. Council would like to see something similar done in Arctic Bay to relieve the congestion caused when sealift. is in town.

3.5.2 Harbour Concepts

- If sealift. doesn't get moved, what happens to Options 2 and 3?
- Option 1 is preferred. The main access road is better near the arena away from the far end.
- Option 3 ties in to an area that is too congested already and the hamlet receives complaints from residents in this area already about the congestion.
- Expect to dredge a lot of junk along with the sediment. Anything round rolls down the hill and in to that area.

3.5.3 Design and Field Program Input

- No concerns were raised with DAS or when the proposed geophysics program was described and discussed again.
- Continue to coordinate with the HTA for field program support.

3.6 Ikajutit HTA June 2019

3.6.1 Harbour Concepts

- There are serious safety concerns with sealift. It causes too much congestion. We need to move sealift. or ensure the design accommodates for it.
- Option 1 provides a good area for sealift. storage. Hunters will want to be able to store boats/trailers in the sealift. area laydown when sealift. is gone.
- Option 2 doesn't seem to provide as much sealift. laydown area. Option 1 is preferred over Option 2 for this reason.
- The entrance in Option 3 seems very vulnerable to waves. There are strong SE storms. Option 1 preferred for this reason.
- Large storms will ruin or completely wipe out the small road on the breakwater in Option 3.
- Whether it is designed to be a road or not, if people can, they will use it as a road. Option 1 preferred because you can drive on the breakwater.
- Option 3 is not supported by the hunters. They believe, as designed, that it will be dangerous to navigate the entrance during storms.

3.6.2 Quarry and Aggregates

- Inland sites are better for stronger rock source.
- Road will need to be improved if hauling from Victor Bay area. There are many very sharp turns.

3.6.3 Design and Field Program Input

- No concerns were raised with DAS or when the proposed geophysics program was described and discussed again.
- Members supported Mishak Allurut as local coordinator for the field program; this was confirmed following the consultation visit.

3.6.4 Harvesting

- Pleased that hunters may soon have an easier way to access land and water to hunt and fish.
- This project will be a big benefit to the community and support our ability to obtain country food.

3.6.5 Future Consultations and Communications

- Coordinate with HTA manager (Jennifer Pauloosie).

3.7 Hamlet of Arctic Bay November 2019

3.7.1 Harbour Concepts

- Most people don't have trailers. In the next stage, suggest looking at the idea of multiple small breakwaters along the shoreline so residents can moor their boats close to home.
- Consider moving the sealift unloading and laydown area over to the right in Option 1.
- Concern with sealift offloading area in Option 1. Despite the increased laydown area provided it will still be too dangerous to have sealift operating in the area. Too much traffic and congestion. Public safety hazard. Also, an elder's residence is right at the laydown area, the elder's access would be limited while sealift is in. Hunters access is also restricted to get to their boats during sealift. Sealift must move to the industrial zone.
- Inquiry about whether the existing breakwater will be fixed in the short term while the harbour development is being planned. Boats are capsizing during tide changes and residents are losing valuable equipment.
 - Lazarus Akeeagok (GN EDT) explained that the budget for SCH maintenance in communities is very small and doesn't provide for major repairs requiring construction works.
 - Cory Toews (TC) committed to passing along the Hamlet's requests for moving sealift and repairs to the existing breakwater to the co-chair of the Oceans Protection Plan (OPP) and will communicate with DFO-SCH about any funding opportunities through OPP for these requests.

3.7.2 Quarry and Haul Route

- Concern with dynamite being used in Location 2, so close to the community's alternate water supply.
- If Location 2 is developed, the alternate water supply must be protected.
- The road to the proposed quarry location near the sewage lagoon is not very wide. A return trip from the harbour area to that proposed quarry location would take approximately 45 mins.
- The road from Arctic Bay to Victor Bay is used 24 hrs/day, especially in the Spring and open water season. The Project must notify the community of planned activities in the area.
- The community needs a breakwater. If people are kept properly informed, blasting will not be an issue. People will avoid the area at the appropriate times as long as they are kept informed of blasting activities.
- The proposed plan for the Project to provide a stockpile of carving stone is acceptable to the Hamlet. The community would benefit if the Project were to mine several tonnes of carving stone. *"The local carvers and the carvers from Igloolik that come here for stone, will be happy"*
- Inquire with the HTA about a possible food cache along the proposed haul route. Uncertain if the cache is still actively used.

3.7.3 Feedback from Field Program

- No feedback or complaints about field program activities or personnel received by the Hamlet.

3.7.4 Project Planning Considerations

- Ensure that road maintenance will be a requirement in the construction contract. The contractor must maintain the roads in good condition.
- Include royalties (quarry) in cost estimate. They will be required.

3.7.5 Future Consultations and Communications

- Looking forward to the open house in the new year. It will be an important opportunity for the community to have a chance to review the concepts and provide feedback.
- Request by SAO to send slide deck of presentation for distribution to Mayor and council. (Advisian sent the slide deck by email to the SAO on November 6, 2019).

3.8 Ikajutit HTA November 2019

3.8.1 Harbour Concepts

- Option 3 was marked up to show a better tie in to the road and a more robust breakwater shape to deal with vulnerable entrance
- The access road in Option 3 is very high, it will need to be diverted.
- Consider making the breakwaters all driveable so that residents can tie their boats up in more areas.
- If a road is built on the breakwater, make sure to provide a turn around for vehicles.
- Snow machines will likely park across the breakwater in the Spring.
- It's best to keep the ramp away from houses and buildings as much as possible. Please move ramps so they are away from dwellings.
- The cheapest option is the one that always seems to get built, so even though it's not the best option for our community, Option 3 will likely be the one getting built.
- Option 3 allows people to park their boats where people can't easily access them. This decreases the risk of boats being vandalized in the dark season.
- The strongest winds these days come from the direction that will cause wave action in the harbour in Option 3. Even if the breakwater is extended as marked, the harbour will experience too many waves.
- Option 3 is the most vulnerable, the entrance is too exposed and there will be too much wave action in the harbour
- Option 2 is currently preferred but this depends on whether sealift will be moved or not. Option 2 is the best design for dealing with wave action.
- Change the ramp location in Option 2.
- Request installing a boat ramp at Victor Bay and at Oulouksione Point on the Adams Sound side of the point. A boat ramp in this location would allow longer access to open water (Arctic Bay becomes frozen well before Adams Sound)

3.8.2 Quarry and Haul Route

- Request a list from the SAO of cabin owners at Victor Bay. They will need to be kept informed of quarry activities and road closures.
- There is one cabin owner/resident who currently lives in Victor Bay and travels back and forth to Arctic Bay everyday for work. Consult with him directly for timing of blasting so not to restrict his access.
- The road to Victor Bay is heavily travelled in the Spring and all summer. All day and night.
- Road safety will be required if there will be blasting and quarry operations in the area of Location 1 and 2. Consider a gate to block people from being on the road during blasting.
- Skidoo access along the haul route will also need to be considered. There are many well travelled skidoo trails heading to Victor Bay.

3.8.3 Feedback from Field Program

- The HTA did not receive any complaints or feedback concerning the summer field program activities or personnel.

3.8.4 Harvesting

- The HTA confirmed that a food cache in the area along the proposed haul route is sometimes used (see Figure 3-1 [Arctic Bay Land Use and Occupancy Map] in Appendix 7 of the main report).
- Continue to design and plan the SCH collaboratively with the community and with consideration for hunters.

3.8.5 Future Consultations and Communications

- Communicate directly with the HTO in January (2020) about planned drilling activities to ensure residents have enough time to remove equipment and dogs off the ice.
- Communicate directly with the Hamlet and HTO to coordinate local labour to support drilling program.
- Notify the community of any consultations or project activities by local radio, Facebook, and VHF radio. Cabin owners at Victor Bay are only reachable by VHF.
- Pleased that the public will soon be engaged so they can also voice their concerns and provide suggestions.
- A request was made to clear boulders from the beach area at the south end of the town road. A ramp is not required here, just clear the boulders so boats can be launched better.
- Boat owners will provide more ideas for the team at the open house next year.

4. Closure

We trust that this report satisfies your current requirements and provides a suitable documentation for your records. If you have any questions or require further details, please contact the undersigned at any time.

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Senior Review by:



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Senior Project Manager

Advisian, Americas

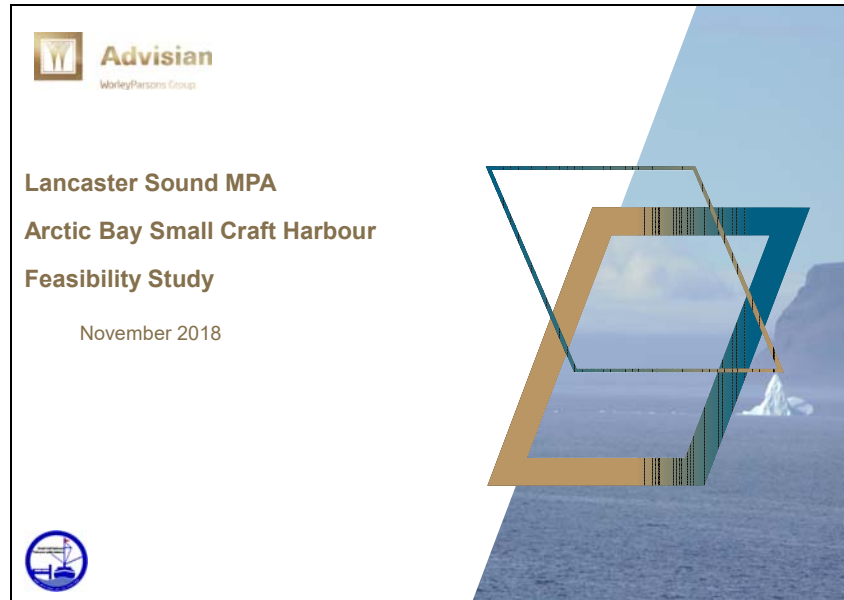

Appendices



Appendix 1

Community Presentation November 2018




Introduction and Study Timelines

- Advisian contracted by DFO – Feasibility study only
- Funding has not been secured for construction
- Study Schedule

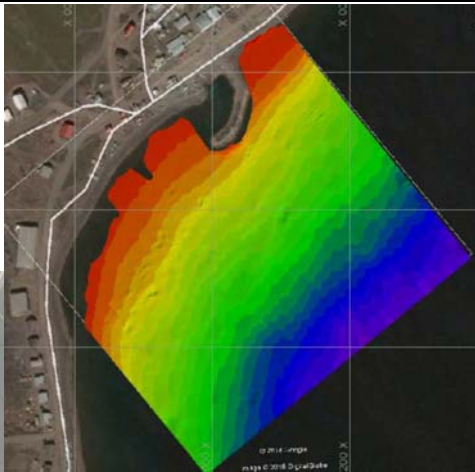

• Jun 2018	Community visit by DFO and QIA
• Oct 2018	DFO awards study to Advisian
• Nov 2018	1 st Consultation visit
• Jan 2018 – Jun 2019	Develop concepts
• Jun 2019	2 nd Consultation – present concepts
• Aug 2019	Field program (without drilling)
• Sep - Oct 2019	Update concepts (based on feedback and field program)
• Oct 2019	3 rd Consultation – field program/concept update
• Oct 2019	Cost Estimate to build harbour
• Nov/Dec 2019	Finalize Study Report




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September Surveys

- Bathymetric survey
- Topographic survey







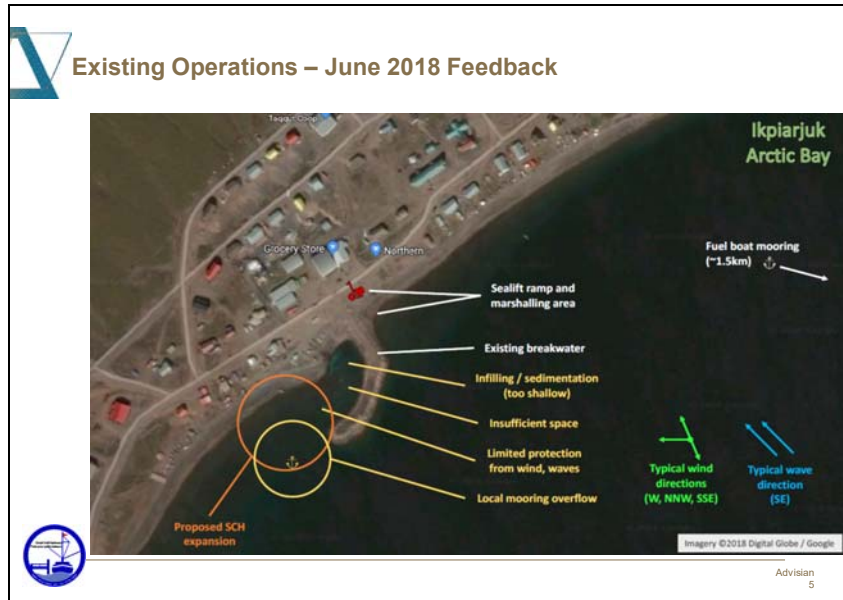
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2019 Field Program

- Marine habitat survey
- Subbottom profiling work (using pulser and blank shells – sound equivalent to outboard motor)
 - Any concerns with
- Current measurements with drogue (drifting buoy)
- Quarry site(s) assessment
- Plants and birds (quarry, haul road, site(s))
- Archeology survey (quarry, haul road, site(s))
- Qikitaaluk Corporation will coordinate for local support
 - Wildlife monitors, field assistants, boat/operators, trucks, ATVs
- DFO will probably complete aerial photography



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Quarry

- Existing borrow pit near airport
- Haul route using existing roads?
- Best sites may be:
 - Dyke near Victor Bay
 - Dyke between AB and VB

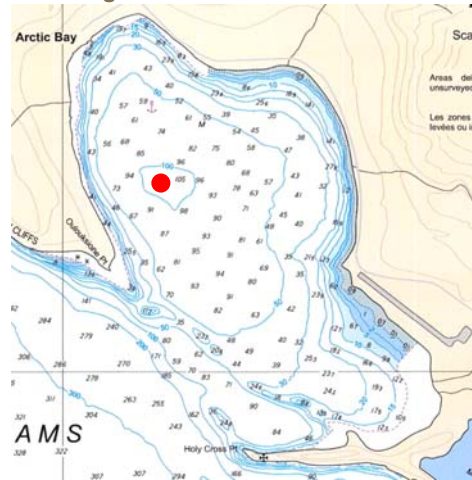


Advisian
7



Suggested Disposal Sites for Dredged Sediments

- Dredging may be required
- Prefer to reclaim land (infilling is fisheries issue)
- Option to dispose of sediments offshore
- Must assess offshore sites
- Closer is better (less cost)



Advisian
8



Thank You / ၵုၵ်ႈ ၵုၵ်ႈ ၵုၵ်ႈ

Contact information:

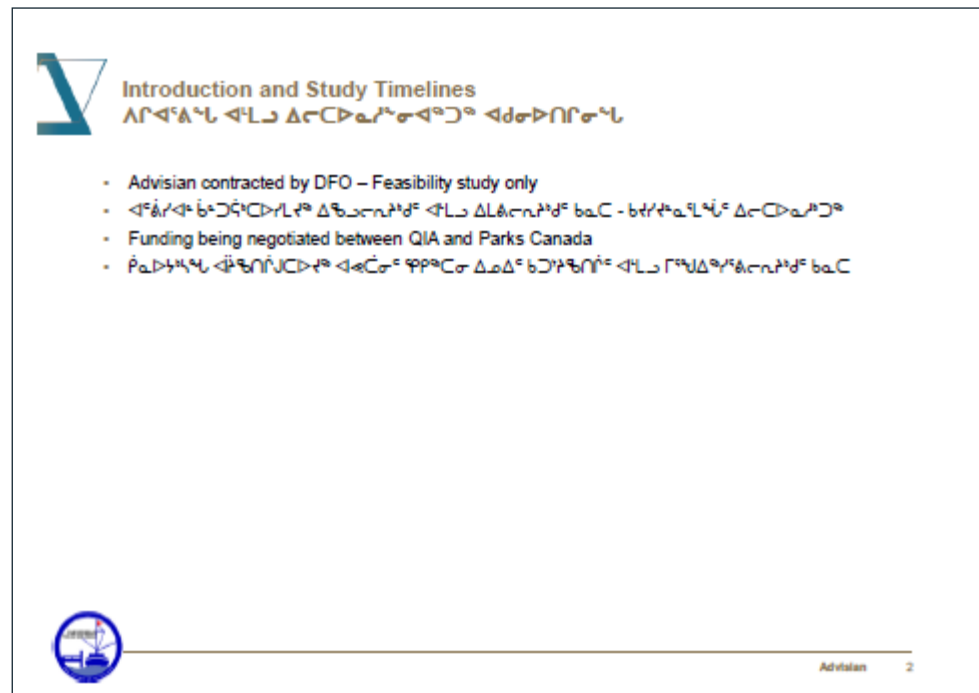
- diane.pinto@advisian.com
- Cell: 647-829-8531
- harald.kullmann@advisian.com
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Appendix 2

Community Presentation May 2019





Study Schedule - $\Delta \propto C \propto \frac{1}{r^2} \propto \frac{1}{\Delta^2} \propto \frac{1}{\Delta^2} \propto \frac{1}{\Delta^2}$

- [illegible]



Advisors



Study Schedule - $\Delta \text{C} \triangleright \text{e} \text{r}^{\text{b}} \text{A}^{\text{b}} \text{y} \Delta^{\text{c}} \triangleright^{\text{c}} \text{J}^{\text{c}} \text{r}^{\text{c}}$

- | | |
|--|---|
| <ul style="list-style-type: none"> May/Jun 2019 LA/2019 | <p>2nd Consultation – present concepts</p> <p>Λ¹β²γ³δ⁴ε⁵ζ⁶η⁷θ⁸ι⁹κ¹⁰λ¹¹μ¹²ν¹³ξ¹⁴ο¹⁵π¹⁶ρ¹⁷σ¹⁸τ¹⁹υ²⁰φ²¹χ²²ψ²³ω²⁴</p> |
| <ul style="list-style-type: none"> Aug 2019 ΔJ/2019 | <p>Field program (no drilling)</p> <p>αβγδεζηθικλμνξοπρστυφχψω</p> |
| <ul style="list-style-type: none"> Sep – Oct 2019 ΓΠΑ - Δ/2019 | <p>Update concepts (based on feedback and field program)</p> <p>Λ¹β²γ³δ⁴ε⁵ζ⁶η⁷θ⁸ι⁹κ¹⁰λ¹¹μ¹²ν¹³ξ¹⁴ο¹⁵π¹⁶ρ¹⁷σ¹⁸τ¹⁹υ²⁰φ²¹χ²²ψ²³ω²⁴</p> |
| <ul style="list-style-type: none"> Oct 2019 Δ/2019 | <p>3rd Consultation – field program/preferred concept</p> <p>Λ¹β²γ³δ⁴ε⁵ζ⁶η⁷θ⁸ι⁹κ¹⁰λ¹¹μ¹²ν¹³ξ¹⁴ο¹⁵π¹⁶ρ¹⁷σ¹⁸τ¹⁹υ²⁰φ²¹χ²²ψ²³ω²⁴</p> |
| <ul style="list-style-type: none"> Nov 2019 ΔΠΑ 2019 | <p>Cost Estimate to build harbour</p> <p>αβγδεζηθικλμνξοπρστυφχψω</p> |
| <ul style="list-style-type: none"> Nov/Dec 2019 ΔΠΑ 2019 | <p>Finalize Study Report</p> <p>αβγδεζηθικλμνξοπρστυφχψω</p> |



Advisory 4



2019 Field Program ᓄᓇᓴ ᐱᓕᓂᓂᓐᓂᓐᓴᐅᓐᓴᓐ

- Marine habitat survey
 - Sub-bottom profiling work (using pulser and blank shells – sound equivalent to outboard motor)
 - Current measurements using drogue (drifting buoy)
 - Quarry site(s) assessment
 - Plants and birds (quarry, haul road, site(s))
 - Archeology survey (quarry, haul road, site(s))
 - Team will require local support: Wildlife monitors, field assistants, boat/operators, trucks, ATVs
 - DFO will complete aerial photography
-
- ᐱᓕᓂᓐᓂᓐᓴᐅᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ
 - ᐱᓕᓂᓐᓂᓐᓴᐅᓐᓴᓐ ᐱᓕᓂᓐᓂᓐᓴᐅᓐᓴᓐ (ᐱᓕᓂᓐᓂᓐᓴᐅᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ)
 - ᐱᓕᓂᓐᓂᓐᓴᐅᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ
 - ᐱᓕᓂᓐᓂᓐᓴᐅᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ
 - ᐱᓕᓂᓐᓂᓐᓴᐅᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ
 - ᐱᓕᓂᓐᓂᓐᓴᐅᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ
 - ᐱᓕᓂᓐᓂᓐᓴᐅᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ



Advisian 5



2019 Geophysical Survey Work ᓄᓄᓐᓴ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ

ᐱᓕᓂᓐᓂᓐᓴᐅᓐᓴᓐ

- ᐱᓕᓂᓐᓂᓐᓴᐅᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ
- ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ – 142 ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ (ᐱᓕᓂᓐᓂᓐᓴᐅᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ)
- ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ
- ~4 ᓄᓄᓐᓴᓐ (1 ᓄᓄᓐᓴᓐ ᓄᓄᓐᓴᓐ)

- ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ ᓄᓄᓐᓴᓐᓴᓐ
- ~ 1/1000 ᓄᓄᓐᓴᓐᓴᓐ

Sub-bottom Profiling

- Electrical acoustic source (signals received by hydrophones towed behind a boat)
- Source is a pulser system – 142 dB (at standard reference)
- Equivalent noise to an outboard motor
- ~4 hours (during 1 day)
- Compared to offshore seismic survey
 - ~ 1/1000 noise level



Type of Sound	In Air (dB re 20µPa @ 20m) (unless otherwise stated)	In Water (dB re 1µPa @ 1m)
Threshold of Hearing	0 dB	82 dB
Whisper at 1 Meter	20 dB	82 dB
Noised Conversation in Restaurant	60 dB	122 dB
Ambient sea noise	–	100 dB
Blue Whale	–	190 dB
Low Rock Motor	110 dB	177 dB
Thunderclap or Chainsaw	120 dB	182 dB
Large Ship	–	200 dB
Earthquake	–	210 dB
Seismic Array at 1 Meter	158 - 178 dB	220 - 240 dB
Bottlenose Dolphin	–	225 dB
Sperm Whale Click	–	236 dB
Jet Engine Take-off at 1 Meter	180 dB	242 dB
Volcanic Eruption	–	255 dB
Colossal Iceberg	–	220


2019 Geophysical Survey Work ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ

ᑭᓄᓐ ᑭᓄᓐ

- 2 ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ
- 8ga (500 grain) ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ
- ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ
- 5 ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ
- 2 ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ

Refraction survey

- 2 or 3 lines extending offshore from the beach
- 8ga (500 grain) blank shotgun shells fired from heavy-wall tubes (shotguns)
- Receivers are submersible hydrophone cable
- 5 to 6 fired offshore, within 1 and 10m deep, (small shotgun)
- 2 fired onshore, within 30m of the beach (large shotgun)



Large shotgun

Small Shotgun

SUMMARY OF FEEDBACK – ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ

- Sediment infilling needs dredging – not done for 5-6 years.
- ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ
- Boats turn over, dumping equipment at low tide.
- ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ
- Too many mooring ropes criss-cross in the harbour.
- ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ
- ~50 boats in the harbour at any given time in the community; growing quickly.
- ~50 ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ
- Sealift blocks harbour for 4-5 days.
- ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ ᑭᓄᓐ



SUMMARY OF FEEDBACK – ᐱᐃᐅᓂᕈᕋᔭᓂᕐ ᐆᑦᑖᕐᑎᕐ

- Ice access is good, nice and flat.
- ᐱᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ.
- The breakwater area may be contaminated - weather station (~1950s)
- ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ
- Hard rock is near Victor Bay.
- ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ.
- Quarry needs to be far enough from cabins and shore.
- ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ
- May need alternate/wider road to Victor Bay for rock trucks (or residents)
- ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ
- Back-up water source is near potential quarry site(s)
- ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ ᐸᑦᓴᑦ

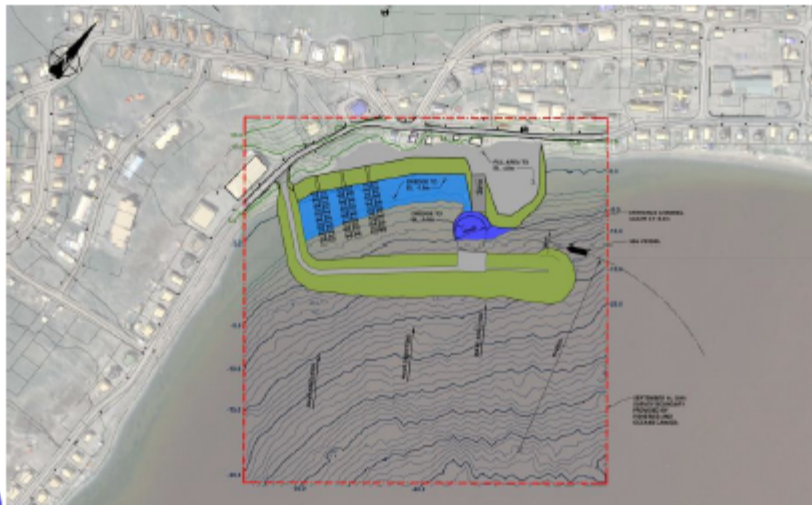


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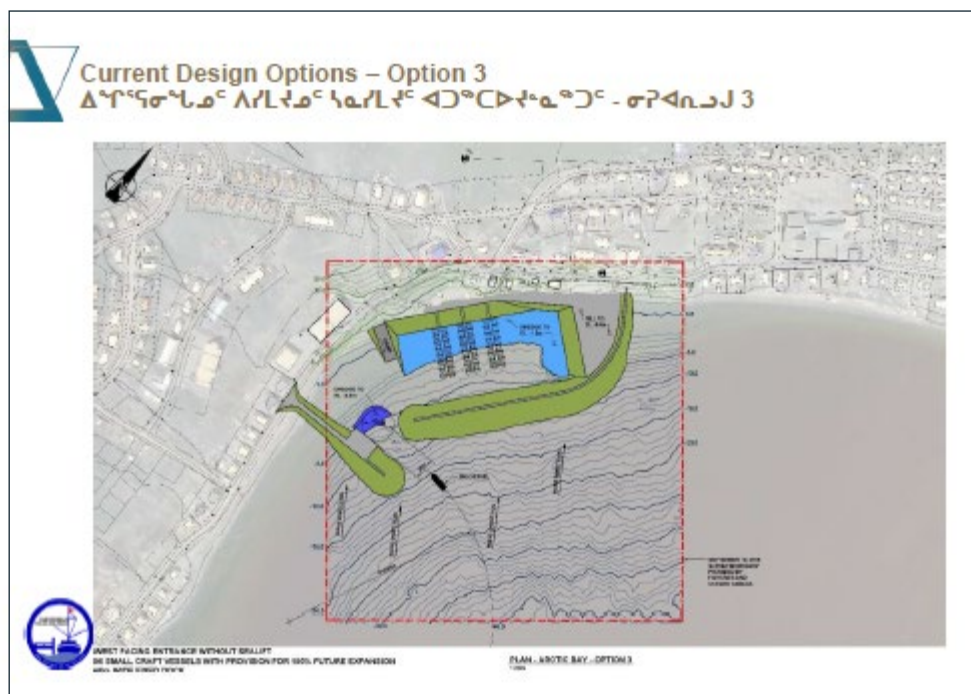
Current Design Options – Option 1

Δ¹°C/σ¹ε¹μ¹ C A/L¹μ¹ C ኤ/ε¹L¹ C <D>C>ε¹μ¹ C - σ¹Δ¹μ¹ J 1



EAST FACING ENTRANCE W/ACCESS TO TUG BOAT LIFT
 100 SMALL CRAFT VESSELS WITH PROVISION FOR 100% FUTURE EXPANSION
 100' WIDE FIXED DOCK

PLAN - ADOTC BAY - OPTION 1





Quarry - ᐅᑦᑲᑦᓴᑦ

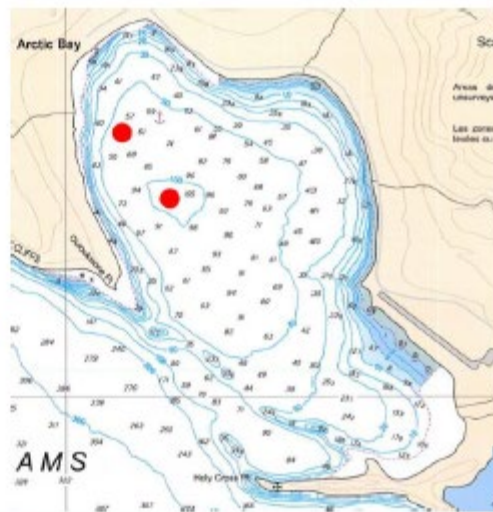


Activities 13



Suggested Disposal Sites for Dredged Sediments

- Dredging may be required
 - Prefer to reclaim land (infilling is fisheries issue)
 - Option to dispose of sediments offshore
 - Must assess offshore sites
 - Closer is better (less cost)
-
- $dA \propto C_n \cdot Q_c \cdot \Delta L \Delta t \cdot J$
 - $A \propto J \cdot \text{sediment} \cdot \text{depth} \cdot \text{width}$
($\Delta L \propto \text{sediment} \cdot \text{depth} \cdot \text{width} \cdot \text{time} \cdot \text{width}$)
 - $\text{sediment} \cdot \text{depth} \cdot \text{width} \cdot \text{time} \cdot \text{width} \propto Q_c \cdot C_n \cdot \Delta L \cdot J$
 $\Delta L \propto J$
 - $\Delta L \propto J \cdot \Delta L \cdot J \propto J^2 \cdot \Delta L$
 - $\text{sediment} \cdot \text{depth} \cdot \text{width} \cdot \text{time} \cdot \text{width} \propto J^2 \cdot \Delta L$



Activity 3.4

 Thank You / ᐅᐅᐅᐅᐅᐅᐅᐅᐅ

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- Cell: 778-996-6906



Advisian 15

Appendix 3

Community Presentation November 2019





Advisian

WorleyParsons Group

ᑕᑦᐃᑦᐅᑦᐅᑦ ᐃᑭᑭ

ᑭᑦᑭᑦ ᐅᑭᑦᑭᑦᑭᑦ ᑭᑦ ᑭᑦᑭᑦᑭᑦ

ᑭᑦᑭᑦᑭᑦᑭᑦᑭᑦ ᐃᑭᑭᑭᑭᑭᑦᑭᑦ

November 2019 ᐅᑦᑭᑭᑭᑭ

Lancaster Sound

Small Craft Harbour

Feasibility Study





- Advisian contracted by DFO – Feasibility study only
- Advisian ᐅᓂᑕᔭᐱᒃᓴᓄᖅ ᐱᒪᓁጥᑕᓕᓚᓲᐅᓂᑦ - ᐅᐳᓯᓰᓇᓁᒪᓗᓂᖅ ᓁᐅᓶኝᓀᑕᑕᓂᓂᑦ
- Funding negotiated between QIA and Parks Canada
- ᓆᓇᑕᓴᓂᑎᐩᐤ ᐱᓲᓈᑕᑕᓰᓰᓂᑕᓂᓂᑦ ᐱᒪᓵ ገᓁᓴᐱᓕᓚᓲᓰᐱᓂᑦ ᐅᓇᑕገ



- | | |
|--|--|
| <ul style="list-style-type: none"> • Jun 2018 • ᐳᐅ 2018 | <p>Community visit by DFO, QIA and GN</p> <p>ᓄᓇᓕᓐᓄᑦ ᓂᓕᓕᓐᓂᓐᓂᑦ ᐃᓕᓐᓂᓐᓂᑦ ᓂᓐᓂᓐᓂᓐᓂᑦ</p> |
| <ul style="list-style-type: none"> • Oct 2018 • ᐅᐅᐅᐅ 2018 | <p>DFO awards study to Advisian</p> <p>ᐃᓕᓐᓂᓐᓂᑦ ᓂᓐᓂᓐᓂᑦ ᓂᓐᓂᓐᓂᑦ Advisian-ᓄᓐᓄᑦ</p> |
| <ul style="list-style-type: none"> • Nov 2018 • ᓄᓄᓄᓄ 2018 | <p>1st Consultation visit</p> <p>ᓂᓐᓂᓐᓂᑦ ᓂᓐᓂᓐᓂᑦ ᓂᓐᓂᓐᓂᑦ ᓄᓄᓄᓄᓐᓂᓐᓂᑦ</p> |
| <ul style="list-style-type: none"> • Jan 2018 – May 2019 • ᐳᐅᐅᐅ 2018 – ᐃᐃ 2019 | <p>Develop concepts</p> <p>ᓂᓐᓂᓐᓂᑦ ᓂᓐᓂᓐᓂᑦ ᓂᓐᓂᓐᓂᑦ</p> |
| <ul style="list-style-type: none"> • May/June 2019 • ᐃᐃ/ᐳᐅ 2019 | <p>2nd Consultation – present concepts</p> <p>ᐃᓐᓂᓐ ᓂᓐᓂᓐᓂᑦ ᓂᓐᓂᓐᓂᑦ ᓂᓐᓂᓐᓂᑦ - ᓂᓐᓂᓐᓂᑦ ᓂᓐᓂᓐᓂᑦ</p> |





- | | |
|--------------------|--|
| • Aug 2019 | Field program (no drilling) |
| • ᐃᑭᕈ 2019 | ᓄᐱᒥ ᐱᓕᐲᐢᓕᐢᓗᓗᓂᔪᖅ (ᓂᓯᖅᑐᖅᑐᖅᓴᓕᓕᓂᖅ) |
| • Sep - Oct 2019 | Update concepts (based on feedback and field program) |
| • ᓯᐢᐱᐲ - ᓯᓂᓗᓂ 2019 | ᐱᓚᓕᓕᐱᓯᒪᓂᖅᓯᐱᓂᖅ ᖅᓂᓯᓂᖅᓇᓗᓂᔪᖅ (ᐱᓯᒪᔪᖅ ᓯᖅᓂᓯᓯᓯᖅᓕᓕᓗᓂᖅᑐᓂᖅ
ᐱᓕᐲᓇᓯᖅᓂᓯᓯᓯᖅ ᐱᓕᐲᐱᒥᖅ) |
| • Nov 2019 | 3 rd Consultation – field program/preferred concept |
| • ᓄᐱᐱᐲ 2019 | ᐱᖅᓕᓗᓂᔪᓂᔪᖅ ᑐᓴᐲᐱᓕᓦᓇᖅᓂᖅ – ᐱᓕᐲᓇᓯᖅᓂᓯᓯᓯᖅ ᐱᓕᐲᐱᓂᖅ/ᓂᓯᐱᒪᓯᓗᓂᔪᖅ
ᐱᓯᖅᓂᓯᓯᓯᖅᑐᓂᖅ |
| | Cost Estimate to build harbour
ᐱᓯᖅᓕᓗᓂᔪᓂᔪᖅ ᓯᓴᓯᓴᓕᓗᓂᔪᓂᔪᖅ ᑐᓕᓕᓕᓦᓇᓗᓂᔪᖅ |
| • Nov/Dec 2019 | Finalize Study Report |
| • ᓄᐱᐱᐲ/ᓰᓯᓴᓚ 2019 | ᐱᓯᖅᓂᓯᓯᓯᖅ ᖅᓂᓯᓂᖅᓴᓕᓕᓂᖅ ᓯᓂᖅᓂᖅ |





- Serious safety concerns with sealift. It causes too much congestion.
 - ᐱᑦᑕᓇ ᖃᑐᔭᒐᓚᔭᑦᑲᑦᑕᑦᑭᑦᑎᓄᑦ ᐃᑦᒐᑐᑕᐅᑭᑯᑦ ᐅᑦᐱᑦᐳᐱᑦᐅᑦ ᐅᑦᑎᑦᑲᑦᑕᑦᑭᑦᑎᓄᑦ. ᑦᑕᑦᑲᑕᐅᑦᑭᑯᑦᑲᑐᐱᑦᑲᑦᑕᑦᑭᑦᑎᓄᑯᑦ.
- Sealift laydown in Pangnirtung is very big. Council would like to see something similar in Arctic Bay.
- ᐅᑦᐱᑦᐳᐱᑦᐅᑦ ᐅᑦᑦᑦᑦᑦ ᑭᐅᑦᑲᑦᑕᐅᑭᑯᑦᑲᑦ ᑕᓄᑭᑦᑐᑦ ᐱᑦᑎᑦᐳᐱᑦᐅᑦ. ᑲᑎᒐᑲᑦ ᐱᑦᑲᑕᑐᐱᑦᑲᑦ ᑕᐅᑦᑭᑯᑦᑲᑦ ᐃᑦᐱᐱᑦᐳᑦ.
- Either move sealift or ensure the design accommodates for it.
- ᓄᑶᑎᑦᑐᑕᑐᓄᑦᑲᑦ ᐅᑦᐱᑦᐳᐱᑦᐅᑦ ᐅᑦᑕᓚᑭᑦ ᐅᑦᑕᑐᓄᑦᑲᑦ ᐱᑦᑲᑲᑲᑦᑭᑦᑭᑦᑭᑦᑲᑦ ᐱᑦᑲᑲᑲᑦᑭᑦᑭᑦᑲᑦ.
- Residents will want to store boats/trailers in sealift laydown once sealift is gone.
- ᓄᓇᑦᑲᑦᑲᑦᑐᑦ ᑐᑦᑲᐃᑦᑭᑦᑲᑦᑕᑲᒐᒐᑕ ᐅᑦᐱᑦᑭᑦᑲᑦ/ᑲᑕᑕᑎᑭᑦ ᐅᑦᐱᑦᐳᐱᑦᐅᑦ ᐅᑦᑦᑦᑦᑦ ᑭᐅᑦᑲᑦᑕᑲᑦᑲᑦ ᓄᑕᐅᑦᑭᑯᑦᑲᑐᐱᑦᑕᑦ.





- [illegible]





- Marine habitat survey
 - Sub-bottom profiling work (using pulser and blank shells – sound equivalent to outboard motor)
 - Current measurements using drogue (drifting buoy)
 - Quarry site(s) assessment
 - Plants and birds (quarry, haul road, site(s))
 - Archeology survey (quarry, haul road, site(s))
 - DFO - aerial photography
-
- ᑕᓕᓂᓄᑦ ᐅᓕᓕᓂᓄᑦ ᓇᓕᓕᓂᓄᑦ ᑦᓂᐅᓕᓂᓄᑦ ᑦᓂᐅᓕᓂᓄᑦ
 - ᐃᓂᓂᓄᑦ ᓇᓂᓇᓂᓄᑦ ᑦᓂᐅᓕᓂᓄᑦ ᑦᓂᐅᓕᓂᓄᑦ ᑦᓂᐅᓕᓂᓄᑦ (ᐃᓂᓂᓄᑦ ᓂᓂᓂᓄᑦ ᐃᓂᓂᓄᑦ ᐃᓂᓂᓄᑦ ᐃᓂᓂᓄᑦ – ᓂᓂᓂᓄᑦ ᐃᓂᓂᓄᑦ ᐃᓂᓂᓄᑦ)
 - ᐃᓂᓂᓄᑦ ᑦᓂᐅᓕᓂᓄᑦ ᐃᓂᓂᓄᑦ ᐃᓂᓂᓄᑦ ᐃᓂᓂᓄᑦ (ᓂᓂᓂᓄᑦ ᐃᓂᓂᓄᑦ ᐃᓂᓂᓄᑦ)
 - ᐃᓂᓂᓄᑦ ᐃᓂᓂᓄᑦ ᑦᓂᐅᓕᓂᓄᑦ ᑦᓂᐅᓕᓂᓄᑦ
 - ᐃᓂᓂᓄᑦ ᐃᓂᓂᓄᑦ (ᐃᓂᓂᓄᑦ, ᐃᓂᓂᓄᑦ ᐃᓂᓂᓄᑦ, ᐃᓂᓂᓄᑦ)
 - DFO – ᑦᓂᓂᓄᑦ ᑦᓂᐅᓕᓂᓄᑦ ᐃᓂᓂᓄᑦ ᐃᓂᓂᓄᑦ





Quarry and Haul Road



Legend

- Potential Small Craft Harbour Study Area
- Potential Quarry
- Potential Haul Route - Existing Road/Track
- Potential Haul Route - Construct New Road
- Dolomite Dike
- Dolomite Dike (Visited)
- Dolomite Dike (Viewed From Road)
- Photo Location

0 250 500 1,000
Metres



Aerial Image: CHS July 2017; GoogleEarth, July 2016
Locations approximate.

DEPARTMENT OF FISHERIES AND OCEANS
ARCTIC BAY HARBOUR DEVELOPMENT

ARCTIC BAY POTENTIAL QUARRY LOCATIONS AND HAUL ROAD ROUTES

Date: 30-OCT-19	Drawn by: KR	Collected by:	Revised by:
Project No: 30707-1-01306		FIG No: 1	REV: B
<div><div> Fisheries and Oceans Canada</div><div>Advisian Worley Group</div></div> <div><small>This drawing is prepared solely for the use of our customers as specified in the accompanying report. WorleyParsons Canada Services Ltd. assumes no liability to any other party for any representations contained in this drawing.</small></div>			



Quarry and Haul Road



Legend

- Potential Quarry
- Potential Haul Route - Existing Road/Track
- Potential Haul Route - Construct New Road
- Dolerite Dike

0 50 100 200
Metres



Aerial Image: CHS July 2017; GoogleEarth, July 2016
Locations approximate.

DEPARTMENT OF FISHERIES AND OCEANS
ARCTIC BAY HARBOUR DEVELOPMENT

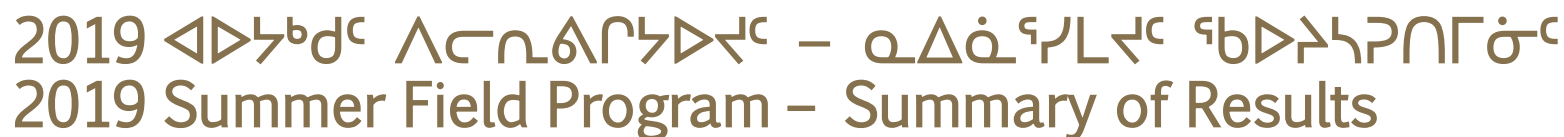
ARCTIC BAY POTENTIAL QUARRY LOCATIONS AND HAUL ROAD ROUTES

 Fisheries and Oceans Canada	Date: 30-OCT-19	Drawn by: KR	Issued by: _____		Appr'd by: _____
	Advisian Worley Group		Project No. 30707 1-01306		
			FIG No. 2		REV: B
			<small>"This drawing is prepared solely for the use of our customers as specified in the accompanying report. WorleyParsons Canada Services Ltd. assumes no liability to any other party for any representations contained in this drawing."</small>		



Quarry and Haul Road





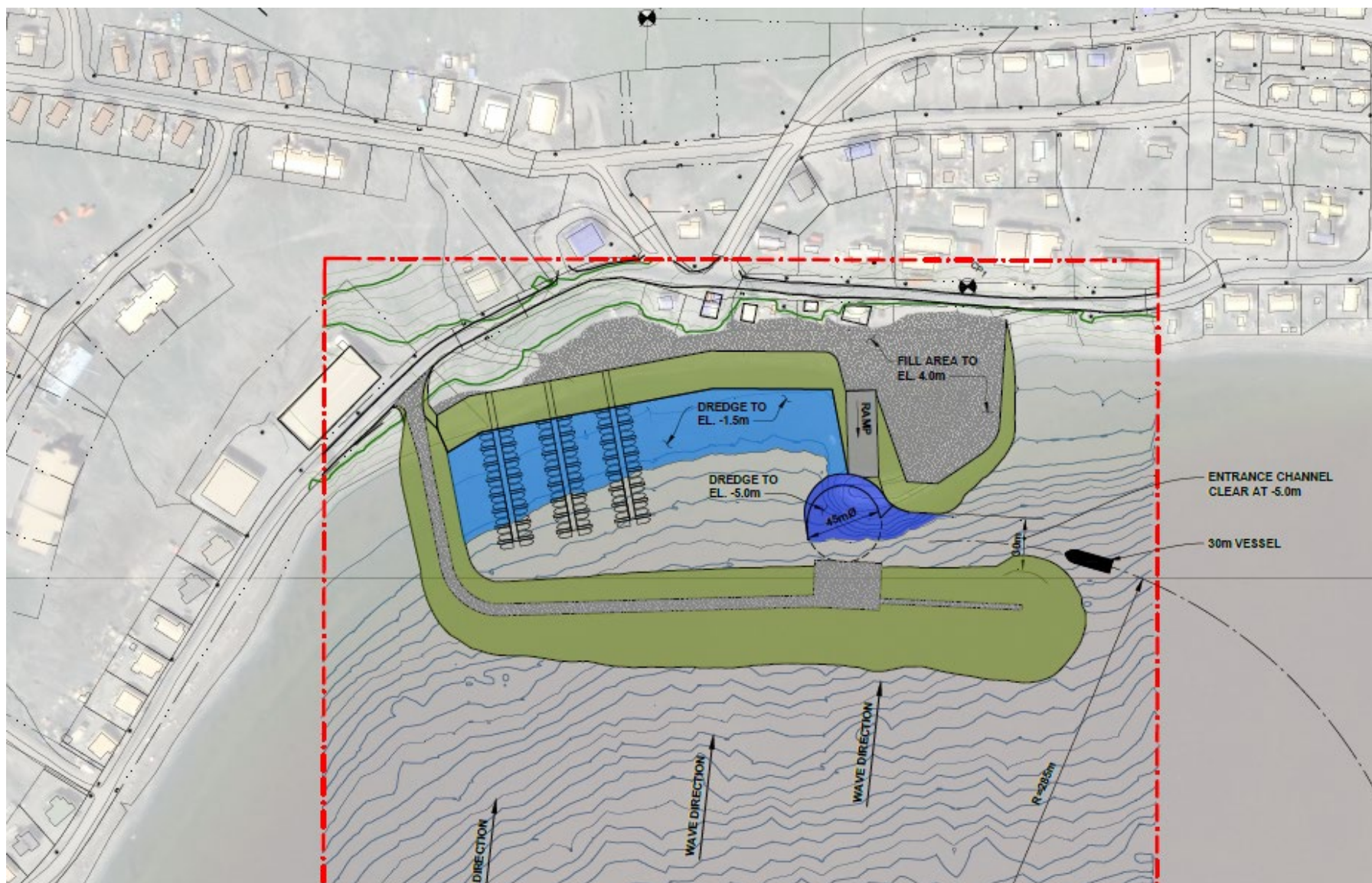
- Quarry:
 - Main rock supply options: black igneous diabase (very hard, very durable, very dense)
 - Several option sites; preferred for cost are closest to harbour
 - Location 1 – downstream of Alternate Water Supply Lake
 - Location 2 – upstream of Alternate Water Supply Lake
 - Stockpile areas
- Haul road (for ~40 ton rock trucks):
 - Upgrade existing road up hillside, including width, pullouts, corners
 - Passes several houses/businesses

[illegible][illegible]



Current Design Options – Option 1

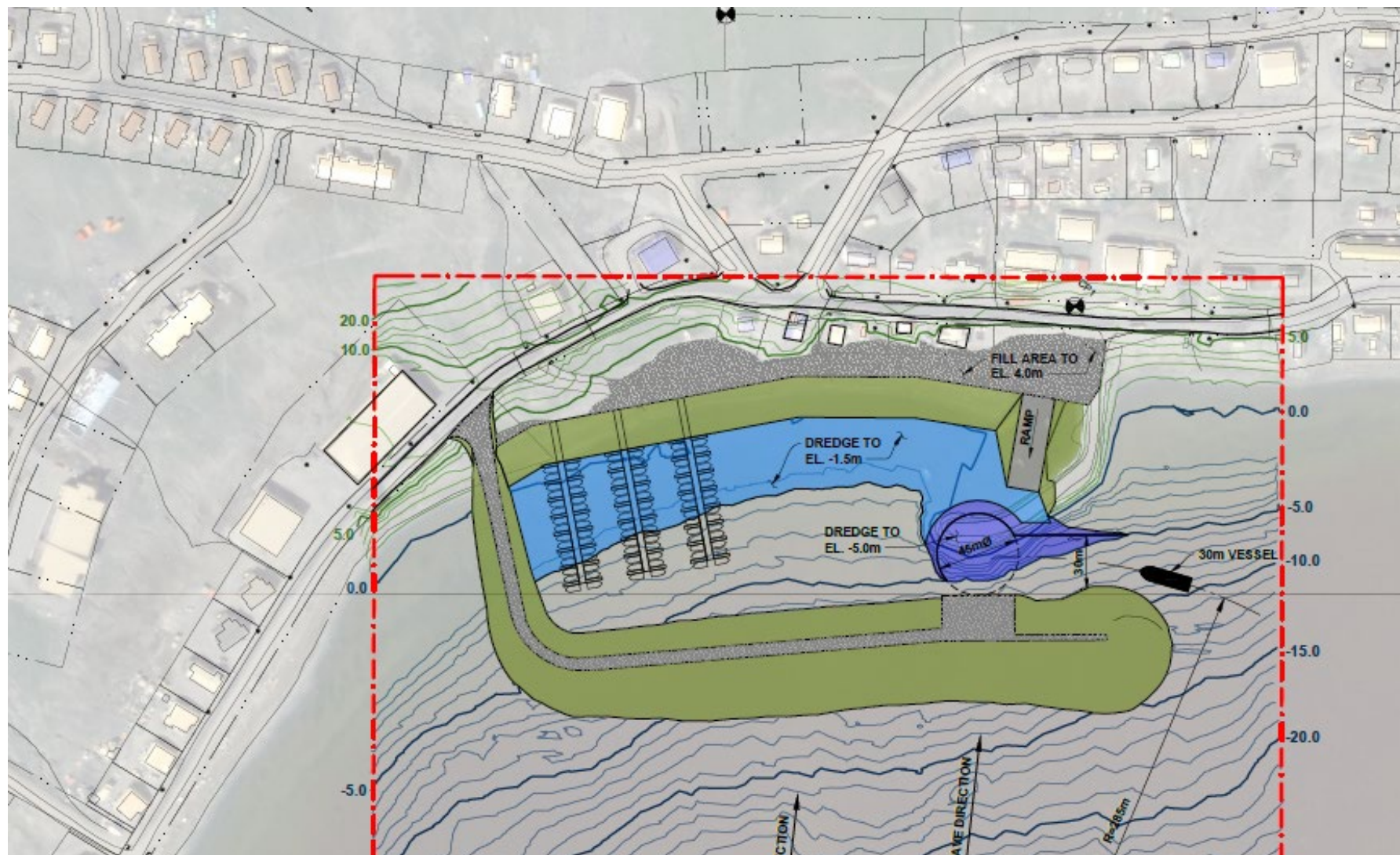
Δ^αρ^ςς^ςσ^ςβ: Δ^ςβ^ςΡ^ςΛ^ςσ^ςΛ^ςμ^ς ^ςε^ςς^ςΡ^ςΝ^ςΥ^ς ^ςε^ςς^ςΡ^ςΝ^ςΥ^ς 1





Current Design Options – Option 2

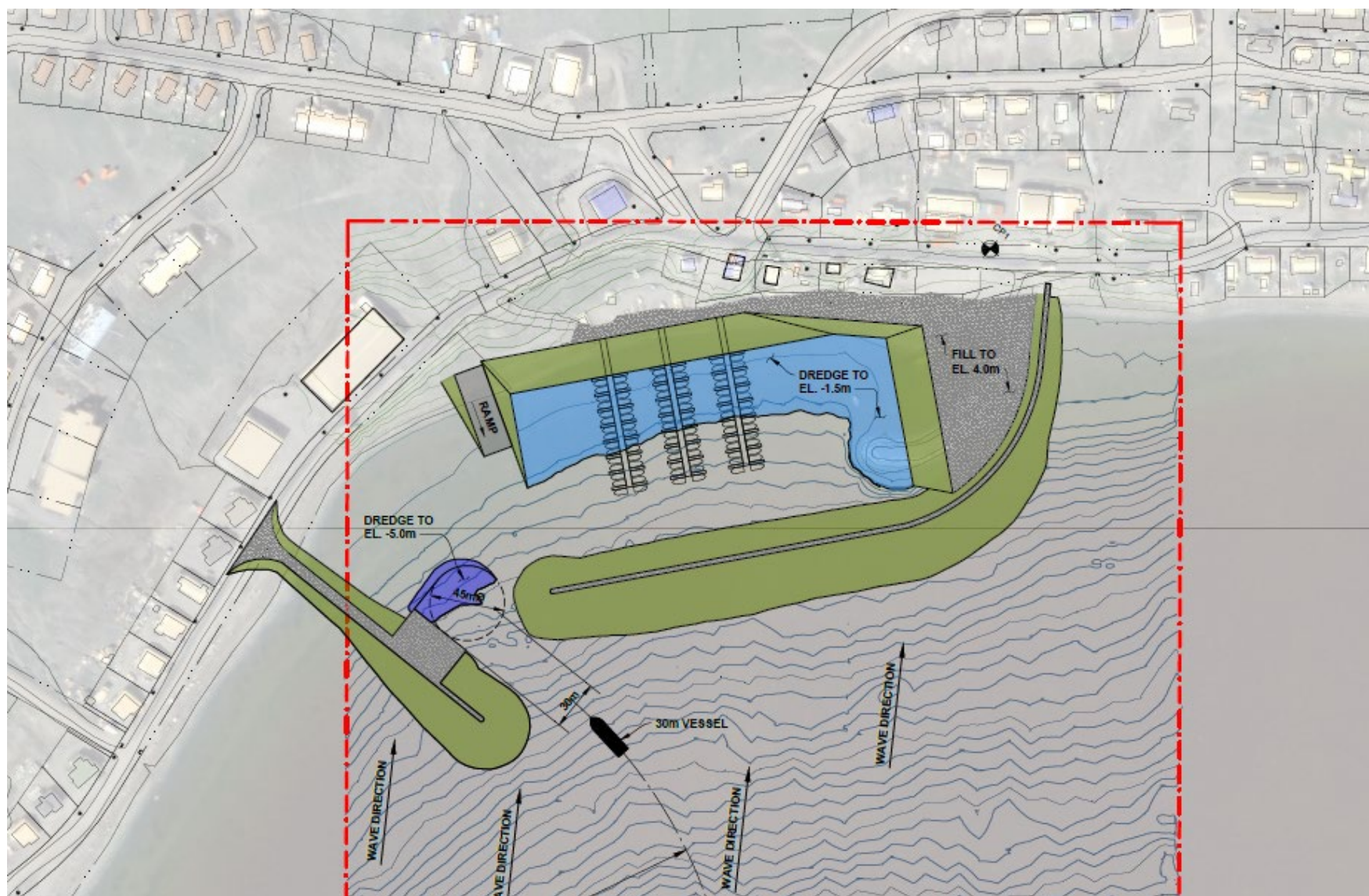
ᐃᓄᐱᓕᓕᓐᓂᓐ: ᐱᓐᓂᓕᓕᓐᓂᓐ ᐃᓕᓕᓕᓕᓐᓂᓐ – ᐃᓕᓕᓕᓕᓐᓂᓐ 2





Current Design Options – Option 3

ᐃᓄᐱᓕᓕᓐᓂᓐ: ᐱᓄᐱᓕᓐᓂᓐ ᐃᓄᐱᓕᓐᓂᓐ – ᐃᓄᐱᓕᓐᓂᓐ 3





NEXT STEPS

Feasibility Study

- Complete and provide to community - January 2020.

Tentative Detailed Design Schedule:

- Tender - November 2019
- Contract award - January 2020.
- Public open house - February/March 2020.
- Geotechnical work complete - April 2020.
- Field work complete - October 2020.
- Community consultations – August 2020, November 2020 and February 2021.
- Harbour detailed design complete by 2021.

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- ለፍፅላት ገንዘብ ዕቅድ - ነሐሴ 2020

ፍፅላትናፍርደታቸው ዕቅድ ለፍፅላትናፍርደታቸው ለፍፅላትናፍርደታቸው

- ፍፅላትናፍርደታቸው - ነሐሴ 2019
- ከፍፅላትናፍርደታቸው - ነሐሴ 2020.
- ገንዘብ ማግኘት ለፍፅላትናፍርደታቸው - ጥቅምት/ሰኔ 2020.
- ዕቅድ ለፍፅላትናፍርደታቸው ለፍፅላትናፍርደታቸው - ጥቅምት 2020.
- ለፍፅላትናፍርደታቸው ለፍፅላትናፍርደታቸው - ነሐሴ 2020.
- ዕቅድ ለፍፅላትናፍርደታቸው - ጥቅምት 2020, ነሐሴ 2020, ጥቅምት 2021.
- ከፍፅላትናፍርደታቸው ዕቅድ ለፍፅላትናፍርደታቸው ከፍፅላትናፍርደታቸው ለፍፅላትናፍርደታቸው 2021-፡፡





NEXT STEPS

Environmental Permitting & Property Acquisition:

- To be completed in 2021 & 2022.

Harbour Construction:

- Tender and contract award in 2022 & 2023.
- Harbour construction - planned completion by March 2026.

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- ᐱᑦᑎᑦᑎᑦᑎᑦᑎᑦᑎᑦ 2021 & 2022.

ᑎᓐᑦᑎᑦᑎᑦᑎᑦ ᐱᑦᑎᑦᑎᑦ:

- ᐊᑦᑎᑦᑎᑦᑎᑦᑎᑦ ᐊᑦᑎᑦ ᑎᑦᑎᑦᑎᑦᑎᑦ 2022 & 2023.
- ᑎᓐᑦᑎᑦᑎᑦᑎᑦ ᐱᑦᑎᑦᑎᑦ - ᑎᑦᑎᑦᑎᑦᑎᑦ ᐱᑦᑎᑦᑎᑦᑎᑦᑎᑦ ᑎᑦᑎᑦ 2026.



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