
Appendix N

Stakeholder Consultation

STAKEHOLDER CONSULTATION for the Admiralty Inlet Pilot Tidal Project

The District has consulted with a variety of stakeholders (agencies, tribes, non-governmental organizations, members of the public) to discuss the Admiralty Inlet Pilot Tidal Project, pre-installation studies, potential mechanisms for harm, post-installation studies and monitoring, and protection, mitigation, and enhancement measures. These discussions can be broken into two categories. The first category of consultations can be characterized as general presentations and discussions of the Project as a whole or of large aspects of the Project. These discussions were held with all stakeholders, including many held at town halls and other local forums to solicit feedback from members of the public most likely to be impacted by the Project. The majority of these discussions are documented in the District's biannual preliminary permit progress reports submitted to the Commission.

The second category of consultations was discussions focused on a specific species or potential impact. These discussions were primarily held with agencies and tribes, and ultimately identified all of the potential Project impacts, the likelihood of significant harm from those impacts, and the need for measures to mitigate or monitor species' interaction with the turbines or other Project facilities. The District primarily worked with these agencies and tribes in formulating pre-installation study plans and reporting on the results of those investigations. To assist in resolving disputes between the District and some stakeholders, the group utilized a professional facilitator during discussions during 2010.

As the Commission's non-federal representative for informal consultation under Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act, the District informally consulted with the appropriate agencies and tribes as part of the various consultations described herein during implementation of pre-installation study plans and the reporting of results.

A summary of the consultation efforts leading up to the filing of the Final License Application are contained in Exhibit E, section 1.4. That summary does not include consultation that occurred via email or phone. Supporting consultation documents are available upon request.

The vast majority of stakeholder comments on the Final License Application and the various monitoring plans were presented to the District during in-person meetings, including the facilitated meetings that took place throughout 2010, and through phone calls or other informal communications. The primary written comments received by the District are contained in the District's June 24, 2011, response to the Commission's August 2010 request for additional information.

Stakeholder Consultation During 2010

The District has also received written stakeholder comments in response to the Draft License Application. The District received the following letters commenting on the Draft License Application, all of which were filed in the official FERC docket:

- Sauk-Suiattle Indian Tribe, February 24, 2010
- Swinomish Indian Tribal Community, February 24, 2010
- USFWS, February 25, 2010

- NMFS, February 26, 2010
- National Park Service, February 24, 2010
- Suquamish Tribe, February 26, 2010
- Tulalip Tribes, March 1, 2010

The comments on the Draft License Application questioned (1) whether the Project was appropriate for the Commission's pilot license process, and (2) whether the pre-installation and proposed monitoring plans were adequate to support environmental analysis.

These comments prompted Commission staff to hold a technical meeting on April 12, 2010, to scope issues and to discuss information and monitoring needs for the license application. At the technical meeting, Commission staff focused discussion on the information gaps that needed to be addressed to ensure that sufficient information exists for the Commission to make a determination on whether the proposed Project meets the criteria for a pilot project and for processing a license application for a pilot project once it is filed with the Commission.

Following the April 12, 2010, technical conference, the District and several agencies and tribes engaged a professional facilitator to oversee regular meetings and/or conference calls, including meetings throughout 2010. The meeting dates and general topics covered are listed below:

- April 21 and 22 – Introduction to the process, general objectives, discussion of DLA
- May 6 and 7 – Adaptive management framework, baseline information needs
- May 18 – HDD Plan, adaptive management, FERC additional information request, development of draft Biological Assessment
- May 26 and 27 – Baseline information needs, potential acoustic impacts, Southern Resident killer whale concerns, adaptive management triggers, potential marine mammal impacts
- June 3 – Adaptive management triggers, potential marine mammal impacts, FERC additional information request
- June 15 – FERC additional information request
- June 22 – Full stakeholder meeting, review progress made during facilitated discussions during April, May, and early June (not facilitated)
- June 25 – FERC additional information request, finalize June 30 letter to send to FERC
- July 19 – Derelict Gear Monitoring Plan, Benthic Habitat Monitoring Plan, Acoustic Monitoring Plan
- July 21 – Benthic Habitat Monitoring Plan (conference call)
- July 30 – Acoustic Monitoring Plan, Near-Turbine Monitoring Plan, Southern Resident killer whale monitoring/mitigation plan
- August 5 – Acoustic Monitoring Plan, draft Biological Assessment
- August 25 – Derelict Gear Monitoring Plan, Benthic Habitat Monitoring Plan, Adaptive Management Framework, HDD Plan, update from PNNL work on SRKW detection, Near-Turbine Monitoring Plan, EMF
- September 9 – Benthic Habitat Monitoring Plan, Adaptive Management Framework, Derelict Gear Monitoring Plan, Acoustic Monitoring, review outstanding issues
- October 20 – Acoustic Monitoring Plan, ROV Survey, Benthic Habitat Plan, Near-Turbine Plan (conference call)

- November 12 – Update on status of outstanding issues (conference call)
- November 17 – Update on PNNL work on SRKW detection, Acoustic Monitoring Plan, ROV Survey Report, updates on Near-Turbine Monitoring Plan, Cable Laying Plan, and draft Biological Assessment
- December 20 – Update on status of outstanding issues (conference call)

A second technical conference was held with Commission staff on November 15, 2010, to clarify the Commission's request for additional information. The District utilized many of the facilitated meetings described above to discuss with stakeholders how to respond to the Commission's requests.

Stakeholder Consultation During 2011

Meetings continued during 2011, but the pace slowed down as the District began preparing documents in response to the Commission's August 2010 request for additional information. During the early months of 2011, the District finalized draft responses, including revised monitoring plans, and shares those with stakeholders. The District received written comments on many aspects of its response to the Commission's additional information request. Those comments, and the District's written responses to them, are attached to the District's June 24, 2011, response filed with the Commission.

Most of the consultation during 2011 was either ad-hoc and informal, or part of the 30-day written comment period required by the Commission as part of its additional information request. However, some stakeholder meetings were held, though this list does not cover every meeting or discussion between the District and stakeholders, nor does it cover discussions with members of the public and other interested non-agency parties, as most of those discussions were ad-hoc and informal.

Although some meetings were held, as summarized below, the monitoring plans were primarily revised by consultants for the District working closely with agency technical staff, exchanging and developing language for the plans informally. As a result, no written comments and responses were exchanged. This collaborative effort continues as the District works with NOAA Fisheries and other agencies to complete the Near-Turbine Monitoring Plan, the Acoustic Monitoring Plan, and the Marine Mammal Monitoring Plan (further described in Appendix A to the Final License Application).

- January 26 – Acoustic levels, status of District's response to FERC additional information request, review ROV habitat characterization report (conference call)
- February 25 – Partial response to the Commission's additional information request sent to stakeholders for review, with comments due March 28
- April 6 – Second partial response to the Commission's additional information request sent to stakeholders for review, with comments due May 9
- April 14 – Southern Resident killer whale monitoring/mitigation plan
- August 16 – Southern Resident killer whale monitoring/mitigation plan
- September 14 – Meeting with NOAA Fisheries to discuss Southern Resident killer whale monitoring/mitigation plan

- November 22 – Meeting with NOAA Fisheries, U.S. Department of Energy, Pacific Northwest National Laboratory, and Sandia National Laboratories to discuss Project impacts to Southern Resident killer whales
- December 12 – Status of strike analysis being conducted by Pacific Northwest National Laboratory and Sandia National Laboratories

Stakeholder Consultation During 2012

On February 24, 2012, a conference call and web link was held to discuss a draft report describing the preliminary findings of the strike analysis developed by Pacific Northwest National Laboratory and Sandia National Laboratories. The final report was released on February 28, 2012, though NOAA Fisheries has indicated that they are still reviewing the report and may provide additional comments once that review is complete.

Consultation with PC Landing Corp.

In addition to the exchange of information related to the Draft License Application and the included monitoring plans, and the written comments received in connection with the Commission's August 2010 request for additional information (the District's written responses to those comments can be found with the District's June 24, 2011, filing in response to the information request), the District has received comment letters from PC Landing Corp. PC Landing Corp. has raised concerns regarding the proximity of the turbines to their fiber optic cables on the Admiralty Inlet seafloor. The District's written responses to the two most recent letters are included as Attachment 1 to this document.

General Stakeholder Distribution List

A list of the stakeholders receiving communications about the Project is included as Attachment 2 to this document.

Responses to PC Landing Corp. February 13, 2012, Comments

Number	Comment	District Response
1	By any measure, the placement of an electric generation turbine approximately 100 meters from our PC-1 North cable poses unacceptable risks to the cable and its operation as well as to the safety of vessels performing maintenance activities within the vicinity of the cable. Well-accepted industry standards for the placement of generating facilities near submarine cables developed in connection with current generation fiber optic cables, require placement of the turbines well in excess of the proposed separation from the cables to avoid interactions between our respective operations, damage to our respective facilities, and to ensure the safety of our respective installation and maintenance crews.	See the District's Jan. 12, 2012, responses to PC Landing Corp.'s Nov. 17, 2011, letter, which is included with this response matrix.
2	SnoPUD's response acknowledges that the proposed placement of the turbines to the east of PC-1 North is perfectly optimized for the installation and operation of your system based on SnoPUD's needs- but these needs do not take into account the negative impacts on PCLC's PC-1 North cable. SnoPUD also admits that placement of the turbines further to the southwest of PC-1 North is completely feasible from a technical standpoint and in terms of substrate suitability and navigational considerations. In addition, it acknowledges that impacts on the natural environment, including impacts on plant and marine life, would be no different southwest of the PC-1 North than at your preferred location. Moreover, it suggests that placement to the southwest would be more costly to the PUD from an installation and operational standpoint without quantifying the extent that cost, and that the placement would result in lower electricity output, without providing any analysis on the extent to which this would affect the data from and the utility of, what is, after all, an experimental tidal energy system and not a commercial system.	As stated in the District's Jan. 12 response, and described in Exhibit E, the District has examined numerous sites throughout Puget Sound, as well as several locations within Admiralty Inlet. In addition to those factors, the proximity of the proposed Project site to the shore allows for greater accuracy in marine mammal observations (combination of theodolite and video tracking). Increasing the distance between the project and shoreline would reduce the effectiveness of these observations, which are needed to address areas of critical environmental uncertainty for tidal energy development. Additionally, relocation of the Project to a less energetic location would represent a clear and significant impediment to the achievement of project objectives as this would result in less turbine run time at useful rotation rates and a commensurate decrease in data collection for essentially all facets of project analysis.
3	SnoPUD also complains that placing the turbines to the southwest of PC-1 North would result in a cable crossing. Such cable crossings, however, are completely routine and common in the industry with well-established agreements governing each party's rights. SnoPUD fails to explain any basis for concerns relating to a crossing, which from	The District's concerns with respect to a cable crossing are described in the District's Jan. 12 response, and include a significant risk of entanglement should repairs to the PC-1 North and/or PC-1 East cables be required.

Number	Comment	District Response
	PCLC's standpoint would be a preferred alternative to the placement of the turbines practically on top of its cable.	
4	Finally, SnoPUD completely dismisses the significant impacts that the current location would have on PC-1 North and its safe operation, while noting the significant resources the District has expended investigating and optimizing the current location since 2009, suggesting it would be inconvenient and economically infeasible to study alternative locations at this stage in the FERC and NEPA processes. SnoPUD's own experts noted the presence of PC-1 North, described as "an in-service" submarine cable, as early as 2009 in the report recently provided to us with its response. However, rather than beginning a dialog with PCLC at that time, SnoPUD waited nearly two years, until you were locked into the current location, before approaching PCLC. This denied us the opportunity to participate in the formal pre-application process and work with the District to identify reasonable alternatives and mitigation measures, and instead resulted in the current situation where SnoPUD essentially claims that it has invested too much time and resources, and it is too late in the process to look at any alternatives to reduce physical and operational impacts on PC-1 North.	The Project was well advertised in local media, including the primary newspaper distributed in Western Washington, the Seattle Times. For example, articles on the Project appeared on November 17, 2008,¹ and on April 15, 2009.² The District's periodic Progress Reports required by its 2007 preliminary permits describe the extensive media coverage and the large volume of meetings the District held with stakeholders and members of the general public. Further, as part of the District's survey work in early 2009, the District's consultants contacted the U.S. Coast Guard to determine if there were any active power or communication cables in the area. The U.S. Coast Guard verbally informed the District that the existing cables were inactive.
5	Coming from the lead SEPA agency on the project, before the SEPA process has even commenced, as it acknowledges, SnoPUD's prejudgment of this issue and its refusal to entertain reasonable alternatives even within Admiralty Inlet is highly prejudicial and not consistent with the requirements imposed on a lead agency by SEPA. We remain completely available to work with you to find a suitable location for the turbines southwest of PC-1 North, but the current location of the turbines, approximately 100 meters from the cable, is unacceptable to PCLC and we will oppose the application to place the cable on that basis before FERC, and in other appropriate forums.	Prior to taking action on the District's Final License Application, the Federal Energy Regulatory Commission will conduct an environmental review pursuant to NEPA. Furthermore, the District intends to fully comply with its obligations under the Washington State Environmental Protection Act, including utilizing the Commission's NEPA documents and analyses to the extent allowed by applicable law and regulation.

¹ The article can be found at http://seattletimes.nwsources.com/html/localnews/2008399727_oceanenergy17m.html (last visited Feb. 29, 2012).

² The article can be found at http://seattletimes.nwsources.com/html/education/2009054791_tidal15m.html (last visited Feb. 29, 2012).

Number	Comment	District Response
6	To facilitate our further discussions to find a mutually suitable location for the turbines in advance of your filing the final application, we address in the attachment some of our detailed concerns with your January 12 responses, and the Project, generally, and include a number of follow-up questions the answers to which will further facilitate our continued discussion of this matter.	Noted.
7	After you have reviewed our response, we suggest a meeting among the principals and their consultants to address our concerns, and to discuss the identification of a more suitable location for the turbines, southwest of PC-1 North. Again, we remain willing and open to working with the District to address these concerns, but please understand that the proposed placement of the turbines approximately 100 meters from PC-1 North is unacceptable by any measure.	Noted.
I	A SEPA Lead Agency Should Not Render Decisions or Prejudge Alternatives Before the SEPA and NEPA Review Is Complete SnoPUD is lead agency for the Project under the Washington State Environmental Policy Act ("SEPA"), RCW 43.21C010 et seq. Under basic SEPA principles, SnoPUD cannot take action that would limit its choice of alternatives or have significant impacts, prior to complying with the statute's mandate to consider the reasonable alternatives to its proposed action, analyze adverse environmental impacts, and adopt appropriate mitigation measures. See, e.g., WAC 197-11-070. As applicant for the Project, SnoPUD is also subject to NEPA's bar on engaging in activity which has not been through the NEPA process. 40 CF.R. 1506.1. However, its answers to PCLC's question reveal that SnoPUD has already prejudged the outcome of this environmental review, short-circuiting the proper process under SEPA and NEPA. It is apparent that SnoPUD has selected a final location for the Project before conducting the necessary studies on potential environmental impacts of alternatives, including potential impacts on existing critical infrastructure such as PC-1 North. In addition, SnoPUD is relying on	As stated above, the Commission's licensing process will include environmental review pursuant to NEPA. In addition, the District intends to fully comply with its obligations under the Washington State Environmental Protection Act.

Number	Comment	District Response
	insufficient information to conduct a meaningful environmental review given the experimental nature of the Project. The decision to locate the Project at its proposed location in Admiralty Inlet has already been made-before a thorough study of all reasonable alternatives-in violation of SEPA and NEPA.	
II	A Thorough and Meaningful SEPA and NEPA Alternatives Analysis Is Necessary SnoPUD is a public agency subject to SEPA and has decided to be the SEPA lead agency with regard to this Project. Information made available to date reveals several significant adverse environmental impacts as a result of the Project. Accordingly, environmental review of the Project will require an environmental impact statement, including a thorough analysis of reasonable alternatives for the Project. See, e.g., RCW 43.21C031. The alternatives analysis must include a reasonable range of alternatives, and therefore is not limited to locations within Admiralty Inlet. See, e.g., WAC 197-11-786. Within Admiralty Inlet, the alternatives analysis must include locations other than the preferred location, including locations to the southwest of PC-1 North. As discussed above, as lead SEPA agency SnoPUD may not act on the Project in a way that would have an adverse environmental impact or limit alternatives until it has issued a final threshold determination or final EIS pursuant to SEPA. SnoPUD's response to PCLC's comment regarding the inadequate analysis of alternatives concedes that the proper alternatives analysis has not been conducted. (Response to Nov. 17 Questions, at 18, Response to (viii).) SnoPUD's response further reveals that generation capacity of locations and installation cost is the sole criterion which has effectively determined the proposed location for the Project. SnoPUD has therefore failed to compare the potential adverse environmental impacts of a reasonable range of alternatives in making its decision. Alternatives analysis must occur before SnoPUD acts on the Project. Here, SnoPUD has reversed the order of this process-and has already decided the precise location for its turbines prior to any environmental review, which includes impacts on utilities and the built environment,	As stated above, the Commission's licensing process will include environmental review pursuant to NEPA. This review will examine whether the proposed Project will have significant adverse environmental impacts. In addition, the District intends to fully comply with its obligations under the Washington State Environmental Protection Act. As described elsewhere in this response, in the District's earlier responses to PCLC, and in Exhibit E of the Final License Application, the District considered many factors in selecting Admiralty Inlet as the location to utilize in the Final License Application. The District has not yet acted on the proposed Project, in that the District has not yet agreed to execute contracts for the purchase of turbines or the construction of Project facilities. Such action will occur after the Commission's NEPA review and after the District has complied with its obligations under the Washington State Environmental Policy Act.

Number	Comment	District Response
	economic impacts, and in particular impacts on pre-existing critical telecommunications infrastructure such as PC-1 North.	
III	Other Suitable Sites West Of PC-1 North Should Be Considered, and Cannot Be Eliminated Based Solely on SnoPUD's Economic Concerns SnoPUD has rejected locations west of the PC-1 North cable due to economic factors such as alleged increased cost of operations at a deeper underwater location. However, data to substantiate SnoPUD's economic concerns has not been made available. The bathymetry maps produced by SnoPUD demonstrate that the depths of the proposed locations do not vary substantially, calling into question the extent of the alleged increase in cost. Even if SnoPUD can substantiate significant increased costs from a deeper location, SnoPUD cannot eliminate reasonable alternatives solely in order to avoid increased costs without considering any other factors. Specifically, SnoPUD has selected a site and rejected reasonable alternatives without regard to the potential adverse impacts its Project will have on an element of the environmental under SEPA, e.g., existing utilities and the built environment. This course of action would impose unknown and undue risks on PCLC's facilities and operations, including unforeseeable risks in connection with the installation and removal of the turbines, and the potential for adverse interactions between PC-1 North maintenance providers and the turbine infrastructure. Potential for these adverse interactions led SnoPUD to recommend a Restricted Navigation Area zone around the turbines (the Coast Guard prefers use of the Puget Sound Vessel Traffic Service), and to recommend that PC-1 North maintenance activities not be conducted in the vicinity of the turbines. In essence SnoPUD seeks to impose the risk and costs of its preferred location on PCLC. PC-1 North, as a pre-existing use, should not have to bear the risk of SnoPUD's implementation of an experimental technology which may threaten the PC-1 North cable or its operations.	As described in the numerous documents included in the Commission's docket for this Project, and as described in the Final License Application and the District's Jan. 12 response, the District has considered a large number of potential sites throughout Puget Sound and throughout Admiralty Inlet. In addition to the reduced power generation potential and increase in cost for locations to the west of PC-1 North, achieving the separation distance requested by PC Landing Corp. would place the project in conflict with the northbound Traffic Separation Zone and reduce the effectiveness of marine mammal observers positioned on Admiralty Head. The District concluded in the Jan. 12 response that the Project as proposed will not have a material impact to the PC-1 cables or PC Landing Corp.

Number	Comment	District Response
IV	SnoPUD Has Failed to Consider and Follow Applicable Cable Separation Guidelines SnoPUD's Project location is also contrary to the current industry standard recommendations for separation between undersea cables and structures similar to the Project turbines. As PCLC explained to SnoPUD in its June 16, 2011 letter, the customary industry recommendation is based on distances necessary to safely perform cable maintenance operations, taking into consideration the area needed for grapnel and ROV operations given water depth, and any recommended buffer zone around the turbines (which was included by SnoPUD as part of its Navigation Safety Plan). Here, based on the industry standard for separation distance contained in the International Cable Protection Committee (ICPC) Recommendation No. 13: Proximity of Wind Farm Developments & Submarine Cables, which includes the industry standard cable repair formula, given the 59m water depth of the proposed location, PCLC suggested that the turbines should be separated from the cables by approximately 1500 meters. Whether SnoPUD wants to quibble with our proposed 1500 meter distance, its proposed separation distance of approximately 100 meters from one of the turbines (and 150 meters from the second) is patently absurd, and as SnoPUD noted in its initial draft environmental assessment, would simply preclude safe maintenance activities in the vicinity of the cable. While it is no longer recommending a regulated navigation area in the areas of the turbines that would preclude PC-1 maintenance activities as a regulatory matter, the fact is that performing maintenance within 100 meters of the turbines would be unsafe under any assumptions, and contrary to any interpretation of industry recommendations on separation distance between submarine cables and structures such as the Project turbines. As a passing note, contrary to SnoPUD's assertion, these recommendations are not guidelines from the late 19'h Century based	See the District's Jan. 12 response. The large requested separation distances are in sharp contrast to the extremely narrow easements PC Landing Corp. has obtained from the Washington State Department of Natural Resources. Those easements cover "[a] 0.5 foot wide strip of submerged lands in the bedlands of Puget Sound."³ In addition, due to the number of inactive power and communications cables to the southwest of Admiralty Head associated with Fort Casey that run perpendicular to the currents, grapneling for cables in this area is unlikely be effective. The separation between the turbines and the cable is sufficient for ROV operations. The District's Benthic Habitat Monitoring Plan and Derelict Gear Removal Plan will both utilize ROVs in close proximity to the turbines (i.e., less than 5 m). Finally, we have learned through personal communications with Alcatel-Lucent (one of the few companies in the world capable of repairing subsea cables) that the company shares our view that the proposed Project, particularly given its relatively tiny footprint, will not cause a significant problem for maintenance activities.

³ The easement documents are included with this response matrix.

Number	Comment	District Response
	on cable and vessel technology from that era as SnoPUD contends. Instead these are the 2010 in-force guidelines of the ICPC developed in connection with current generation cables and relating to the placement of structures in proximity to submarine cables based on marine engineering principles and taking into account water depth and other factors. SnoPUD misapprehends the purpose of these separation standards, which are designed to circumvent issues under normal operations as well as in the case of unforeseen circumstances. In addition to protecting pre-existing cable uses, the recommendations take into account vessel safety considerations; snags on submarine cables can cause risks to vessel stability if not properly managed in advance through adequate separation of submarine uses. A reasonable worst-case scenario analysis should be performed to assess the real risks to PC-1 North and the crews of vessels that may have to perform non-routine maintenance on PCLC's facilities.	
V	SnoPUD Knew PC-1 North Was Active In 2009, But Failed to Notify PCLC Until May, 2011 SnoPUD failed to timely notify PCLC of its Project in violation of FERC regulations. By September 2009 (at the latest) SnoPUD was aware that the PC-1 North cable was present at its current location, and operational in Admiralty Inlet. The September 2009 Fugro report for SnoPUD plainly depicts the as-laid path of PC-1 North and accurately describes it as "in- service." In addition, PC-1 North is the subject of a publicly recorded easement filed with WDNR - thus SnoPUD should have been aware of the cable from its first stages of due diligence investigating Admiralty Inlet. The location alone of PC-1 North plainly put SnoPUD on notice that PC-1 North was a use with a potentially serious incompatibility with the Project. However, SnoPUD did not notify PCLC of its Project until May 2011, in violation of FERC regulations. FERC regulations required SnoPUD to notify PCLC as an interested party when it filed its Notice of Intent and Draft License Application in December, 2009. 18 CFR Part 5. PCLC was	See response to comment #4. Further, as required by Commission regulations, notice of the NOI, application, and associated documents filed on December 28, 2009 were published in The Herald, a newspaper of general circulation in Island County, Washington (where the proposed Project will be located). Proof of the notice was provided to the Commission on Jan. 12, 2010. Once the District identified the PC-1 cables as active and in operation, the District began discussions with PC Landing Corp. and increased the distance from PC-1 North four-fold, from 26 m to 100 m.

Number	Comment	District Response
	therefore deprived of the ability to comment on the pre-filing process. It is not clear when SnoPUD informed FERC of the existence of PC-1 North, as a potentially incompatible adjacent use requiring analysis of potential adverse impacts, however, it is clear PCLC was kept uninformed. SnoPUD has asked PCLC to rely on its statements that it believes no impacts will occur to PC-1 North as a result of the Project. In essence, SnoPUD is saying to PCLC and FERC, "trust us." However, the current record demonstrates SnoPUD's failure to act on basic information by timely informing PCLC-an interested party-of the existence of the Project. In this context SnoPUD's assurances cannot be taken at face value, and it should bear the burden of demonstrating via verifiable data its assumptions regarding potential impacts to PC-1 North.	
VI	A Cable Crossing at PC-1 North is a Reasonable Alternative Which Must be Explored Further SnoPUD takes the position in its response to PCLC comments that a location northwest of the PC-1 North cable is necessary to avert a cable crossing. PCLC requests that this position be revisited. Cable crossings do not pose a material threat to the PC-1 North cable. Such crossings are subject to standard practices in the industry and do not pose the same risks as location of large turbines. SnoPUD's assumption that a cable crossing is unacceptable has artificially restricted the potential alternatives sites which may have lesser impacts on PC-1 North. SnoPUD should therefore reconsider locations to the southwest of PC-1 North in order to allow for a thorough and comprehensive examination of a range of reasonable alternatives.	See response to comment #3. The desire to avoid a cable crossing was just one factor in selecting the proposed Project site.
VII	Requests for Additional Information In addition to the foregoing comments, PCLC requests that SnoPUD provide the following information to allow PCLC to continue its assessment and analysis of the Project, and PCLC's position with respect thereto:	

Number	Comment	District Response
VII.1	Please provide copies of your correspondence with the U.S. Coast Guard regarding vessel navigation and safety.	The vast majority of communications between the District (or its consultants) and the U.S. Coast Guard have been by phone or other informal means. The U.S. Coast Guard provided the District with comments on the Assessment of Potential Puget Sound marine Safety Risk Resulting from the Project. Those comments, and the District's responses to them, are included with the District's June 24, 2011, response to the Commission's request for additional information.
VII.2	Please provide your analysis of any increased costs to SnoPUD from installing, operating and decommissioning the proposed pilot turbine system from a location southwest of PC-1 North in comparison to the proposed location.	A formal analysis has not been completed.
VII.3	Please provide details on the Acoustic Doppler Current Profiler (ADCP) survey referenced on pages 3 to 4 of your response, including information on the dates profilers were deployed and any written report or analysis of the results associated with the survey, including its author.	The ADCP surveys conducted for the proposed Project have been led by the University of Washington. A tidal energy resource characterization journal paper describing the ADCP work was attached to the Jan. 12 response and is included with the Final License Application in Appendix L. Additionally, Exhibit E includes a description of siting studies that led to the selection of the preferred project site. This section of the license application was drafted by Dr. Polagye using the same methodology as in the journal paper.
VII.4	Please describe the selection criteria used for the locations surveyed. Please provide a plot on a single map of the ADCP deployment locations for the referenced survey and the ADCP locations plotted in the Polagye journal paper appended SnoPUD's response.	See response to comment VII.3.
VII.5	Please provide any analyses of the average power output for the different locations in the ADCP survey implied by the survey results, any analysis of the impact on the pilot test of the turbine systems at each different location surveyed, including your analysis of the extent to which a location southwest of PC-1 North would limit SnoPUD's ability to conduct a pilot test of the turbine systems, and any financial modeling comparing the financial performance of the pilot test at the different survey locations.	This information is included in Exhibit E to the Final License Application. Additionally, the effectiveness of shore-based observations of marine mammal responsiveness to turbine noise will decrease with increasing distance from shore, compromising a key monitoring goal for the project.

Number	Comment	District Response
VII.6	Please provide a complete answer to PCLC's question regarding the failure of equipment at the Bay of Fundy pilot project. PCLC's question 5 in its November 17, 2011 letter, requested information regarding "impacts on the surrounding environment, the extent of damage to the turbines, and the distance and velocity associated with the turbine's failure," including copies of any and all documents relating to the requested information. SnoPUD has failed to provide the requested information. In addition to any other relevant documents relating to the above topics, please specifically include a copy of the 2009 AECOM Environmental Assessment, referenced in the Admiralty Inlet Draft Environmental Report at 152.	Based on discussions with OpenHydro, velocities at the Fundy site exceeded, by a factor of two, those predicted by the limited ADCP information available prior to installation. These velocities exceeded the design specifications of the blades and, as would be expected, the blades were damaged. Based on this experience, the District has gone to extensive lengths to characterize all aspects of the tidal currents expected at the proposed Project site, including long-term measurements of current magnitude and direction at multiple locations in Admiralty Inlet.⁴ This information, in turn, will be used by OpenHydro to design and construct a turbine suitable for installation into Admiralty Inlet. The 2009 AECOM Environmental Assessment can be found at: http://fundyforce.ca/assessment (last visited Feb. 29, 2012).
VII.7	SnoPUD states that it "does not believe there is incomplete or unavailable information" requiring analysis under 40 C.F.R. § 1502.22 or WAC 197-11-080. (SnoPUD Response to Nov. 17 Questions at 19.) However, SnoPUD also acknowledges that it "is not aware of any prior tidal turbine installations in the proximity of submarine cables elsewhere in the world" (id. at 14 (emphasis supplied)) and that there is "risk of damage to PC-1" during the Project's installation and removal. (Id.) Please explain SnoPUD's conclusion regarding incomplete or unavailable information in light of SnoPUD's statement that this is the first installation of the Project's type in proximity to a cable anywhere in the world, and the known risks to PC-1 North.	This comment misinterprets the District's Jan. 12 response. On page 14, the District stated that "[o]nly during the system's installation and removal is there a risk of damage to PC-1." Earlier in the Jan. 12 response, as well as in the appendix to that response, the District explained the installation process in great detail, including past installations of these turbines by OpenHydro. Although the District is unaware of prior tidal turbine installations near submarine cables, OpenHydro has experience installing tidal turbines within ±5 m accuracy. As a result, the risk of damage to PC-1 during installation, while theoretically greater than zero, is <i>de minimus</i> .

⁴ See the journal paper titled *Tidal Energy Resource Characterization*, Manuscript Draft, Polagye, B. and Thomson, J. (2011) included in Appendix L to the Final License Application.

NO EXCISE TAX
REQUIRED

MAR 18 2003

BOB DANTINI, Snohomish County Treasurer

By BOB DANTINI

RECORDING REQUESTED BY
AND WHEN RECORDED, MAIL TO:

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03-18-2003 12:10pm \$35.00
SNOHOMISH COUNTY, WASHINGTON

MEMORANDUM OF EASEMENT

Grantor: State of Washington, acting through the Department of Natural Resources

Grantee: PC Landing Corp.

CHICAGO
Accommodation
5930019

Legal Description: GOVERNMENT Lot 3

Abbreviated form: Section 20, Township 28 North, Range 4 East,
Snohomish County

Additional legal on exhibit A of document

Assessor's Property Tax Parcel Account Number(s): NA

SURVEY MAP REF# 200303185002

This Memorandum of Easement ("Memorandum") is made and entered into as of 11th day of March, 2003, by and between the State of Washington, acting through the Department of Natural Resources ("Grantor"), and PC Landing Corp., a Delaware corporation ("Grantee").

Grantor previously granted and conveyed to Grantee a nonexclusive easement over, upon and under certain premises ("Premises") consisting of a portion of real property more particularly described on Exhibit A attached, located in the Clallam County, Kitsap County, Snohomish County, Island County and Jefferson County, State of Washington ("Land").

The easement was made upon all of the terms, covenants and conditions set forth in that certain unrecorded Easement No. 51-070810 between the parties dated August 16, 2000 ("Easement"). The Easement expires on April 14, 2007, unless earlier terminated or extended in accordance with the provisions of the Easement. Under the Easement, Grantee is provided two (2) options to extend the original term for an additional seven and one-half (7.5) years and ten (10) years, respectively.

Grantor and Grantee have entered into this Memorandum in order that third parties may have notice of the existence of the unrecorded easement and some of its specific provisions. This Memorandum is not a complete summary of the Easement. This Memorandum is not intended to amend, modify, or otherwise change the terms and conditions of the Easement. Provisions in this Memorandum shall not be used in interpreting the provisions of the Easement. In the event of a conflict between this Memorandum and the Easement, the Easement shall control.

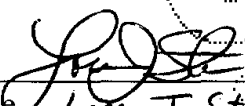
GRANTOR:

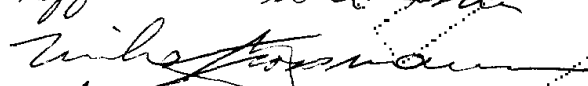
STATE OF WASHINGTON, acting through
the Department of Natural Resources

By

Name

Its


Loren J. Stern
Aquatic Resources Division Manager

Approved as to form

Michael S. Grossman
AAG 3-10-03

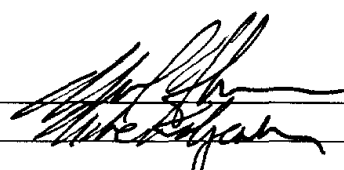
GRANTEE:

PC LANDING CORP.,
a Delaware corporation

By

Name

Its

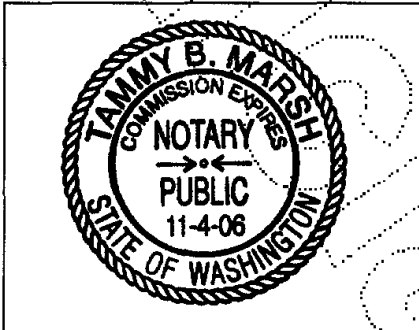

Mike Ragan

STATE OF WA
COUNTY OF Thurston

)
) ss.
)

I certify that I know or have satisfactory evidence that Loren J. Stern is the person who appeared before me, and said person acknowledged that he/she signed this instrument, on oath stated that he was authorized to execute the instrument and acknowledged it as the Aquatic Division Manager of the Washington Department of Natural Resources, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: 3/11/03



(Use this space for notarial stamp/seal)

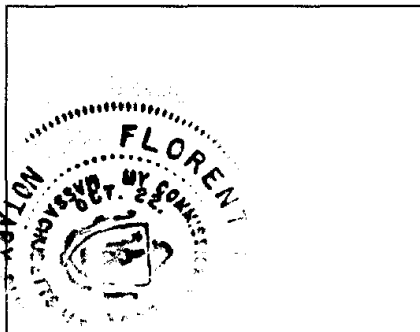
Tammy B. Marsh
Notary Public
Print Name Tammy B. Marsh
My commission expires 11/04/06

STATE OF MA
COUNTY OF MIDDLESEX

)
) ss.
)

I certify that I know or have satisfactory evidence that MICHAEL KATZENSTEIN is the person who appeared before me, and said person acknowledged that he/she signed this instrument, on oath stated that he was authorized to execute the instrument and acknowledged it as the VICE-PRESIDENT of PC Landing Corp., a Delaware corporation, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: 1-7-03



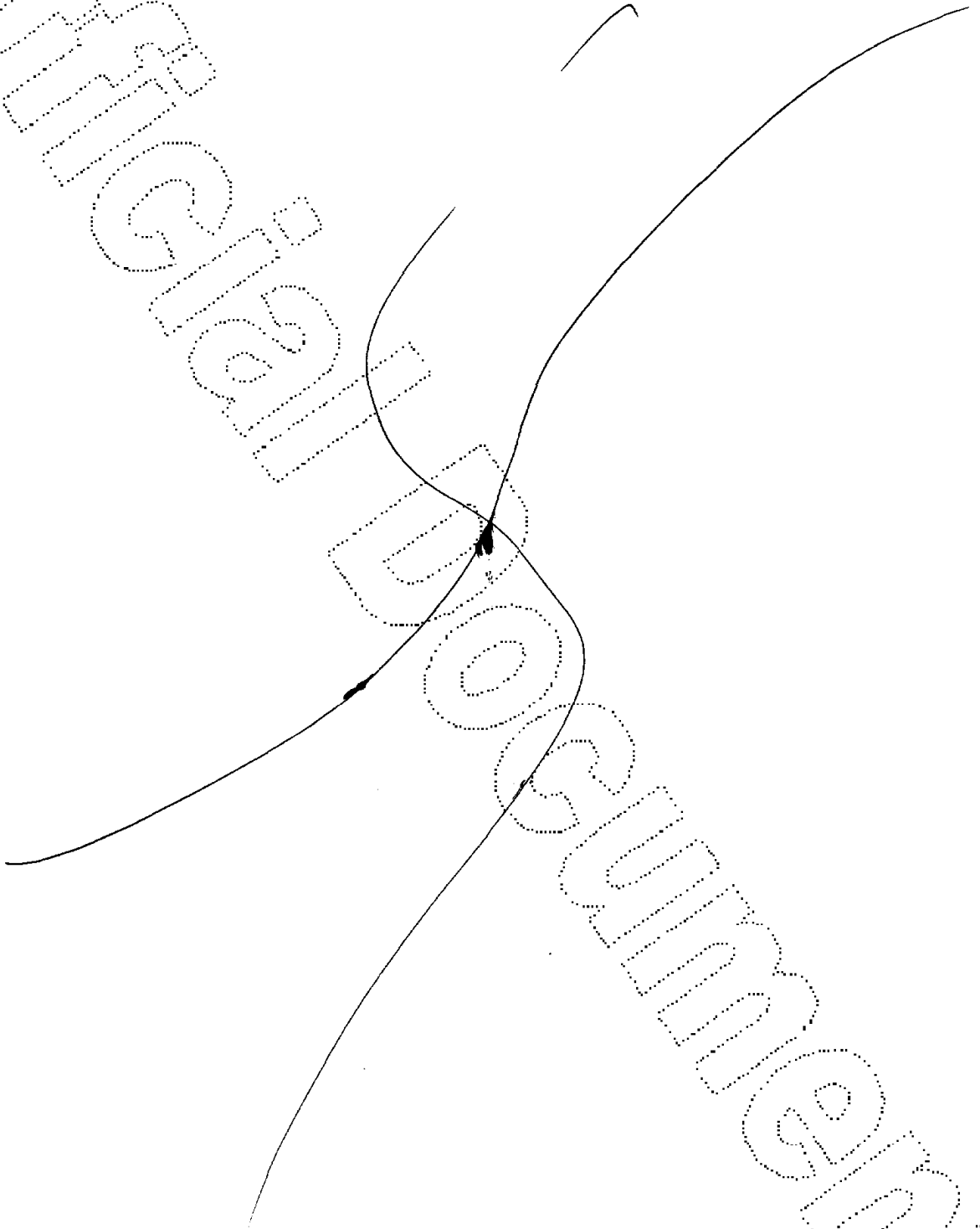
(Use this space for notarial stamp/seal)

Florent H. Norion
Notary Public
Print Name FLORANT H. NORION
My commission expires MY COMMISSION EXPIRES OCTOBER 22, 2006

EXHIBIT A

Legal Description of Property

SEE ATTACHED



**MUKILTEO TO JAPAN
EASEMENT DESCRIPTION**

A 0.5 foot wide strip of submerged lands in the bedlands of Puget Sound, the Strait of Juan de Fuca, and the Pacific Ocean lying between the Extreme Low Tide Line and the State of Washington Offshore Boundary, the centerline of said strip being a submarine fiber optic cable commonly referred to as "Pacific Cable 1 (PC-1) North" and more particularly described as follows:

BEGINNING at a point in Section 20, Township 28 North, Range 4 East, in Snohomish County Washington having a Latitude of 47° 54' 12.8183" North and a Longitude of 122° 19' 23.8162" West, said point being a brass disk in a concrete monument entitled Snohomish County Public Works point 58/1031; thence South 32° 34' 07" West 2402.39 feet to a point on the Extreme Low Tide Line, said point being the beginning of a non-tangent curve concave to the Northeast having a radius of 509.48 feet and radial bearing North 21° 34' 11" East, said point being the POINT OF BEGINNING; thence continuing Northwesterly 167.32 feet more or less along said curve through a central angle of 18° 49' 01"; thence North 50° 02' 26" West 167.32 feet; thence North 47° 22' 47" West 163.32 feet; thence North 47° 46' 17" West 539.50 feet to a point having a Latitude of 47° 53.983' North and a Longitude of 122° 19.899' West, said point being the seaward end of a section of steel conduit; thence North 60° 37' 44" West 235.88 feet to a point having a Latitude of 47° 54.002' North and a Longitude of 122° 19.951' West; thence North 52° 08' 44" West 244.44 feet to a point having a Latitude of 47° 54.026' North and a Longitude of 122° 19.999' West; thence North 56° 03' 15" West 807.65 feet to a point having a Latitude of 47° 54.098' North and a Longitude of 122° 20.165' West; thence North 57° 15' 53" West 149.79 feet to a point having a Latitude of 47° 54.111' North and a Longitude of 122° 20.196' West; thence North 55° 14' 35" West 878.80 feet to a point having a Latitude of 47° 54.191' North and a Longitude of 122° 20.375' West; thence North 56° 58' 55" West 827.67 feet to a point having a Latitude of 47° 54.263' North and a Longitude of 122° 20.547' West; thence North 71° 57' 57" West 542.66 feet to a point having a Latitude of 47° 54.289' North and a Longitude of 122° 20.674' West; thence North 79° 51' 33" West 624.76 feet to a point having a Latitude of 47° 54.305' North and a Longitude of 122° 20.825' West; thence South 81° 58' 32" West 766.51 feet to a point having a Latitude of 47° 54.285' North and a Longitude of 122° 21.010' West; thence South 68° 38' 38" West 477.81 feet to a point having a Latitude of 47° 54.255' North and a Longitude of 122° 21.118' West; thence South 59° 17' 39" West 495.46 feet to a point having a Latitude of 47° 54.212' North and a Longitude of 122° 21.221' West; thence South 47° 30' 58" West 660.37 feet to a point having a Latitude of 47° 54.137' North and a Longitude of 122° 21.338' West; thence South 33° 55' 26" West 1019.55 feet to a point having a Latitude of 47° 53.996' North and a Longitude of 122° 21.473' West; thence South 19° 06' 39" West 965.19 feet to a point having a Latitude of 47° 53.845' North and a Longitude of 122° 21.546' West; thence South 11° 05' 01" West 2085.91 feet to a point having a Latitude of 47° 53.507' North and a Longitude of 122° 21.634' West; thence South 09° 56' 28" West 2380.74 feet to a point having a Latitude of 47° 53.120' North and a Longitude of 122° 21.723' West; thence South 09° 40' 22" West 3356.72 feet to a point having a Latitude of 47° 52.574' North and a Longitude of 122° 21.845' West; thence South 09° 12' 40" West 1461.85 feet to a point having a Latitude of 47° 52.336' North and a Longitude of 122° 21.895' West; thence South 09° 56' 37" West 1389.88 feet to a point having a Latitude of 47° 52.110' North and a Longitude of 122° 21.947' West; thence

South 10° 06' 57" West 677.53 feet to a point having a Latitude of 47° 52.000' North and a Longitude of 122° 21.973' West; thence South 22° 06' 32" West 2734.03 feet to a point having a Latitude of 47° 51.580' North and a Longitude of 122° 22.212' West; thence South 33° 16' 30" West 114.83 feet to a point having a Latitude of 47° 51.564' North and a Longitude of 122° 22.227' West; thence South 35° 39' 53" West 2044.45 feet to a point having a Latitude of 47° 51.287' North and a Longitude of 122° 22.510' West; thence South 35° 54' 60" West 1634.83 feet to a point having a Latitude of 47° 51.066' North and a Longitude of 122° 22.738' West; thence South 52° 21' 40" West 447.04 feet to a point having a Latitude of 47° 51.020' North and a Longitude of 122° 22.823' West; thence South 47° 41' 53" West 2598.67 feet to a point having a Latitude of 47° 50.726' North and a Longitude of 122° 23.284' West; thence South 56° 59' 51" West 3605.81 feet to a point having a Latitude of 47° 50.393' North and a Longitude of 122° 24.013' West; thence South 66° 21' 14" West 3345.92 feet to a point having a Latitude of 47° 50.162' North and a Longitude of 122° 24.755' West; thence South 70° 05' 44" West 1368.77 feet to a point having a Latitude of 47° 50.081' North and a Longitude of 122° 25.067' West; thence South 69° 57' 18" West 1981.00 feet to a point having a Latitude of 47° 49.963' North and a Longitude of 122° 25.518' West; thence South 79° 42' 48" West 1131.18 feet to a point having a Latitude of 47° 49.926' North and a Longitude of 122° 25.789' West; thence South 81° 47' 19" West 2191.47 feet to a point having a Latitude of 47° 49.867' North and a Longitude of 122° 26.317' West; thence North 66° 48' 05" West 30.46 feet to a point having a Latitude of 47° 49.869' North and a Longitude of 122° 26.324' West; thence South 81° 27' 17" West 390.33 feet to a point having a Latitude of 47° 49.858' North and a Longitude of 122° 26.418' West; thence North 76° 53' 49" West 1385.06 feet to a point having a Latitude of 47° 49.905' North and a Longitude of 122° 26.749' West; thence North 76° 09' 50" West 1250.28 feet to a point having a Latitude of 47° 49.950' North and a Longitude of 122° 27.047' West; thence North 60° 40' 51" West 1703.17 feet to a point having a Latitude of 47° 50.082' North and a Longitude of 122° 27.414' West; thence North 59° 52' 51" West 930.65 feet to a point having a Latitude of 47° 50.156' North and a Longitude of 122° 27.613' West; thence North 44° 13' 44" West 735.46 feet to a point having a Latitude of 47° 50.241' North and a Longitude of 122° 27.741' West; thence North 39° 59' 29" West 315.87 feet to a point having a Latitude of 47° 50.280' North and a Longitude of 122° 27.792' West; thence North 37° 32' 24" West 1590.31 feet to a point having a Latitude of 47° 50.484' North and a Longitude of 122° 28.035' West; thence North 27° 23' 55" West 2520.76 feet to a point having a Latitude of 47° 50.848' North and a Longitude of 122° 28.330' West; thence North 19° 34' 32" West 2510.08 feet to a point having a Latitude of 47° 51.234' North and a Longitude of 122° 28.548' West; thence North 16° 24' 12" West 5619.74 feet to a point having a Latitude of 47° 52.115' North and a Longitude of 122° 28.964' West; thence North 17° 45' 56" West 4411.36 feet to a point having a Latitude of 47° 52.801' North and a Longitude of 122° 29.315' West; thence North 18° 03' 15" West 3329.95 feet to a point having a Latitude of 47° 53.318' North and a Longitude of 122° 29.584' West; thence North 18° 05' 20" West 2460.61 feet to a point having a Latitude of 47° 53.700' North and a Longitude of 122° 29.783' West; thence North 18° 27' 21" West 871.84 feet to a point having a Latitude of 47° 53.835' North and a Longitude of 122° 29.855' West; thence North 17° 57' 11" West 3270.23 feet to a point having a Latitude of 47° 54.343' North and a Longitude of 122° 30.118' West; thence North 18° 05' 56" West 3396.03 feet to a point having a Latitude of 47° 54.870' North and a Longitude of 122° 30.393' West; thence North 19° 26' 38" West 844.14 feet to a point having a Latitude of 47° 55.000' North and a Longitude of 122° 30.466' West; thence North 18° 50' 12" West 2570.68 feet to a point having a Latitude of 47° 55.397' North and a Longitude of 122° 30.682' West; thence North 19° 26' 59" West 2982.18 feet to a point having a Latitude of 47° 55.856' North and a Longitude of 122° 30.940' West; thence North 20° 08' 59" West 940.57 feet to a point having a Latitude of 47° 56.000' North and a Longitude of 122° 31.024' West; thence North 00° 33' 26" West 1028.05 feet to a point having a Latitude of 47° 56.169' North and a Longitude of 122° 31.032' West; thence North 00° 45' 31" West 1284.11 feet to a point having a Latitude of 47° 56.380' North and a Longitude of 122° 31.043' West; thence North 29° 33' 13" West 446.03 feet to a point having a Latitude of 47° 56.443' North and a Longitude of 122° 31.099' West; thence North 28° 34' 08" West 1764.89 feet to a point having a Latitude of 47° 56.695' North and a Longitude of 122° 31.314' West; thence North 30° 15' 23" West 236.17 feet to a point having a Latitude of 47° 56.728' North and a Longitude of 122° 31.344' West; thence North 28° 37' 42" West 1031.05 feet to a point having a Latitude of 47° 56.875' North and a Longitude of 122° 31.470' West; thence North 49° 10' 25" West 524.65 feet to a point having a Latitude of 47° 56.930' North and a Longitude of 122° 31.569' West; thence North 48° 27' 08" West 1221.27 feet to a point having a Latitude of 47° 57.060' North and a Longitude of 122° 31.797' West; thence North 54° 54' 58" West 1071.72 feet to a point having a Latitude of 47° 57.158' North and a

Longitude of 122° 32.015' West; thence North 58° 16' 19" West 2648.86 feet to a point having a Latitude of 47° 57.379' North and a Longitude of 122° 32.574' West; thence North 60° 53' 08" West 3348.02 feet to a point having a Latitude of 47° 57.636' North and a Longitude of 122° 33.299' West; thence North 15° 34' 21" West 253.30 feet to a point having a Latitude of 47° 57.676' North and a Longitude of 122° 33.317' West; thence North 41° 08' 15" West 112.69 feet to a point having a Latitude of 47° 57.811' North and a Longitude of 122° 33.501' West; thence North 33° 44' 53" West 1980.83 feet to a point having a Latitude of 47° 58.078' North and a Longitude of 122° 33.779' West; thence North 28° 14' 25" West 3396.25 feet to a point having a Latitude of 47° 58.564' North and a Longitude of 122° 34.189' West; thence North 28° 13' 22" West 3338.95 feet to a point having a Latitude of 47° 59.042' North and a Longitude of 122° 34.592' West; thence North 28° 29' 44" West 2907.20 feet to a point having a Latitude of 47° 59.457' North and a Longitude of 122° 34.946' West; thence North 28° 18' 55" West 3763.27 feet to a point having a Latitude of 47° 59.995' North and a Longitude of 122° 35.402' West; thence North 26° 46' 42" West 3362.62 feet to a point having a Latitude of 48° 0.483' North and a Longitude of 122° 35.790' West; thence South 40° 21' 52" West 78.75 feet to a point having a Latitude of 48° 0.473' North and a Longitude of 122° 35.802' West; thence North 17° 00' 04" West 3361.92 feet to a point having a Latitude of 48° 0.998' North and a Longitude of 122° 36.061' West; thence North 25° 07' 42" West 713.53 feet to a point having a Latitude of 48° 1.103' North and a Longitude of 122° 36.139' West; thence North 31° 30' 32" West 2054.99 feet to a point having a Latitude of 48° 1.387' North and a Longitude of 122° 36.412' West; thence North 38° 45' 58" West 2526.58 feet to a point having a Latitude of 48° 1.705' North and a Longitude of 122° 36.811' West; thence North 33° 15' 27" West 1285.55 feet to a point having a Latitude of 48° 1.879' North and a Longitude of 122° 36.990' West; thence North 20° 01' 12" West 1063.25 feet to a point having a Latitude of 48° 2.042' North and a Longitude of 122° 37.085' West; thence North 14° 15' 05" West 5617.89 feet to a point having a Latitude of 48° 2.932' North and a Longitude of 122° 37.455' West; thence North 03° 55' 06" West 439.03 feet to a point having a Latitude of 48° 3.004' North and a Longitude of 122° 37.465' West; thence North 06° 46' 08" West 2893.17 feet to a point having a Latitude of 48° 3.475' North and a Longitude of 122° 37.565' West; thence North 06° 01' 03" West 9329.40 feet to a point having a Latitude of 48° 4.997' North and a Longitude of 122° 37.858' West; thence North 10° 26' 20" West 4012.41 feet to a point having a Latitude of 48° 5.643' North and a Longitude of 122° 38.059' West; thence North 11° 36' 45" West 3268.91 feet to a point having a Latitude of 48° 6.167' North and a Longitude of 122° 38.239' West; thence North 10° 47' 03" West 384.80 feet to a point having a Latitude of 48° 6.229' North and a Longitude of 122° 38.259' West; thence North 15° 00' 37" West 2154.51 feet to a point having a Latitude of 48° 6.569' North and a Longitude of 122° 38.408' West; thence North 24° 41' 00" West 4276.77 feet to a point having a Latitude of 48° 7.201' North and a Longitude of 122° 38.869' West; thence North 26° 11' 21" West 3407.84 feet to a point having a Latitude of 48° 7.698' North and a Longitude of 122° 39.256' West; thence North 25° 59' 01" West 3305.08 feet to a point having a Latitude of 48° 8.181' North and a Longitude of 122° 39.629' West; thence North 58° 57' 09" West 234.61 feet to a point having a Latitude of 48° 8.200' North and a Longitude of 122° 39.679' West; thence North 40° 06' 12" West 2708.91 feet to a point having a Latitude of 48° 8.534' North and a Longitude of 122° 40.120' West; thence North 52° 20' 34" West 3740.15 feet to a point having a Latitude of 48° 8.898' North and a Longitude of 122° 40.861' West; thence North 51° 08' 33" West 4117.08 feet to a point having a Latitude of 48° 9.310' North and a Longitude of 122° 41.664' West; thence North 43° 29' 06" West 2513.94 feet to a point having a Latitude of 48° 9.603' North and a Longitude of 122° 42.100' West; thence North 41° 42' 19" West 3321.82 feet to a point having a Latitude of 48° 10.002' North and a Longitude of 122° 42.658' West; thence North 43° 09' 41" West 2005.68 feet to a point having a Latitude of 48° 10.237' North and a Longitude of 122° 43.004' West; thence North 46° 45' 35" West 4720.75 feet to a point having a Latitude of 48° 10.755' North and a Longitude of 122° 43.869' West; thence North 46° 38' 56" West 3366.52 feet to a point having a Latitude of 48° 11.125' North and a Longitude of 122° 44.485' West; thence North 46° 37' 52" West 3328.99 feet to a point having a Latitude of 48° 11.491' North and a Longitude of 122° 45.094' West; thence North 47° 21' 50" West 3360.20 feet to a point having a Latitude of 48° 11.855' North and a Longitude of 122° 45.716' West; thence North 50° 22' 48" West 1975.88 feet to a point having a Latitude of 48° 12.056' North and a Longitude of 122° 46.098' West; thence North 58° 38' 41" West 1354.87 feet to a point having a Latitude of 48° 12.167' North and a Longitude of 122° 46.387' West; thence North 65° 25' 36" West 1904.49 feet to a point having a Latitude of 48° 12.290' North and a Longitude of 122° 46.818' West; thence North 88° 17' 30" West 1207.54 feet to a point having a Latitude of 48° 12.291' North and a Longitude of 122° 47.115' West; thence South 88° 35' 29" West 122.04 feet to a point having

a Latitude of 48° 12.290' North and a Longitude of 122° 47.145' West; thence South 86° 53' 50" West 1071.57 feet to a point having a Latitude of 48° 12.276' North and a Longitude of 122° 47.408' West; thence North 72° 56' 53" West 746.83 feet to a point having a Latitude of 48° 12.309' North and a Longitude of 122° 47.585' West; thence North 64° 45' 10" West 4161.53 feet to a point having a Latitude of 48° 12.585' North and a Longitude of 122° 48.522' West; thence North 51° 35' 50" West 4179.10 feet to a point having a Latitude of 48° 12.998' North and a Longitude of 122° 49.344' West; thence North 50° 07' 28" West 3348.81 feet to a point having a Latitude of 48° 13.340' North and a Longitude of 122° 49.990' West; thence North 50° 21' 35" West 3641.26 feet to a point having a Latitude of 48° 13.710' North and a Longitude of 122° 50.695' West; thence North 50° 42' 38" West 1577.61 feet to a point having a Latitude of 48° 13.869' North and a Longitude of 122° 51.002' West; thence North 52° 31' 08" West 5155.29 feet to a point having a Latitude of 48° 14.367' North and a Longitude of 122° 52.029' West; thence North 55° 05' 37" West 1424.24 feet to a point having a Latitude of 48° 14.496' North and a Longitude of 122° 52.322' West; thence North 59° 45' 07" West 1455.11 feet to a point having a Latitude of 48° 14.611' North and a Longitude of 122° 52.636' West; thence North 62° 04' 13" West 3567.54 feet to a point having a Latitude of 48° 14.872' North and a Longitude of 122° 53.423' West; thence North 64° 28' 13" West 2004.74 feet to a point having a Latitude of 48° 15.006' North and a Longitude of 122° 53.874' West; thence North 73° 51' 14" West 1686.52 feet to a point having a Latitude of 48° 15.076' North and a Longitude of 122° 54.276' West; thence North 84° 50' 29" West 578.34 feet to a point having a Latitude of 48° 15.082' North and a Longitude of 122° 54.418' West; thence North 84° 47' 20" West 2477.24 feet to a point having a Latitude of 48° 15.108' North and a Longitude of 122° 55.027' West; thence North 88° 01' 08" West 3268.95 feet to a point having a Latitude of 48° 15.112' North and a Longitude of 122° 55.832' West; thence South 89° 42' 22" West 195.00 feet to a point having a Latitude of 48° 15.111' North and a Longitude of 122° 55.880' West; thence South 87° 17' 36" West 3176.54 feet to a point having a Latitude of 48° 15.072' North and a Longitude of 122° 56.660' West; thence South 86° 04' 39" West 3552.32 feet to a point having a Latitude of 48° 15.016' North and a Longitude of 122° 57.531' West; thence South 87° 11' 22" West 5628.77 feet to a point having a Latitude of 48° 14.945' North and a Longitude of 122° 58.913' West; thence North 81° 46' 45" West 4377.99 feet to a point having a Latitude of 48° 15.028' North and a Longitude of 122° 59.984' West; thence North 55° 50' 25" West 67.68 feet to a point having a Latitude of 48° 15.034' North and a Longitude of 122° 59.998' West; thence North 77° 55' 12" West 3282.69 feet to a point having a Latitude of 48° 15.132' North and a Longitude of 123° 00.793' West; thence North 83° 29' 23" West 855.52 feet to a point having a Latitude of 48° 15.144' North and a Longitude of 123° 01.003' West; thence North 85° 27' 28" West 2512.89 feet to a point having a Latitude of 48° 15.165' North and a Longitude of 123° 01.621' West; thence South 89° 28' 30" West 2401.10 feet to a point having a Latitude of 48° 15.150' North and a Longitude of 123° 02.212' West; thence South 79° 21' 06" West 4313.27 feet to a point having a Latitude of 48° 14.999' North and a Longitude of 123° 03.250' West; thence South 77° 20' 04" West 3365.90 feet to a point having a Latitude of 48° 14.862' North and a Longitude of 123° 04.053' West; thence South 77° 34' 13" West 3642.38 feet to a point having a Latitude of 48° 14.716' North and a Longitude of 123° 04.923' West; thence South 77° 29' 15" West 3447.89 feet to a point having a Latitude of 48° 14.577' North and a Longitude of 123° 05.746' West; thence South 77° 26' 45" West 3188.23 feet to a point having a Latitude of 48° 14.448' North and a Longitude of 123° 06.507' West; thence South 77° 19' 05" West 2473.34 feet to a point having a Latitude of 48° 14.347' North and a Longitude of 123° 07.097' West; thence South 74° 36' 24" West 1054.84 feet to a point having a Latitude of 48° 14.296' North and a Longitude of 123° 07.345' West; thence South 72° 08' 12" West 2757.96 feet to a point having a Latitude of 48° 14.144' North and a Longitude of 123° 07.985' West; thence South 71° 15' 26" West 2766.72 feet to a point having a Latitude of 48° 13.985' North and a Longitude of 123° 08.623' West; thence South 70° 51' 28" West 512.33 feet to a point having a Latitude of 48° 13.955' North and a Longitude of 123° 08.741' West; thence South 70° 59' 16" West 2762.71 feet to a point having a Latitude of 48° 13.794' North and a Longitude of 123° 09.377' West; thence South 71° 29' 55" West 545.18 feet to a point having a Latitude of 48° 13.763' North and a Longitude of 123° 09.503' West; thence South 71° 11' 48" West 2755.03 feet to a point having a Latitude of 48° 13.604' North and a Longitude of 123° 10.138' West; thence South 70° 39' 55" West 543.66 feet to a point having a Latitude of 48° 13.572' North and a Longitude of 123° 10.263' West; thence South 71° 14' 05" West 2741.74 feet to a point having a Latitude of 48° 13.414' North and a Longitude of 123° 10.895' West; thence South 72° 01' 13" West 557.21 feet to a point having a Latitude of 48° 13.383' North and a Longitude of 123° 11.024' West; thence South 70° 53' 52" West 3312.39 feet to a point having a Latitude of 48° 13.189' North and a Longitude of 123° 11.786' West; thence South 71° 20' 19"

West 2718.95 feet to a point having a Latitude of 48° 13.033' North and a Longitude of 123° 12.413' West; thence South 70° 36' 31" West 587.32 feet to a point having a Latitude of 48° 12.998' North and a Longitude of 123° 12.548' West; thence South 71° 07' 12" West 3053.27 feet to a point having a Latitude of 48° 12.821' North and a Longitude of 123° 13.251' West; thence South 71° 05' 50" West 3562.11 feet to a point having a Latitude of 48° 12.614' North and a Longitude of 123° 14.071' West; thence South 71° 09' 17" West 3312.57 feet to a point having a Latitude of 48° 12.422' North and a Longitude of 123° 14.834' West; thence South 82° 04' 23" West 717.86 feet to a point having a Latitude of 48° 12.402' North and a Longitude of 123° 15.008' West; thence South 81° 08' 55" West 1943.14 feet to a point having a Latitude of 48° 12.343' North and a Longitude of 123° 15.478' West; thence South 86° 07' 43" West 666.52 feet to a point having a Latitude of 48° 12.332' North and a Longitude of 123° 15.641' West; thence South 85° 17' 11" West 2944.96 feet to a point having a Latitude of 48° 12.277' North and a Longitude of 123° 16.361' West; thence South 85° 24' 37" West 437.40 feet to a point having a Latitude of 48° 12.269' North and a Longitude of 123° 16.468' West; thence South 81° 05' 15" West 1336.13 feet to a point having a Latitude of 48° 12.228' North and a Longitude of 123° 16.791' West; thence South 73° 45' 23" West 1530.08 feet to a point having a Latitude of 48° 12.150' North and a Longitude of 123° 17.149' West; thence North 70° 39' 55" West 60.41 feet to a point having a Latitude of 48° 12.153' North and a Longitude of 123° 17.163' West; thence South 64° 36' 40" West 1023.89 feet to a point having a Latitude of 48° 12.076' North and a Longitude of 123° 17.387' West; thence South 58° 15' 42" West 2638.58 feet to a point having a Latitude of 48° 11.836' North and a Longitude of 123° 17.928' West; thence South 47° 41' 02" West 724.87 feet to a point having a Latitude of 48° 11.753' North and a Longitude of 123° 18.056' West; thence South 46° 23' 54" West 1825.59 feet to a point having a Latitude of 48° 11.539' North and a Longitude of 123° 18.371' West; thence South 42° 37' 21" West 1380.75 feet to a point having a Latitude of 48° 11.367' North and a Longitude of 123° 18.593' West; thence South 41° 59' 57" West 1431.73 feet to a point having a Latitude of 48° 11.187' North and a Longitude of 123° 18.820' West; thence South 58° 17' 06" West 209.25 feet to a point having a Latitude of 48° 11.168' North and a Longitude of 123° 18.863' West; thence South 60° 03' 38" West 3578.55 feet to a point having a Latitude of 48° 10.858' North and a Longitude of 123° 19.611' West; thence South 71° 37' 39" West 3480.40 feet to a point having a Latitude of 48° 10.660' North and a Longitude of 123° 20.414' West; thence South 74° 25' 26" West 3303.32 feet to a point having a Latitude of 48° 10.497' North and a Longitude of 123° 21.189' West; thence South 81° 47' 15" West 3052.30 feet to a point having a Latitude of 48° 10.409' North and a Longitude of 123° 21.928' West; thence South 83° 43' 01" West 776.67 feet to a point having a Latitude of 48° 10.391' North and a Longitude of 123° 22.117' West; thence South 85° 27' 46" West 1681.27 feet to a point having a Latitude of 48° 10.360' North and a Longitude of 123° 22.528' West; thence South 89° 45' 13" West 1628.02 feet to a point having a Latitude of 48° 10.350' North and a Longitude of 123° 22.928' West; thence North 88° 13' 49" West 2493.19 feet to a point having a Latitude of 48° 10.349' North and a Longitude of 123° 23.541' West; thence North 87° 27' 06" West 1102.09 feet to a point having a Latitude of 48° 10.351' North and a Longitude of 123° 23.812' West; thence North 88° 05' 33" West 2163.20 feet to a point having a Latitude of 48° 10.351' North and a Longitude of 123° 24.344' West; thence North 88° 30' 47" West 809.27 feet to a point having a Latitude of 48° 10.350' North and a Longitude of 123° 24.543' West; thence North 88° 13' 28" West 2485.19 feet to a point having a Latitude of 48° 10.349' North and a Longitude of 123° 25.154' West; thence North 88° 01' 39" West 784.46 feet to a point having a Latitude of 48° 10.349' North and a Longitude of 123° 25.347' West; thence North 87° 56' 03" West 2496.62 feet to a point having a Latitude of 48° 10.350' North and a Longitude of 123° 25.961' West; thence North 88° 33' 44" West 757.24 feet to a point having a Latitude of 48° 10.349' North and a Longitude of 123° 26.147' West; thence North 74° 55' 25" West 534.39 feet to a point having a Latitude of 48° 10.369' North and a Longitude of 123° 26.275' West; thence North 75° 17' 46" West 2726.29 feet to a point having a Latitude of 48° 10.468' North and a Longitude of 123° 26.929' West; thence North 73° 05' 44" West 2593.04 feet to a point having a Latitude of 48° 10.578' North and a Longitude of 123° 27.545' West; thence North 72° 32' 45" West 683.47 feet to a point having a Latitude of 48° 10.608' North and a Longitude of 123° 27.707' West; thence North 66° 48' 51" West 1191.21 feet to a point having a Latitude of 48° 10.679' North and a Longitude of 123° 27.980' West; thence North 63° 10' 54" West 1416.34 feet to a point having a Latitude of 48° 10.777' North and a Longitude of 123° 28.296' West; thence North 57° 46' 34" West 639.50 feet to a point having a Latitude of 48° 10.830' North and a Longitude of 123° 28.432' West; thence North 49° 08' 31" West 920.23 feet to a point having a Latitude of 48° 10.925' North and a Longitude of 123° 28.608' West; thence North 47° 47' 21" West 1656.59 feet to a point having a Latitude of 48° 11.101' North and a Longitude of 123°

28.919' West; thence North 30° 15' 23" West 13.89 feet to a point having a Latitude of 48° 11.103' North and a Longitude of 123° 28.921' West; thence North 35° 05' 34" West 419.20 feet to a point having a Latitude of 48° 11.158' North and a Longitude of 123° 28.983' West; thence North 26° 01' 39" West 572.01 feet to a point having a Latitude of 48° 11.241' North and a Longitude of 123° 29.049' West; thence North 25° 55' 22" West 997.35 feet to a point having a Latitude of 48° 11.386' North and a Longitude of 123° 29.164' West; thence North 42° 28' 09" West 256.22 feet to a point having a Latitude of 48° 11.416' North and a Longitude of 123° 29.208' West; thence North 42° 45' 44" West 1720.29 feet to a point having a Latitude of 48° 11.617' North and a Longitude of 123° 29.506' West; thence North 55° 46' 48" West 899.76 feet to a point having a Latitude of 48° 11.696' North and a Longitude of 123° 29.693' West; thence North 55° 55' 55" West 1808.36 feet to a point having a Latitude of 48° 11.854' North and a Longitude of 123° 30.070' West; thence North 58° 05' 40" West 365.17 feet to a point having a Latitude of 48° 11.884' North and a Longitude of 123° 30.148' West; thence South 76° 18' 15" West 244.97 feet to a point having a Latitude of 48° 11.873' North and a Longitude of 123° 30.206' West; thence North 71° 59' 19" West 2267.19 feet to a point having a Latitude of 48° 11.976' North and a Longitude of 123° 30.742' West; thence North 81° 44' 01" West 7191.72 feet to a point having a Latitude of 48° 12.105' North and a Longitude of 123° 32.501' West; thence South 89° 18' 05" West 3198.24 feet to a point having a Latitude of 48° 12.080' North and a Longitude of 123° 33.287' West; thence South 86° 38' 36" West 1041.79 feet to a point having a Latitude of 48° 12.064' North and a Longitude of 123° 33.542' West; thence South 87° 15' 55" West 3290.75 feet to a point having a Latitude of 48° 12.019' North and a Longitude of 123° 34.349' West; thence South 87° 53' 52" West 2262.52 feet to a point having a Latitude of 48° 11.992' North and a Longitude of 123° 34.904' West; thence South 87° 07' 55" West 999.25 feet to a point having a Latitude of 48° 11.978' North and a Longitude of 123° 35.149' West; thence South 86° 31' 02" West 1069.98 feet to a point having a Latitude of 48° 11.961' North and a Longitude of 123° 35.411' West; thence South 88° 19' 03" West 749.32 feet to a point having a Latitude of 48° 11.953' North and a Longitude of 123° 35.595' West; thence South 81° 58' 11" West 243.39 feet to a point having a Latitude of 48° 11.946' North and a Longitude of 123° 35.654' West; thence North 83° 09' 54" West 294.09 feet to a point having a Latitude of 48° 11.950' North and a Longitude of 123° 35.726' West; thence North 61° 42' 35" West 742.71 feet to a point having a Latitude of 48° 12.064' North and a Longitude of 123° 35.890' West; thence North 61° 43' 18" West 2079.13 feet to a point having a Latitude of 48° 12.155' North and a Longitude of 123° 36.349' West; thence North 61° 09' 07" West 269.44 feet to a point having a Latitude of 48° 12.175' North and a Longitude of 123° 36.408' West; thence North 61° 10' 28" West 850.37 feet to a point having a Latitude of 48° 12.238' North and a Longitude of 123° 36.595' West; thence North 63° 26' 06" West 89.44 feet to a point having a Latitude of 48° 12.244' North and a Longitude of 123° 36.615' West; thence North 61° 02' 05" West 2552.25 feet to a point having a Latitude of 48° 12.434' North and a Longitude of 123° 37.175' West; thence South 78° 10' 43" West 175.73 feet to a point having a Latitude of 48° 12.427' North and a Longitude of 123° 37.217' West; thence North 71° 29' 41" West 3097.14 feet to a point having a Latitude of 48° 12.571' North and a Longitude of 123° 37.948' West; thence North 73° 56' 40" West 929.25 feet to a point having a Latitude of 48° 12.608' North and a Longitude of 123° 38.170' West; thence North 73° 46' 32" West 3214.00 feet to a point having a Latitude of 48° 12.737' North and a Longitude of 123° 38.937' West; thence North 74° 45' 29" West 2270.88 feet to a point having a Latitude of 48° 12.822' North and a Longitude of 123° 39.481' West; thence North 77° 50' 50" West 3519.88 feet to a point having a Latitude of 48° 12.923' North and a Longitude of 123° 40.334' West; thence South 85° 41' 02" West 53.15 feet to a point having a Latitude of 48° 12.922' North and a Longitude of 123° 40.347' West; thence North 77° 36' 07" West 475.08 feet to a point having a Latitude of 48° 12.936' North and a Longitude of 123° 40.462' West; thence North 78° 52' 04" West 2719.16 feet to a point having a Latitude of 48° 13.006' North and a Longitude of 123° 41.123' West; thence North 75° 54' 33" West 763.99 feet to a point having a Latitude of 48° 13.032' North and a Longitude of 123° 41.307' West; thence North 79° 19' 55" West 2538.88 feet to a point having a Latitude of 48° 13.094' North and a Longitude of 123° 41.925' West; thence North 78° 44' 04" West 3296.52 feet to a point having a Latitude of 48° 13.180' North and a Longitude of 123° 42.726' West; thence North 79° 03' 13" West 710.94 feet to a point having a Latitude of 48° 13.198' North and a Longitude of 123° 42.899' West; thence North 78° 30' 14" West 3261.43 feet to a point having a Latitude of 48° 13.285' North and a Longitude of 123° 43.691' West; thence North 78° 45' 07" West 3270.83 feet to a point having a Latitude of 48° 13.370' North and a Longitude of 123° 44.486' West; thence North 78° 33' 23" West 3281.23 feet to a point having a Latitude of 48° 13.457' North and a Longitude of 123° 45.283' West; thence North 78° 34' 32" West 2650.51 feet to a point having a Latitude of 48°

13.527' North and a Longitude of 123° 45.927' West; thence North 78° 42' 30" West 612.86 feet to a point having a Latitude of 48° 13.543' North and a Longitude of 123° 46.076' West; thence North 78° 39' 38" West 2675.22 feet to a point having a Latitude of 48° 13.613' North and a Longitude of 123° 46.726' West; thence North 78° 56' 49" West 3280.86 feet to a point having a Latitude of 48° 13.696' North and a Longitude of 123° 47.524' West; thence North 77° 50' 53" West 560.56 feet to a point having a Latitude of 48° 13.712' North and a Longitude of 123° 47.660' West; thence North 78° 41' 24" West 2727.98 feet to a point having a Latitude of 48° 13.783' North and a Longitude of 123° 48.323' West; thence North 78° 37' 55" West 3287.50 feet to a point having a Latitude of 48° 13.869' North and a Longitude of 123° 49.122' West; thence North 78° 42' 44" West 505.78 feet to a point having a Latitude of 48° 13.882' North and a Longitude of 123° 49.245' West; thence North 77° 58' 41" West 2856.65 feet to a point having a Latitude of 48° 13.962' North and a Longitude of 123° 49.938' West; thence North 75° 33' 37" West 3685.42 feet to a point having a Latitude of 48° 14.090' North and a Longitude of 123° 50.825' West; thence North 74° 57' 00" West 3208.04 feet to a point having a Latitude of 48° 14.207' North and a Longitude of 123° 51.595' West; thence North 75° 17' 13" West 3244.38 feet to a point having a Latitude of 48° 14.322' North and a Longitude of 123° 52.375' West; thence North 75° 02' 58" West 3267.61 feet to a point having a Latitude of 48° 14.440' North and a Longitude of 123° 53.160' West; thence North 74° 49' 31" West 2941.57 feet to a point having a Latitude of 48° 14.548' North and a Longitude of 123° 53.866' West; thence North 75° 06' 16" West 3283.33 feet to a point having a Latitude of 48° 14.666' North and a Longitude of 123° 54.655' West; thence North 75° 22' 59" West 598.37 feet to a point having a Latitude of 48° 14.687' North and a Longitude of 123° 54.799' West; thence North 75° 10' 07" West 2691.68 feet to a point having a Latitude of 48° 14.783' North and a Longitude of 123° 55.446' West; thence North 73° 34' 40" West 297.12 feet to a point having a Latitude of 48° 14.795' North and a Longitude of 123° 55.517' West; thence North 75° 03' 02" West 3058.52 feet to a point having a Latitude of 48° 14.905' North and a Longitude of 123° 56.252' West; thence North 75° 21' 25" West 3275.38 feet to a point having a Latitude of 48° 15.020' North and a Longitude of 123° 57.040' West; thence North 75° 01' 23" West 162.52 feet to a point having a Latitude of 48° 15.026' North and a Longitude of 123° 57.079' West; thence North 74° 58' 58" West 3654.82 feet to a point having a Latitude of 48° 15.158' North and a Longitude of 123° 57.957' West; thence North 75° 12' 49" West 3612.64 feet to a point having a Latitude of 48° 15.286' North and a Longitude of 123° 58.826' West; thence North 75° 04' 07" West 3291.13 feet to a point having a Latitude of 48° 15.404' North and a Longitude of 123° 59.617' West; thence North 75° 04' 31" West 3269.29 feet to a point having a Latitude of 48° 15.521' North and a Longitude of 124° 0.403' West; thence North 74° 51' 38" West 3300.55 feet to a point having a Latitude of 48° 15.641' North and a Longitude of 124° 1.196' West; thence North 75° 14' 54" West 3263.57 feet to a point having a Latitude of 48° 15.756' North and a Longitude of 124° 1.981' West; thence North 75° 26' 06" West 3284.56 feet to a point having a Latitude of 48° 15.870' North and a Longitude of 124° 2.772' West; thence North 74° 38' 24" West 3307.13 feet to a point having a Latitude of 48° 15.992' North and a Longitude of 124° 3.566' West; thence North 75° 51' 06" West 2479.20 feet to a point having a Latitude of 48° 16.075' North and a Longitude of 124° 4.164' West; thence North 78° 01' 59" West 4104.20 feet to a point having a Latitude of 48° 16.187' North and a Longitude of 124° 5.161' West; thence North 78° 27' 55" West 3300.66 feet to a point having a Latitude of 48° 16.273' North and a Longitude of 124° 5.964' West; thence North 78° 26' 43" West 6565.05 feet to a point having a Latitude of 48° 16.444' North and a Longitude of 124° 7.561' West; thence North 76° 17' 33" West 3211.47 feet to a point having a Latitude of 48° 16.547' North and a Longitude of 124° 8.337' West; thence North 65° 45' 58" West 3342.56 feet to a point having a Latitude of 48° 16.751' North and a Longitude of 124° 9.102' West; thence North 63° 38' 04" West 3213.25 feet to a point having a Latitude of 48° 16.965' North and a Longitude of 124° 9.826' West; thence North 63° 37' 07" West 3346.52 feet to a point having a Latitude of 48° 17.188' North and a Longitude of 124° 10.580' West; thence North 63° 35' 27" West 3284.80 feet to a point having a Latitude of 48° 17.407' North and a Longitude of 124° 11.320' West; thence North 63° 29' 23" West 3273.16 feet to a point having a Latitude of 48° 17.626' North and a Longitude of 124° 12.057' West; thence North 63° 32' 11" West 3280.76 feet to a point having a Latitude of 48° 17.845' North and a Longitude of 124° 12.796' West; thence North 62° 30' 59" West 1785.51 feet to a point having a Latitude of 48° 17.969' North and a Longitude of 124° 13.195' West; thence North 60° 09' 54" West 1497.47 feet to a point having a Latitude of 48° 18.082' North and a Longitude of 124° 13.523' West; thence North 58° 06' 04" West 3309.85 feet to a point having a Latitude of 48° 18.349' North and a Longitude of 124° 14.234' West; thence North 57° 54' 32" West 3538.70 feet to a point having a Latitude of 48° 18.636' North and a Longitude of 124° 14.993' West; thence North 58° 07' 48" West 2916.70 feet

to a point having a Latitude of 48° 18.871' North and a Longitude of 124° 15.620' West; thence North 57° 59' 14" West 3288.01 feet to a point having a Latitude of 48° 19.137' North and a Longitude of 124° 16.326' West; thence North 60° 38' 05" West 1254.14 feet to a point having a Latitude of 48° 19.230' North and a Longitude of 124° 16.602' West; thence North 61° 22' 50" West 2008.39 feet to a point having a Latitude of 48° 19.375' North and a Longitude of 124° 17.047' West; thence North 63° 34' 33" West 3276.30 feet to a point having a Latitude of 48° 19.593' North and a Longitude of 124° 17.786' West; thence North 63° 20' 57" West 3281.66 feet to a point having a Latitude of 48° 19.813' North and a Longitude of 124° 18.525' West; thence North 63° 33' 08" West 3275.85 feet to a point having a Latitude of 48° 20.031' North and a Longitude of 124° 19.264' West; thence North 63° 34' 30" West 3296.42 feet to a point having a Latitude of 48° 20.250' North and a Longitude of 124° 20.008' West; thence North 63° 14' 20" West 3269.13 feet to a point having a Latitude of 48° 20.470' North and a Longitude of 124° 20.744' West; thence North 63° 34' 14" West 3292.39 feet to a point having a Latitude of 48° 20.690' North and a Longitude of 124° 21.486' West; thence North 63° 26' 34" West 3267.79 feet to a point having a Latitude of 48° 20.908' North and a Longitude of 124° 22.223' West; thence North 63° 24' 39" West 3174.77 feet to a point having a Latitude of 48° 21.120' North and a Longitude of 124° 22.939' West; thence North 63° 29' 45" West 2946.69 feet to a point having a Latitude of 48° 21.316' North and a Longitude of 124° 23.604' West; thence North 63° 31' 45" West 3809.37 feet to a point having a Latitude of 48° 21.569' North and a Longitude of 124° 24.464' West; thence North 63° 13' 53" West 3274.97 feet to a point having a Latitude of 48° 21.789' North and a Longitude of 124° 25.202' West; thence South 71° 46' 58" West 83.17 feet to a point having a Latitude of 48° 21.784' North and a Longitude of 124° 25.221' West; thence North 67° 04' 11" West 3195.51 feet to a point having a Latitude of 48° 21.966' North and a Longitude of 124° 25.961' West; thence North 68° 12' 44" West 3103.71 feet to a point having a Latitude of 48° 22.133' North and a Longitude of 124° 26.685' West; thence North 67° 47' 41" West 3476.86 feet to a point having a Latitude of 48° 22.324' North and a Longitude of 124° 27.494' West; thence North 68° 07' 47" West 3092.57 feet to a point having a Latitude of 48° 22.491' North and a Longitude of 124° 28.215' West; thence North 68° 08' 46" West 3446.69 feet to a point having a Latitude of 48° 22.677' North and a Longitude of 124° 29.019' West; thence North 66° 02' 43" West 756.13 feet to a point having a Latitude of 48° 22.722' North and a Longitude of 124° 29.193' West; thence North 65° 22' 17" West 2541.18 feet to a point having a Latitude of 48° 22.878' North and a Longitude of 124° 29.775' West; thence North 64° 53' 01" West 6740.32 feet to a point having a Latitude of 48° 23.300' North and a Longitude of 124° 31.314' West; thence North 62° 52' 12" West 1133.74 feet to a point having a Latitude of 48° 23.377' North and a Longitude of 124° 31.569' West; thence North 58° 45' 51" West 1949.62 feet to a point having a Latitude of 48° 23.530' North and a Longitude of 124° 31.992' West; thence North 57° 10' 34" West 3265.34 feet to a point having a Latitude of 48° 23.799' North and a Longitude of 124° 32.690' West; thence North 57° 36' 06" West 2952.59 feet to a point having a Latitude of 48° 24.039' North and a Longitude of 124° 33.324' West; thence North 57° 42' 20" West 3256.78 feet to a point having a Latitude of 48° 24.303' North and a Longitude of 124° 34.024' West; thence North 43° 18' 55" West 96.21 feet to a point having a Latitude of 48° 24.314' North and a Longitude of 124° 34.041' West; thence North 64° 17' 49" West 2764.54 feet to a point having a Latitude of 48° 24.491' North and a Longitude of 124° 34.670' West; thence North 83° 31' 01" West 88.57 feet to a point having a Latitude of 48° 24.492' North and a Longitude of 124° 34.692' West; thence North 57° 48' 15" West 223.34 feet to a point having a Latitude of 48° 24.510' North and a Longitude of 124° 34.740' West; thence North 66° 34' 31" West 432.66 feet to a point having a Latitude of 48° 24.535' North and a Longitude of 124° 34.840' West; thence North 64° 30' 01" West 3054.55 feet to a point having a Latitude of 48° 24.729' North and a Longitude of 124° 35.536' West; thence North 64° 24' 11" West 3460.98 feet to a point having a Latitude of 48° 24.950' North and a Longitude of 124° 36.324' West; thence North 64° 16' 35" West 3075.82 feet to a point having a Latitude of 48° 25.147' North and a Longitude of 124° 37.024' West; thence North 64° 39' 53" West 3271.67 feet to a point having a Latitude of 48° 25.353' North and a Longitude of 124° 37.771' West; thence North 64° 20' 19" West 1928.18 feet to a point having a Latitude of 48° 25.476' North and a Longitude of 124° 38.210' West; thence North 64° 19' 10" West 1361.48 feet to a point having a Latitude of 48° 25.563' North and a Longitude of 124° 38.520' West; thence North 64° 33' 22" West 3291.23 feet to a point having a Latitude of 48° 25.771' North and a Longitude of 124° 39.271' West; thence North 64° 56' 30" West 3265.34 feet to a point having a Latitude of 48° 25.974' North and a Longitude of 124° 40.018' West; thence North 63° 58' 09" West 3212.92 feet to a point having a Latitude of 48° 26.182' North and a Longitude of 124° 40.748' West; thence North 66° 20' 46" West 2280.60 feet to a point having a Latitude of 48° 26.315' North and a Longitude of 124° 41.275' West; thence

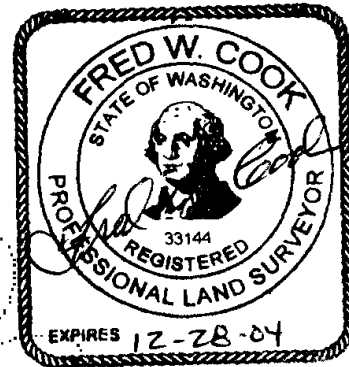
North 69° 05' 43" West 961.28 feet to a point having a Latitude of 48° 26.364' North and a Longitude of 124° 41.501' West; thence North 74° 36' 37" West 3285.82 feet to a point having a Latitude of 48° 26.481' North and a Longitude of 124° 42.294' West; thence North 81° 47' 14" West 1568.08 feet to a point having a Latitude of 48° 26.505' North and a Longitude of 124° 42.680' West; thence North 82° 05' 47" West 2290.76 feet to a point having a Latitude of 48° 26.538' North and a Longitude of 124° 43.244' West; thence North 83° 45' 24" West 2289.58 feet to a point having a Latitude of 48° 26.560' North and a Longitude of 124° 43.809' West; thence North 82° 58' 28" West 3139.37 feet to a point having a Latitude of 48° 26.597' North and a Longitude of 124° 44.583' West; thence North 82° 50' 57" West 3293.62 feet to a point having a Latitude of 48° 26.637' North and a Longitude of 124° 45.395' West; thence North 83° 05' 55" West 3337.18 feet to a point having a Latitude of 48° 26.675' North and a Longitude of 124° 46.218' West; thence North 83° 11' 02" West 3774.68 feet to a point having a Latitude of 48° 26.717' North and a Longitude of 124° 47.149' West; thence North 82° 58' 25" West 1659.46 feet more or less to a point having a Latitude of 48° 26.736' North and a Longitude of 124° 47.558' West, said point being on the State of Washington Offshore Boundary and the POINT OF TERMINATION.

LENGTHENING OR SHORTENING the side lines of said strip to terminate at said Extreme Low Tide Line and at said State of Washington Offshore Boundary, and EXCEPTING THEREFROM any portion of said strip lying landward of said Extreme Low Tide Line or seaward of said State of Washington Offshore Boundary such that said strip contains 367,160 square feet (8.4 acres) more or less.

Geographic coordinates are based on the North American Datum of 1983 (NAD 83); bearings and distances are grid, based on the Washington State Plane Coordinate System, North Zone.

Positional information is based on drawing entitled "Bore Plan and Profile, Sheet 6 of 14, 12/28/99" prepared by David Evans and Associates and "PC-1; Segment N; Route Position List - As Laid, Ajigaura -Harbour Pointe, Issue 8, 01/21/02" provided by Tyco Submarine Systems, Ltd.

END OF DESCRIPTION



MUKILTEO TO CALIFORNIA EASEMENT DESCRIPTION

A 0.5 foot wide strip of submerged lands in the bedlands of Puget Sound, the Strait of Juan de Fuca, and the Pacific Ocean lying between the Extreme Low Tide Line and the State of Washington Offshore Boundary, the centerline of said strip being a submarine fiber optic cable commonly referred to as "Pacific Cable 1 (PC-1) East" and more particularly described as follows:

BEGINNING at a point in Section 20, Township 28 North, Range 4 East, in Snohomish County Washington having a Latitude of 47° 54' 12.8183" North and a Longitude of 122° 19' 23.8162" West, said point being a brass disk in a concrete monument entitled Snohomish County Public Works point 58/1031; thence South 32° 29' 10" West 2416.40 feet to a point on the Extreme Low Tide Line, said point being the beginning of a non-tangent curve concave to the Northeast having a radius of 941.62 feet and radial bearing North 14° 49' 01" East, said point being the POINT OF BEGINNING; thence continuing Northwesterly 285.70 feet more or less along said curve through a central angle of 17° 23' 00"; thence on a non-tangent line North 57° 15' 14" West 707.82 feet to a point having a Latitude of 47° 53.953' North and a Longitude of 122° 19.916' West, said point being the seaward end of a section of steel conduit; thence North 65° 20' 15" West 1625.67 feet to a point having a Latitude of 47° 54.060' North and a Longitude of 122° 20.281' West; thence North 65° 51' 55" West 1181.26 feet to a point having a Latitude of 47° 54.136' North and a Longitude of 122° 20.547' West; thence North 77° 49' 04" West 412.28 feet to a point having a Latitude of 47° 54.149' North and a Longitude of 122° 20.646' West; thence North 81° 11' 02" West 685.09 feet to a point having a Latitude of 47° 54.164' North and a Longitude of 122° 20.812' West; thence South 83° 24' 22" West 548.63 feet to a point having a Latitude of 47° 54.152' North and a Longitude of 122° 20.945' West; thence South 64° 28' 38" West 663.77 feet to a point having a Latitude of 47° 54.103' North and a Longitude of 122° 21.090' West; thence South 47° 45' 44" West 645.63 feet to a point having a Latitude of 47° 54.030' North and a Longitude of 122° 21.205' West; thence South 27° 13' 50" West 1116.77 feet to a point having a Latitude of 47° 53.865' North and a Longitude of 122° 21.325' West; thence South 13° 16' 14" West 871.27 feet to a point having a Latitude of 47° 53.725' North and a Longitude of 122° 21.370' West; thence South 03° 11' 37" East 1615.51 feet to a point having a Latitude of 47° 53.460' North and a Longitude of 122° 21.340' West; thence South 08° 10' 19" West 7576.93 feet to a point having a Latitude of 47° 52.223' North and a Longitude of 122° 21.567' West; thence South 08° 09' 35" West 1366.84 feet to a point having a Latitude of 47° 52.000' North and a Longitude of 122° 21.608' West; thence South 22° 03' 54" West 1008.89 feet to a point having a Latitude of 47° 51.845' North and a Longitude of 122° 21.696' West; thence South 22° 13' 20" West 2149.67 feet to a point having a Latitude of 47° 51.515' North and a Longitude of 122° 21.885' West; thence South 35° 43' 39" West 561.71 feet to a point having a Latitude of 47° 51.439' North and a Longitude of 122° 21.963' West; thence South 35° 30' 13" West 4285.82 feet to a point having a Latitude of 47° 50.857' North and a Longitude of 122° 22.554' West; thence South 50° 52' 51" West 2746.72 feet to a point having a Latitude of 47° 50.565' North and a Longitude of 122° 23.066' West; thence South 53° 59' 07" West 3671.81 feet to a point having a Latitude of 47° 50.200' North and a Longitude of 122° 23.781' West; thence South 67° 41' 36" West 3601.52 feet to a point having a Latitude of 47° 49.964' North and a Longitude of 122° 24.588' West; thence South 67° 58' 04" West 3870.67 feet to a point having a Latitude of 47° 49.713' North and a Longitude of 122° 25.457' West; thence South 78° 36' 48" West 3074.52 feet to a point having

Latitude of 47° 49.603' North and a Longitude of 122° 26.190' West; thence South 86° 54' 21" West 74.11 feet to a point having a Latitude of 47° 49.602' North and a Longitude of 122° 26.208' West; thence North 86° 03' 30" West 1643.89 feet to a point having a Latitude of 47° 49.615' North and a Longitude of 122° 26.609' West; thence North 86° 17' 08" West 1528.21 feet to a point having a Latitude of 47° 49.626' North and a Longitude of 122° 26.982' West; thence North 72° 10' 04" West 871.89 feet to a point having a Latitude of 47° 49.667' North and a Longitude of 122° 27.186' West; thence North 71° 10' 37" West 700.46 feet to a point having a Latitude of 47° 49.702' North and a Longitude of 122° 27.349' West; thence North 62° 17' 50" West 1486.38 feet to a point having a Latitude of 47° 49.811' North and a Longitude of 122° 27.674' West; thence North 62° 10' 17" West 1561.60 feet to a point having a Latitude of 47° 49.926' North and a Longitude of 122° 28.015' West; thence North 48° 47' 44" West 2638.35 feet to a point having a Latitude of 47° 50.205' North and a Longitude of 122° 28.509' West; thence North 32° 39' 34" West 2636.92 feet to a point having a Latitude of 47° 50.565' North and a Longitude of 122° 28.868' West; thence North 17° 27' 55" West 1289.45 feet to a point having a Latitude of 47° 50.766' North and a Longitude of 122° 28.969' West; thence North 02° 43' 45" West 3906.43 feet to a point having a Latitude of 47° 51.407' North and a Longitude of 122° 29.035' West; thence North 06° 47' 21" West 4254.84 feet to a point having a Latitude of 47° 52.100' North and a Longitude of 122° 29.180' West; thence North 20° 12' 09" West 8458.37 feet to a point having a Latitude of 47° 53.395' North and a Longitude of 122° 29.936' West; thence North 20° 30' 08" West 3489.00 feet to a point having a Latitude of 47° 53.928' North and a Longitude of 122° 30.252' West; thence North 22° 58' 44" West 8186.62 feet to a point having a Latitude of 47° 55.156' North and a Longitude of 122° 31.074' West; thence North 22° 16' 12" West 4269.46 feet to a point having a Latitude of 47° 55.800' North and a Longitude of 122° 31.491' West; thence North 29° 15' 17" West 2420.75 feet to a point having a Latitude of 47° 56.143' North and a Longitude of 122° 31.792' West; thence North 42° 38' 07" West 3358.79 feet to a point having a Latitude of 47° 56.541' North and a Longitude of 122° 32.362' West; thence North 39° 14' 40" West 2326.80 feet to a point having a Latitude of 47° 56.832' North and a Longitude of 122° 32.732' West; thence North 37° 22' 58" West 1541.66 feet to a point having a Latitude of 47° 57.030' North and a Longitude of 122° 32.968' West; thence North 51° 55' 41" West 791.37 feet to a point having a Latitude of 47° 57.108' North and a Longitude of 122° 33.123' West; thence North 52° 00' 25" West 3193.81 feet to a point having a Latitude of 47° 57.422' North and a Longitude of 122° 33.750' West; thence North 41° 45' 15" West 5557.58 feet to a point having a Latitude of 47° 58.090' North and a Longitude of 122° 34.679' West; thence North 26° 08' 20" West 13290.21 feet to a point having a Latitude of 48° 0.030' North and a Longitude of 122° 36.180' West; thence North 42° 31' 32" West 1408.46 feet to a point having a Latitude of 48° 0.197' North and a Longitude of 122° 36.419' West; thence North 41° 07' 21" West 1275.71 feet to a point having a Latitude of 48° 0.352' North and a Longitude of 122° 36.630' West; thence North 67° 39' 07" West 1070.40 feet to a point having a Latitude of 48° 0.415' North and a Longitude of 122° 36.875' West; thence North 67° 06' 25" West 1403.53 feet to a point having a Latitude of 48° 0.500' North and a Longitude of 122° 37.195' West; thence North 39° 23' 24" West 882.45 feet to a point having a Latitude of 48° 0.610' North and a Longitude of 122° 37.336' West; thence North 38° 35' 00" West 2695.41 feet to a point having a Latitude of 48° 0.950' North and a Longitude of 122° 37.760' West; thence North 24° 35' 48" West 5780.52 feet to a point having a Latitude of 48° 1.805' North and a Longitude of 122° 38.380' West; thence North 9° 25' 27" West 7395.82 feet to a point having a Latitude of 48° 3.000' North and a Longitude of 122° 38.719' West; thence North 3° 19' 38" West 6099.28 feet to a point having a Latitude of 48° 4.000' North and a Longitude of 122° 38.841' West; thence North 10° 12' 12" West 8744.29 feet to a point having a Latitude of 48° 5.409' North and a Longitude of 122° 39.271' West; thence North 20° 14' 45" West 7565.42 feet to a point having a Latitude of 48° 6.566' North and a Longitude of 122° 39.955' West; thence North 37° 59' 43" West 3177.41 feet to a point having a Latitude of 48° 6.970' North and a Longitude of 122° 40.450' West; thence North 39° 09' 47" West 8392.32 feet to a point having a Latitude of 48° 8.019' North and a Longitude of 122° 41.790' West; thence North 52° 15' 24" West 6113.11 feet to a point having a Latitude of 48° 8.615' North and a Longitude of 122° 43.000' West; thence North 45° 33' 51" West 2298.21 feet to a point having a Latitude of 48° 8.873' North and a Longitude of 122° 43.413' West; thence North 47° 19' 11" West 2009.12 feet to a point having a Latitude of 48° 9.091' North and a Longitude of 122° 43.784' West; thence North 45° 33' 47" West 6764.51 feet to a point having a Latitude of 48° 9.850' North and a Longitude of 122° 45.000' West; thence North 48° 06' 56" West 16028.35 feet to a point having a Latitude of 48° 11.560' North and a Longitude of 122° 48.000' West; thence North 63° 04' 55" West 1669.93 feet to a point having a Latitude of 48° 11.678' North and a Longitude of 122° 48.371' West; thence North 35° 46' 25" West 846.75 feet to a point having a Latitude of 48° 11.789' North and a Longitude of 122°

48.497' West; thence North 38° 14' 32" West 1628.47 feet to a point having a Latitude of 48° 11.995' North and a Longitude of 122° 48.753' West; thence North 39° 04' 13" West 1656.42 feet to a point having a Latitude of 48° 12.202' North and a Longitude of 122° 49.018' West; thence North 35° 39' 12" West 518.12 feet to a point having a Latitude of 48° 12.270' North and a Longitude of 122° 49.095' West; thence North 53° 06' 26" West 4512.60 feet to a point having a Latitude of 48° 12.700' North and a Longitude of 122° 50.000' West; thence North 47° 34' 24" West 3953.18 feet to a point having a Latitude of 48° 13.126' North and a Longitude of 122° 50.735' West; thence North 52° 18' 25" West 3906.78 feet to a point having a Latitude of 48° 13.660' North and a Longitude of 122° 51.270' West; thence North 47° 13' 24" West 3134.84 feet to a point having a Latitude of 48° 14.000' North and a Longitude of 122° 51.850' West; thence North 52° 22' 38" West 3166.47 feet to a point having a Latitude of 48° 14.307' North and a Longitude of 122° 52.480' West; thence North 62° 09' 33" West 7271.71 feet to a point having a Latitude of 48° 14.837' North and a Longitude of 122° 54.085' West; thence North 81° 38' 25" West 3741.76 feet to a point having a Latitude of 48° 14.910' North and a Longitude of 122° 55.000' West; thence North 85° 19' 47" West 663.20 feet to a point having a Latitude of 48° 14.916' North and a Longitude of 122° 55.163' West; thence South 82° 29' 08" West 7554.88 feet to a point having a Latitude of 48° 14.720' North and a Longitude of 122° 57.000' West; thence North 89° 28' 03" West 5596.24 feet to a point having a Latitude of 48° 14.703' North and a Longitude of 122° 58.378' West; thence North 80° 15' 09" West 4890.60 feet to a point having a Latitude of 48° 14.817' North and a Longitude of 122° 59.570' West; thence North 81° 56' 01" West 5843.82 feet to a point having a Latitude of 48° 14.925' North and a Longitude of 123° 1.000' West; thence North 87° 34' 33" West 5295.74 feet to a point having a Latitude of 48° 14.937' North and a Longitude of 123° 2.304' West; thence South 77° 34' 52" West 18037.04 feet to a point having a Latitude of 48° 14.215' North and a Longitude of 123° 6.612' West; thence South 71° 25' 00" West 4032.23 feet to a point having a Latitude of 48° 13.985' North and a Longitude of 123° 7.543' West; thence South 71° 17' 53" West 32359.62 feet to a point having a Latitude of 48° 12.125' North and a Longitude of 123° 15.005' West; thence South 84° 06' 03" West 7160.92 feet to a point having a Latitude of 48° 11.967' North and a Longitude of 123° 16.751' West; thence South 73° 57' 25" West 2417.14 feet to a point having a Latitude of 48° 11.845' North and a Longitude of 123° 17.317' West; thence South 58° 52' 19" West 1855.11 feet to a point having a Latitude of 48° 11.679' North and a Longitude of 123° 17.700' West; thence South 44° 21' 12" West 626.54 feet to a point having a Latitude of 48° 11.603' North and a Longitude of 123° 17.804' West; thence South 44° 01' 36" West 1706.49 feet to a point having a Latitude of 48° 11.395' North and a Longitude of 123° 18.086' West; thence South 44° 08' 55" West 1998.50 feet to a point having a Latitude of 48° 11.152' North and a Longitude of 123° 18.417' West; thence South 43° 37' 36" West 1239.21 feet to a point having a Latitude of 48° 11.000' North and a Longitude of 123° 18.620' West; thence South 58° 49' 16" West 3836.11 feet to a point having a Latitude of 48° 10.656' North and a Longitude of 123° 19.411' West; thence South 73° 19' 22" West 7226.99 feet to a point having a Latitude of 48° 10.278' North and a Longitude of 123° 21.096' West; thence South 83° 11' 25" West 5591.45 feet to a point having a Latitude of 48° 10.139' North and a Longitude of 123° 22.455' West; thence North 88° 05' 12" West 15604.70 feet to a point having a Latitude of 48° 10.139' North and a Longitude of 123° 26.292' West; thence North 73° 13' 34" West 7723.63 feet to a point having a Latitude of 48° 10.464' North and a Longitude of 123° 28.128' West; thence North 57° 57' 27" West 4755.47 feet to a point having a Latitude of 48° 10.856' North and a Longitude of 123° 29.140' West; thence North 42° 00' 56" West 1656.88 feet to a point having a Latitude of 48° 11.052' North and a Longitude of 123° 29.423' West; thence North 47° 10' 29" West 279.51 feet to a point having a Latitude of 48° 11.082' North and a Longitude of 123° 29.475' West; thence North 27° 41' 21" West 1230.97 feet to a point having a Latitude of 48° 11.258' North and a Longitude of 123° 29.625' West; thence North 28° 37' 20" West 1158.58 feet to a point having a Latitude of 48° 11.422' North and a Longitude of 123° 29.770' West; thence North 36° 38' 60" West 521.00 feet to a point having a Latitude of 48° 11.489' North and a Longitude of 123° 29.850' West; thence North 45° 49' 16" West 888.22 feet to a point having a Latitude of 48° 11.587' North and a Longitude of 123° 30.012' West; thence North 60° 06' 14" West 1362.28 feet to a point having a Latitude of 48° 11.692' North and a Longitude of 123° 30.308' West; thence North 72° 10' 45" West 1918.03 feet to a point having a Latitude of 48° 11.778' North and a Longitude of 123° 30.762' West; thence North 87° 51' 01" West 7064.97 feet to a point having a Latitude of 48° 11.781' North and a Longitude of 123° 32.500' West; thence South 88° 34' 53" West 5049.55 feet to a point having a Latitude of 48° 11.731' North and a Longitude of 123° 33.740' West; thence South 86° 25' 03" West 1184.31 feet to a point having a Latitude of 48° 11.712' North and a Longitude of 123° 34.030' West; thence North 87° 57' 10" West 3191.04 feet to a point having a Latitude of 48° 11.712' North and a Longitude of 123° 34.815' West; thence North 74° 03' 48" West 1820.99 feet to a point having

a Latitude of 48° 11.784' North and a Longitude of 123° 35.250' West; thence North 87° 55' 07" West 853.56 feet to a point having a Latitude of 48° 11.784' North and a Longitude of 123° 35.460' West; thence North 87° 56' 28" West 1809.17 feet to a point having a Latitude of 48° 11.784' North and a Longitude of 123° 35.905' West; thence North 77° 39' 39" West 32.76 feet to a point having a Latitude of 48° 11.785' North and a Longitude of 123° 35.913' West; thence North 73° 15' 52" West 2878.94 feet to a point having a Latitude of 48° 11.905' North and a Longitude of 123° 36.598' West; thence North 75° 57' 50" West 32.98 feet to a point having a Latitude of 48° 11.906' North and a Longitude of 123° 36.606' West; thence North 51° 39' 50" West 2157.11 feet to a point having a Latitude of 48° 12.116' North and a Longitude of 123° 37.034' West; thence North 51° 28' 09" West 1248.92 feet to a point having a Latitude of 48° 12.238' North and a Longitude of 123° 37.281' West; thence North 73° 30' 56" West 1124.21 feet to a point having a Latitude of 48° 12.284' North and a Longitude of 123° 37.549' West; thence North 73° 19' 03" West 8520.63 feet to a point having a Latitude of 48° 12.637' North and a Longitude of 123° 39.578' West; thence North 83° 52' 52" West 6004.21 feet to a point having a Latitude of 48° 12.706' North and a Longitude of 123° 41.052' West; thence North 77° 26' 41" West 2111.49 feet to a point having a Latitude of 48° 12.769' North and a Longitude of 123° 41.563' West; thence North 77° 56' 51" West 34792.94 feet to a point having a Latitude of 48° 13.750' North and a Longitude of 123° 50.000' West; thence North 75° 05' 43" West 55740.36 feet to a point having a Latitude of 48° 15.748' North and a Longitude of 124° 3.396' West; thence North 78° 27' 60" West 20711.20 feet to a point having a Latitude of 48° 16.287' North and a Longitude of 124° 8.434' West; thence North 63° 03' 48" West 1792.47 feet to a point having a Latitude of 48° 16.409' North and a Longitude of 124° 8.836' West; thence North 63° 32' 02" West 20187.70 feet to a point having a Latitude of 48° 17.758' North and a Longitude of 124° 13.382' West; thence North 58° 09' 52" West 17784.40 feet to a point having a Latitude of 48° 19.189' North and a Longitude of 124° 17.206' West; thence North 63° 26' 38" West 33940.83 feet to a point having a Latitude of 48° 21.454' North and a Longitude of 124° 24.859' West; thence North 68° 01' 07" West 19401.36 feet to a point having a Latitude of 48° 22.508' North and a Longitude of 124° 29.379' West; thence North 64° 56' 31" West 10100.68 feet to a point having a Latitude of 48° 23.139' North and a Longitude of 124° 31.686' West; thence North 57° 29' 08" West 11408.15 feet to a point having a Latitude of 48° 24.070' North and a Longitude of 124° 34.132' West; thence North 64° 52' 26" West 21299.45 to a point having a Latitude of 48° 25.400' North and a Longitude of 124° 39.000' West; thence North 74° 17' 08" West 18734.21 feet to a point having a Latitude of 48° 26.085' North and a Longitude of 124° 43.514' West; thence South 74° 13' 19" West 1691.74 feet to a point having a Latitude of 48° 25.996' North and a Longitude of 124° 43.910' West; thence North 77° 22' 27" West 12050.40 feet to a point having a Latitude of 48° 26.330' North and a Longitude of 124° 46.846' West; thence North 76° 51' 38" West 3022.12 feet to a point having a Latitude of 48° 26.418' North and a Longitude of 124° 47.581' West; thence North 76° 38' 58" West 3100.80 feet more or less to a point having a Latitude of 48° 26.510' North and a Longitude of 124° 48.335' West, said point being on the State of Washington Offshore Boundary and the POINT OF TERMINATION.

LENGTHENING OR SHORTENING the side lines of said strip to terminate at said Extreme Low Tide Line and at said State of Washington Offshore Boundary, and EXCEPTING THEREFROM any portion of said strip lying landward of said Extreme Low Tide Line or seaward of said State of Washington Offshore Boundary such that said strip contains 367,400 square feet (8.4 acres) more or less.

Geographic coordinates are based on the North American Datum of 1983 (NAD 83); bearings and distances are grid, based on the Washington State Plane Coordinate System, North Zone.

Positional information is based on drawing entitled "Bore Plan and Profile, Sheet 6 of 14, 12/28/99" prepared by David Evans and Associates and "PC-1, Segment E, Route Position List - As Laid, Harbour Pointe, Grover Beach, Issue 2, 10/02/01" provided by Tyco Submarine Systems, Ltd.

END OF DESCRIPTION





February 13, 2012

Mr. Kim Moore
Assistant General Manager for the Generation Department
Mr. Craig Collar
Senior Manager of Energy Resource Development,
Public Utility District No. 1 of Snohomish County
2320 California St.
Everett, WA 98201

Re: *Admiralty Inlet Pilot Tidal Project, FERC Project P-12690*

Dear Messrs. Moore and Collar:

We write in connection with the proposed Admiralty Inlet Pilot Tidal Project, FERC Project No. P-2690 (the "Project"). PC Landing Corp. ("PCLC") has reviewed SnoPUD's response to PCLC dated January 12, 2012. We appreciate the additional information SnoPUD has provided in response to our questions, and wish to advise you that the current proposed location of the two turbines, approximately 100 and 150 meters, respectively, from PC-1 North, remains unacceptable to PCLC. We remain open to working with SnoPUD to find a suitable location for the turbines southwest of PC-1 North, and ask that SnoPUD continue to coordinate with us as key stakeholder in an effort to resolve this issue in advance of filing its final application. To the extent, however, that it declines to do so, we intend to oppose any application that would seek placement of the turbines at the current proposed locations.

By any measure, the placement of an electric generation turbine approximately 100 meters from our PC-1 North cable poses unacceptable risks to the cable and its operation as well as to the safety of vessels performing maintenance activities within the vicinity of the cable. Well-accepted industry standards for the placement of generating facilities near submarine cables developed in connection with current generation fiber optic cables, require placement of the turbines well in excess of the proposed separation from the cables to avoid interactions between our respective operations, damage to our respective facilities, and to ensure the safety of our respective installation and maintenance crews.

SnoPUD's response acknowledges that the proposed placement of the turbines to the east of PC-1 North, is perfectly optimized for the installation and operation of your system based on SnoPUD's needs—but these needs do not take into account the negative impacts on PCLC's PC-1 North cable. SnoPUD also admits that placement of the turbines further to the southwest of PC-1 North is completely feasible from a technical standpoint and in terms of substrate suitability and navigational considerations. In addition, it acknowledges that impacts on the natural environment, including impacts on plant and marine life, would be no different southwest of the PC-1 North than at your preferred location. Moreover, it suggests that placement to the southwest would be more costly to the PUD from an installation and



operational standpoint without quantifying the extent that cost, and that the placement would result in lower electricity output, without providing any analysis on the extent to which this would affect the data from and the utility of, what is, after all, an experimental tidal energy system and not a commercial system.

SnoPUD also complains that placing the turbines to the southwest of PC-1 North would result in a cable crossing. Such cable crossings, however, are completely routine and common in the industry with well-established agreements governing each party's rights. SnoPUD fails to explain any basis for concerns relating to a crossing, which from PCLC's standpoint would be a preferred alternative to the placement of the turbines practically on top of its cable.

Finally, SnoPUD completely dismisses the significant impacts that the current location would have on PC-1 North and its safe operation, while noting the significant resources the District has expended investigating and optimizing the current location since 2009, suggesting it would be inconvenient and economically infeasible to study alternative locations at this stage in the FERC and NEPA processes. SnoPUD's own experts noted the presence of PC-1 North, described as "an in-service" submarine cable, as early as 2009 in the report recently provided to us with its response. However, rather than beginning a dialog with PCLC at that time, SnoPUD waited nearly two years, until you were locked into the current location, before approaching PCLC. This denied us the opportunity to participate in the formal pre-application process and work with the District to identify reasonable alternatives and mitigation measures, and instead resulted in the current situation where SnoPUD essentially claims that it has invested too much time and resources, and it is too late in the process to look at any alternatives to reduce physical and operational impacts on PC-1 North.

Coming from the lead SEPA agency on the project, before the SEPA process has even commenced, as it acknowledges, SnoPUD's prejudgment of this issue and its refusal to entertain reasonable alternatives even within Admiralty Inlet is highly prejudicial and not consistent with the requirements imposed on a lead agency by SEPA. We remain completely available to work with you to find a suitable location for the turbines southwest of PC-1 North, but the current location of the turbines, approximately 100 meters from the cable, is unacceptable to PCLC and we will oppose the application to place the cable on that basis before FERC, and in other appropriate forums.

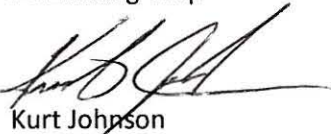
To facilitate our further discussions to find a mutually suitable location for the turbines in advance of your filing the final application, we address in the attachment some of our detailed concerns with your January 12 responses, and the Project, generally, and include a number of follow-up questions the answers to which will further facilitate our continued discussion of this matter.



After you have reviewed our response, we suggest a meeting among the principals and their consultants to address our concerns, and to discuss the identification of a more suitable location for the turbines, southwest of PC-1 North. Again, we remain willing and open to working with the District to address these concerns, but please understand that the proposed placement of the turbines approximately 100 meters from PC-1 North is unacceptable by any measure.

Sincerely,

PC Landing Corp



Kurt Johnson
Chief Financial Officer

Attachments

cc: Jeffrey Kallstrom, Esq.



ATTACHMENT

I. A SEPA Lead Agency Should Not Render Decisions or Prejudge Alternatives Before the SEPA and NEPA Review Is Complete

SnoPUD is lead agency for the Project under the Washington State Environmental Policy Act ("SEPA"), RCW 43.21C.010 *et seq.* Under basic SEPA principles, SnoPUD cannot take action that would limit its choice of alternatives or have significant impacts, prior to complying with the statute's mandate to consider the reasonable alternatives to its proposed action, analyze adverse environmental impacts, and adopt appropriate mitigation measures. *See, e.g.,* WAC 197-11-070. As applicant for the Project, SnoPUD is also subject to NEPA's bar on engaging in activity which has not been through the NEPA process. 40 C.F.R. 1506.1.

However, its answers to PCLC's question reveal that SnoPUD has already prejudged the outcome of this environmental review, short-circuiting the proper process under SEPA and NEPA. It is apparent that SnoPUD has selected a final location for the Project before conducting the necessary studies on potential environmental impacts of alternatives, including potential impacts on existing critical infrastructure such as PC-1 North. In addition, SnoPUD is relying on insufficient information to conduct a meaningful environmental review given the experimental nature of the Project. The decision to locate the Project at its proposed location in Admiralty Inlet has already been made—before a thorough study of all reasonable alternatives—in violation of SEPA and NEPA.

II. A Thorough and Meaningful SEPA and NEPA Alternatives Analysis Is Necessary

SnoPUD is a public agency subject to SEPA and has decided to be the SEPA lead agency with regard to this Project. Information made available to date reveals several significant adverse environmental impacts as a result of the Project. Accordingly, environmental review of the Project will require an environmental impact statement, including a thorough analysis of reasonable alternatives for the Project. *See, e.g.,* RCW 43.21C.031. The alternatives analysis must include a reasonable range of alternatives, and therefore is not limited to locations within Admiralty Inlet. *See, e.g.,* WAC 197-11-786. Within Admiralty Inlet, the alternatives analysis must include locations other than the preferred location, including locations to the southwest of PC-1 North. As discussed above, as lead SEPA agency SnoPUD may not act on the Project in a way that would have an adverse environmental impact or limit alternatives until it has issued a final threshold determination or final EIS pursuant to SEPA.

SnoPUD's response to PCLC's comment regarding the inadequate analysis of alternatives concedes that the proper alternatives analysis has not been conducted. (Response to Nov. 17 Questions, at 18, Response to (viii).) SnoPUD's response further reveals that generation capacity of locations and installation cost is the sole criterion which has effectively determined the proposed location for the Project. SnoPUD has therefore failed to compare the potential



adverse environmental impacts of a reasonable range of alternatives in making its decision. Alternatives analysis must occur before SnoPUD acts on the Project. Here, SnoPUD has reversed the order of this process—and has already decided the precise location for its turbines prior to any environmental review, which includes impacts on utilities and the built environment, economic impacts, and in particular impacts on pre-existing critical telecommunications infrastructure such as PC-1 North.

III. Other Suitable Sites West Of PC-1 North Should Be Considered, and Cannot Be Eliminated Based Solely on SnoPUD's Economic Concerns

SnoPUD has rejected locations west of the PC-1 North cable due to economic factors such as alleged increased cost of operations at a deeper underwater location. However, data to substantiate SnoPUD's economic concerns has not been made available. The bathymetry maps produced by SnoPUD demonstrate that the depths of the proposed locations do not vary substantially, calling into question the extent of the alleged increase in cost.

Even if SnoPUD can substantiate significant increased costs from a deeper location, SnoPUD cannot eliminate reasonable alternatives solely in order to avoid increased costs without considering any other factors. Specifically, SnoPUD has selected a site and rejected reasonable alternatives without regard to the potential adverse impacts its Project will have on an element of the environment under SEPA, e.g., existing utilities and the built environment.

This course of action would impose unknown and undue risks on PCLC's facilities and operations, including unforeseeable risks in connection with the installation and removal of the turbines, and the potential for adverse interactions between PC-1 North maintenance providers and the turbine infrastructure. Potential for these adverse interactions led SnoPUD to recommend a Restricted Navigation Area zone around the turbines (the Coast Guard prefers use of the Puget Sound Vessel Traffic Service), and to recommend that PC-1 North maintenance activities not be conducted in the vicinity of the turbines.

In essence SnoPUD seeks to impose the risk and costs of its preferred location on PCLC. PC-1 North, as a pre-existing use, should not have to bear the risk of SnoPUD's implementation of an experimental technology which may threaten the PC-1 North cable or its operations.

IV. SnoPUD Has Failed to Consider and Follow Applicable Cable Separation Guidelines

SnoPUD's Project location is also contrary to the current industry standard recommendations for separation between undersea cables and structures similar to the Project turbines. As PCLC explained to SnoPUD in its June 16, 2011 letter, the customary industry recommendation is based on distances necessary to safely perform cable maintenance operations, taking into consideration the area needed for grapnel and ROV operations given water depth, and any recommended buffer zone around the turbines (which was included by



SnoPUD as part of its Navigation Safety Plan). Here, based on the industry standard for separation distance contained in the International Cable Protection Committee (ICPC) Recommendation No. 13: Proximity of Wind Farm Developments & Submarine Cables, which includes the industry standard cable repair formula, given the 59m water depth of the proposed location, PCLC suggested that the turbines should be separated from the cables by approximately 1500 meters.

Whether SnoPUD wants to quibble with our proposed 1500 meter distance, its proposed separation distance of approximately 100 meters from one of the turbines (and 150 meters from the second) is patently absurd, and as SnoPUD noted in its initial draft environmental assessment, would simply preclude safe maintenance activities in the vicinity of the cable. While it is no longer recommending a regulated navigation area in the areas of the turbines that would preclude PC-1 maintenance activities as a regulatory matter, the fact is that performing maintenance within 100 meters of the turbines would be unsafe under any assumptions, and contrary to any interpretation of industry recommendations on separation distance between submarine cables and structures such as the Project turbines.

As a passing note, contrary to SnoPUD's assertion, these recommendations are not guidelines from the late 19th Century based on cable and vessel technology from that era as SnoPUD contends. Instead these are the 2010 in-force guidelines of the ICPC developed in connection with current generation cables and relating to the placement of structures in proximity to submarine cables based on marine engineering principles and taking into account water depth and other factors.

SnoPUD misapprehends the purpose of these separation standards, which are designed to circumvent issues under normal operations as well as in the case of unforeseen circumstances. In addition to protecting pre-existing cable uses, the recommendations take into account vessel safety considerations; snags on submarine cables can cause risks to vessel stability if not properly managed in advance through adequate separation of submarine uses. A reasonable worst-case scenario analysis should be performed to assess the real risks to PC-1 North and the crews of vessels that may have to perform non-routine maintenance on PCLC's facilities.

V. **SnoPUD Knew PC-1 North Was Active In 2009, But Failed to Notify PCLC Until May, 2011**

SnoPUD failed to timely notify PCLC of its Project in violation of FERC regulations. By September 2009 (at the latest) SnoPUD was aware that the PC-1 North cable was present at its current location, and operational in Admiralty Inlet. The September 2009 Fugro report for SnoPUD plainly depicts the as-laid path of PC-1 North and accurately describes it as "in-

service.”¹ In addition, PC-1 North is the subject of a publicly recorded easement filed with WDNR – thus SnoPUD should have been aware of the cable from its first stages of due diligence investigating Admiralty Inlet. The location alone of PC-1 North plainly put SnoPUD on notice that PC-1 North was a use with a potentially serious incompatibility with the Project.

However, SnoPUD did not notify PCLC of its Project until May 2011, in violation of FERC regulations. FERC regulations required SnoPUD to notify PCLC as an interested party when it filed its Notice of Intent and Draft License Application in December, 2009. 18 CFR Part 5. PCLC was therefore deprived of the ability to comment on the pre-filing process. It is not clear when SnoPUD informed FERC of the existence of PC-1 North, as a potentially incompatible adjacent use requiring analysis of potential adverse impacts, however, it is clear PCLC was kept uninformed.

SnoPUD has asked PCLC to rely on its statements that it believes no impacts will occur to PC-1 North as a result of the Project. In essence, SnoPUD is saying to PCLC and FERC, “trust us.” However, the current record demonstrates SnoPUD’s failure to act on basic information by timely informing PCLC—an interested party—of the existence of the Project. In this context SnoPUD’s assurances cannot be taken at face value, and it should bear the burden of demonstrating via verifiable data its assumptions regarding potential impacts to PC-1 North.

VI. A Cable Crossing at PC-1 North is a Reasonable Alternative Which Must be Explored Further

SnoPUD takes the position in its response to PCLC comments that a location northwest of the PC-1 North cable is necessary to avert a cable crossing. PCLC requests that this position be revisited. Cable crossings do not pose a material threat to the PC-1 North cable. Such crossings are subject to standard practices in the industry and do not pose the same risks as location of large turbines. SnoPUD’s assumption that a cable crossing is unacceptable has artificially restricted the potential alternatives sites which may have lesser impacts on PC-1 North. SnoPUD should therefore reconsider locations to the southwest of PC-1 North in order to allow for a thorough and comprehensive examination of a range of reasonable alternatives.

VII. Requests for Additional Information

In addition to the foregoing comments, PCLC requests that SnoPUD provide the following information to allow PCLC to continue its assessment and analysis of the Project, and PCLC’s position with respect thereto:

¹ Fugro, “Bathymetric and Geophysical Survey Site Characterization Admiralty Inlet Pilot Tidal Project” (Sept. 23, 2009) at Fig. 4-1; 4.2.7 (describing “the as-laid position for the in-service PC-1 North telecommunications cable”); Fig.4-6 (describing “the as-laid position for the in-service PC-1 North telecommunications cable”); Fig. 4-8 (describing “the in-service PC-1 cable”).



1. Please provide copies of your correspondence with the U.S. Coast Guard regarding vessel navigation and safety.
2. Please provide your analysis of any increased costs to SnoPUD from installing, operating and decommissioning the proposed pilot turbine system from a location southwest of PC-1 North in comparison to the proposed location.
3. Please provide details on the Acoustic Doppler Current Profiler (ADCP) survey referenced on pages 3 to 4 of your response, including information on the dates profilers were deployed and any written report or analysis of the results associated with the survey, including its author.
4. Please describe the selection criteria used for the locations surveyed. Please provide a plot on a single map of the ADCP deployment locations for the referenced survey and the ADCP locations plotted in the Polagye journal paper appended SnoPUD's response.
5. Please provide any analyses of the average power output for the different locations in the ADCP survey implied by the survey results, any analysis of the impact on the pilot test of the turbine systems at each different location surveyed, including your analysis of the extent to which a location southwest of PC-1 North would limit SnoPUD's ability to conduct a pilot test of the turbine systems, and any financial modeling comparing the financial performance of the pilot test at the different survey locations.
6. Please provide a complete answer to PCLC's question regarding the failure of equipment at the Bay of Fundy pilot project. PCLC's question 5 in its November 17, 2011 letter, requested information regarding "impacts on the surrounding environment, the extent of damage to the turbines, and the distance and velocity associated with the turbine's failure," including copies of any and all documents relating to the requested information. SnoPUD has failed to provide the requested information. In addition to any other relevant documents relating to the above topics, please specifically include a copy of the 2009 AECOM Environmental Assessment, referenced in the Admiralty Inlet Draft Environmental Report at 152.
7. SnoPUD states that it "does not believe there is incomplete or unavailable information" requiring analysis under 40 C.F.R. § 1502.22 or WAC 197-11-080. (SnoPUD Response to Nov. 17 Questions at 19.) However, SnoPUD also acknowledges that it "is not aware of any prior tidal turbine installations in the proximity of submarine cables elsewhere in the world" (id. at 14 (emphasis supplied)) and that there is "risk of damage to PC-1" during the Project's installation and removal. (Id.) Please explain SnoPUD's conclusion regarding incomplete or unavailable information in light of SnoPUD's statement that this is the first installation of the Project's type in proximity to a cable anywhere in the world, and the known risks to PC-1 North.



We expect to have additional information requests in the future and do not intend these requests to represent a comprehensive list of the data that we believe is necessary to evaluate the Project. PCLC reserves the right to amend and supplement these comments at any time.



Your Northwest Renewables Utility invites you to be a Conservation Sensation!

January 12, 2012

Mr. Kurt Johnson
Chief Financial Officer
PC Landing Corp.
319 Diablo Road, Suite 213
Danville, CA 94526

Re: Admiralty Inlet Pilot Tidal Project, FERC Project No. 12690

Dear Mr. Johnson,

We appreciate the time you and your colleagues have spent over the last several months reviewing the Admiralty Inlet Project and discussing your concerns with us. We have carefully reviewed the follow-up questions you provided us on November 17, 2011. Attached are answers and clarifications in response to those questions, which we hope will clear up most, if not all, of the outstanding issues.

Should you have additional questions or comments about the attached responses or the Project in general, please contact us at any time. However, as you are aware, we intend to file a Final License Application for the Project on or before February 28, 2012. To allow us time to review any additional questions or comments you may have and incorporate those into the Final License Application, please send us those questions or comments by February 13, 2012.

Sincerely,

A handwritten signature in blue ink, appearing to read "Craig Collar".

Craig Collar
Senior Manager, Energy Resource
Development

Enclosed: Response to PC Landing Corp. Questions
Draft Tidal Energy Resource Characterization Journal Paper
Habitat Characterization Report
Assessment of Marine Safety Risk
Fugro Geophysical Report
Golder Geophysical Report
Draft Navigational Safety Plan

ATTACHMENT – RESPONSE TO PC LANDING CORP. QUESTIONS

- 1. The Draft Environmental Report ("ER"), pp. 56-57, refers to several factors considered by SnoPUD in selecting a specific project location within Admiralty Inlet. As noted in Figure 1-1 of the Draft ER you provided, Admiralty Inlet is a very large area bounded by Admiralty Head, Marrowstone Point and Point Wilson. The factors articulated in the materials all appear to relate solely to the operation of the proposed turbines, such as currents, bathymetry, and proximity to existing transmission infrastructure. What other factors were considered in selecting a specific project location within Admiralty Inlet depicted in Figure 2-4? For example, were potential adverse impacts on marine species, marine traffic, contaminated sediments, commercial fisheries, and pre-existing submarine uses and facilities such as PC-1, considered? In order to respond in a meaningful manner to the proposed location of the turbines within Admiralty Inlet, PCLC needs to be provided with and better understand SnoPUD's analysis of and rejection of other locations within Admiralty Inlet, including sediment, benthic environment, bathymetry, etc. Specifically, in the ER and your response, we see no detailed analysis of other sites within Admiralty Inlet, including between the current site and the eastern edge of the shipping lane, and the basis for the rejection of those sites in favor of the current preferred location. Please provide any such detailed analysis that has been completed by SnoPUD or its consultants. We are particularly interested as to whether other sites in Admiralty Inlet, including west of the current location, have been analyzed for suitability in terms of substrate and benthic environment, and the basis for rejection of these sites.**

RESPONSE:

In general, the District has undertaken over three years of data collection at this location and the turbine siting decision was made after considerable analysis and balancing of competing factors. The extent and intensity of site characterization activities for this project exceeds that of any other proposed tidal energy project in North America. Tidal resource, bathymetry, and existing infrastructure are emphasized in filings because these are the three parameters that do vary to meaningful degrees within the potential project deployment area. As described more fully here, other factors that could be relevant to project siting feasibility are relatively homogenous within the deployable area defined by the tidal resource and bathymetry and are, therefore, not distinguishing factors in project siting.

Detailed study of the available tidal energy resource was conducted over several years by the Snohomish District and the University of Washington in coordination, and separately by the U.S. Navy. These studies included bathymetry, side-scan, and sub-bottom evaluation. There are few options that offer both water depth sufficient to accommodate a sizeable turbine without being too deep, and have adequate energy without excessive turbulence. Of those available, the area of Admiralty Inlet near Admiralty Head is the best

by a substantial margin. In addition, constraints associated with marine bird and mammal species were greater at many of the alternative locations.

Tidal Resource: The principal requirement for a viable tidal energy installation is the generation of electrical power. Doppler velocity profilers have been deployed at a number of locations, including to the west of PC-1. As shown in Figure 1 and Table 1, the tidal resource intensity at turbine hub height is significantly lower at deployment locations further from PC-1 than currently proposed (i.e., Location 9 or Location 10). The draft of a submitted journal paper describing tidal resource variability within Admiralty Inlet is attached.

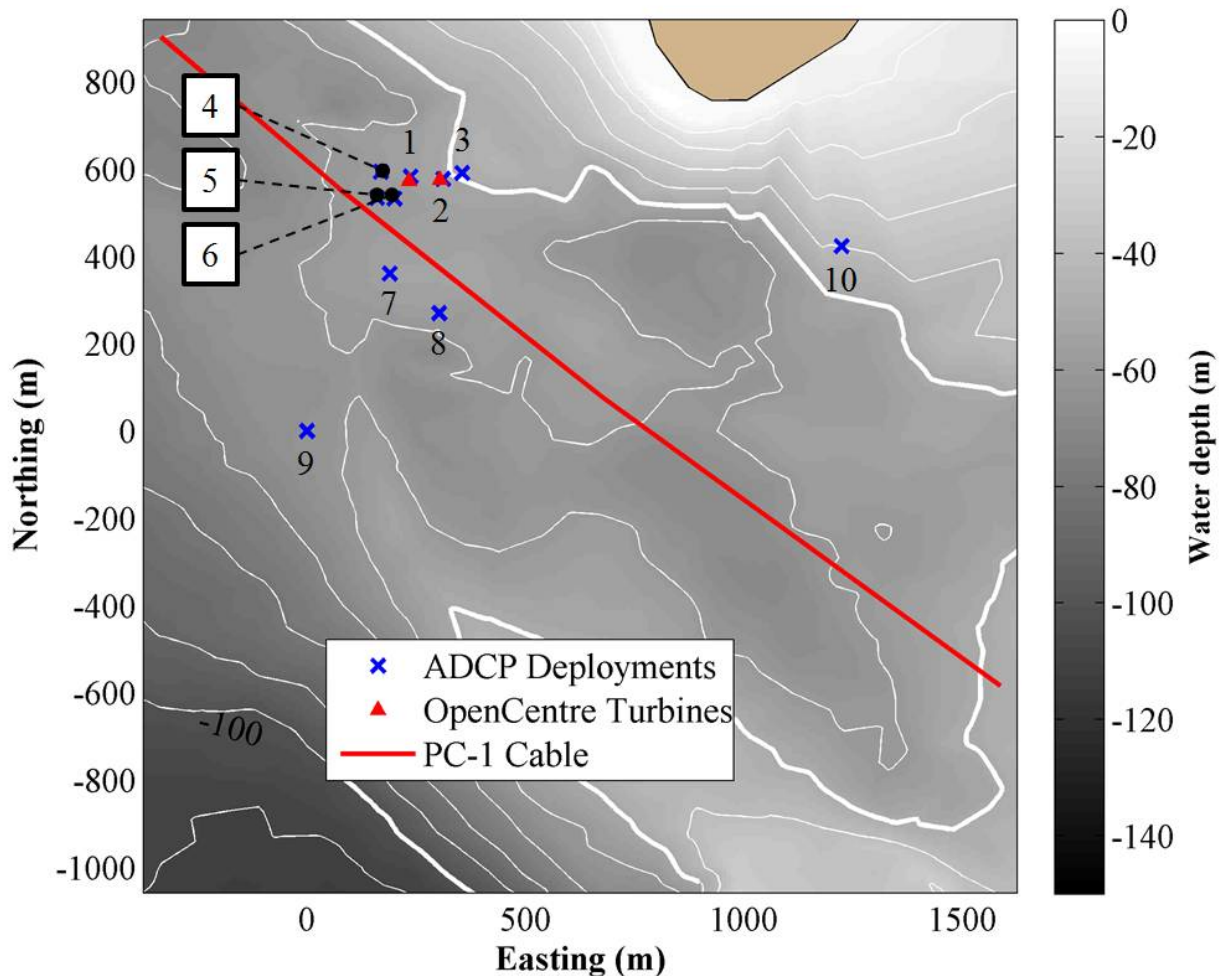


Figure 1 – Surveys for tidal resource intensity in northern Admiralty Inlet.

Table 1 – Tidal resource intensity at turbine hub height (locations shown in Figure 1). Kinetic power density is calculated using 15 minute ensemble average currents and 10 m hub height.

Location	Survey Latitude	Survey Longitude	Mean height kinetic power density (kW/m ²)	Survey Duration (days)
1	48.15293	-122.68707	1.57	95.7
2	48.15288	-122.68607	1.74	95.7
3	48.15300	-122.68548	1.72	30.3
4	48.15304	-122.68798	1.21	356.3
5	48.15248	-122.68757	1.59	30.0
6	48.15250	-122.68810	1.50	90.2
7	48.15093	-122.68772	1.66	75.3
8	48.15012	-122.68620	1.37	81.6
9	48.14770	-122.69028	0.75	78.2
10	48.15147	-122.67382	0.54	92.3

Bathymetry: The bathymetry we seek for turbine placement are plateaus or very gentle slopes without geologic hazards. There is suitable bathymetry to the west of PC1, however, it places the turbine sites closer to the cable than our current locations or in deeper water than is cost effective for installation and maintenance.

Adverse Impacts to Marine Species: Although the District expects that the Project will have minimal adverse impacts upon marine resources, the existing information on the environmental effects of tidal energy generation is limited. A key objective of this project is an improved understanding of these interactions to inform the siting and design of future projects. Based on pre-installation data collection (autonomous echosounders, vessel-based grid surveys, shoreline observers), presence/absence of fish and marine mammals is unlikely to vary with location within the area bounded by the shipping lanes and deployable bathymetry SW of Admiralty Head. Consequently, variation in potential adverse impacts to marine species is not a distinguishing consideration for project siting feasibility.

Benthic Environment: As discussed in more detail in the response to Question 2, the benthic environment is relatively homogenous in the area bounded by the shipping lanes and deployable bathymetry SW of Admiralty Head. Consequently, variation in the benthic environment is not a distinguishing consideration for project siting feasibility.

Marine Traffic: An analysis of marine traffic was undertaken on the basis of a calendar year of Automatic Identification System (AIS) transmissions logged by a receiver on the Admiralty Head Lighthouse (deployed in cooperation with Washington State Parks). As shown in the following figure (part of a forthcoming paper on vessel traffic and ambient noise), the majority of vessel traffic is associated with traffic in the shipping lanes and the cross-channel ferry route. Outside of these regions, vessel traffic density is uniformly low (the vessel traffic concentration in the

project area shown in the “AIS Other” category are research vessels engaged in site characterization activities for this project). As a consequence, marine traffic patterns (beyond the general restrictions of avoiding the traffic lanes and ferry route) are not a distinguishing consideration for project siting feasibility.

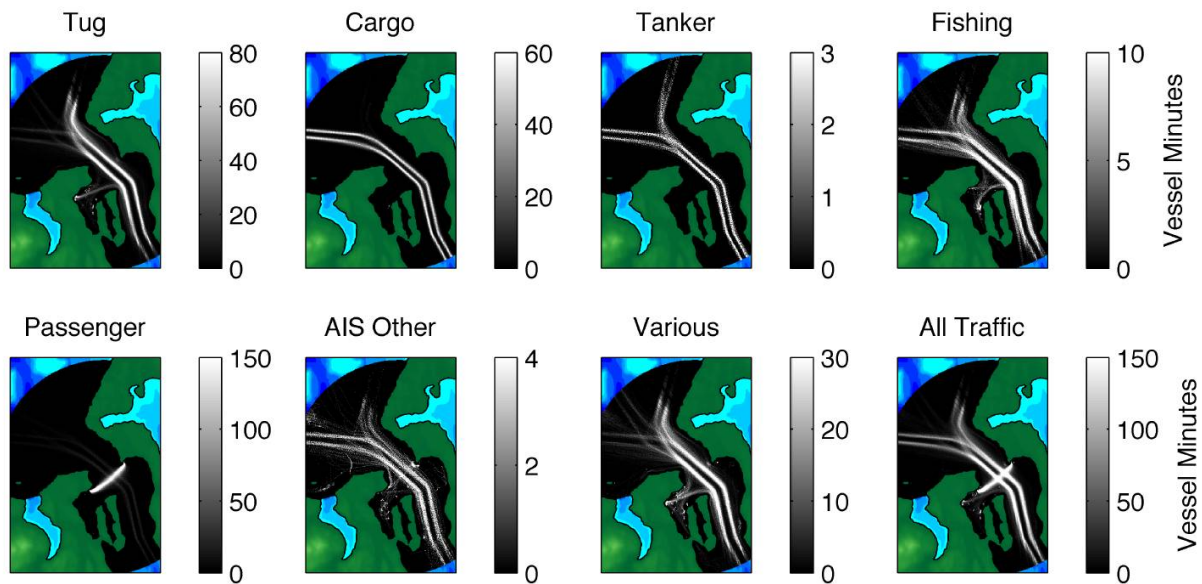


Figure 2 – Vessel traffic patterns in northern Admiralty Inlet Ship plotted on a 100 m x 100 m horizontal grid. Each subplot represents an area with the dimensions of 28 km by 40 km for a particular AIS vessel class.

Contaminated Sediments: There are no known contaminated sediments in the high energy regions of Admiralty Inlet (any such sediments would be scoured away by currents). The Washington Department of Ecology excluded Admiralty Inlet and other high energy regions in Puget Sound from its sediment monitoring program due to a lack of sediment. As a consequence, contaminated sediments are not a distinguishing consideration for project siting feasibility.

Commercial and Tribal Fisheries: There are no commercial fisheries in Admiralty Inlet. The entirety of Admiralty Inlet is within the Usual and Accustomed Fishing Areas of several native tribes. As a consequence, commercial or tribal fisheries are not a distinguishing consideration for project siting feasibility.

Pre-Existing Submarine Uses: The only active pre-existing submarine use known to the District is the PC-1 cable. The District has already moved the turbine locations more than 100 m to the SE specifically to increase separation from the PC-1 cable. Further, the District did not believe it would be desirable to cross over the PC-1 cable. As discussed in the response to further questions, other cables in the project area are believed to be inactive.

2. **It appears that no detailed studies have been completed of sediments at the proposed project location, or alternative locations within Admiralty Inlet (including locations to the west of the current proposed location), and no proposed Route Position Lists for the export cables are available. Will that information be obtained and made available to the agencies and the public before the application is filed with FERC.**

RESPONSE:

Considerable effort has gone into study and survey of the seabed off Whidbey Island at the proposed turbine sites. In addition to high-resolution bathymetry and side-scan data, two sub-bottom surveys using low-frequency sound were performed and two separate ROV camera tows were conducted. Dr. Gary Greene, a prominent geologist from Moss Landing Marine Laboratories, monitored the camera tows and later developed a detailed seabed ecological/habitat report for the area. See attached Habitat Characterization Report.

A pebbly cobblestone layer with widely scattered small boulders was deposited on the surface of the sea floor as the Fraser Glacier retreated ~12,000 years ago. Although tidewater glacial retreat is typically described as “catastrophic, rapid and dynamic, with heavy mass loss more through calving than melting” a prominent channel constriction like Admiralty Inlet has been observed to significantly reduce the rate of retreat. Based upon the observed seafloor west of Admiralty Head, this was likely the case at the turbine site. The layer of cobblestones is thicker here (estimated ½ - 1 meter) than at any other location in Puget Sound. Repeated attempts were made to sample the sub-bottom sediments, but because of the cobblestone pavement those efforts have been unsuccessful. The currents and water depth make diver sampling of the bottom a difficult and hazardous operation.

A preliminary Route Position List (RPL) has been developed for the proposed power cable path and will be provided on the BaseCamp site. This is a preliminary RPL until the final ROV survey of the route is completed and the detailed cable route is finalized.

3. **No exclusion zones are proposed but the ER indicates that a "Restricted Navigation Area" (RNA) will be imposed, and maintenance activities for PC-1 North will be "constrained." Please provide any analyses you have performed of how this proposal will limit or delay repairs and maintenance of PC-1, affect the cost of repairs and maintenance for PC-1, affect reliability of the PC-1 system, including the ability to respond to service interruptions and to expeditiously repair the cable in response to an emergency outage in the vicinity of the RNA. Please describe whether SnoPUD has considered any other sites within Admiralty Inlet that would avoid similar impacts on PC-1 maintenance activities, and the basis for rejection of those sites. Finally, please explain whether SnoPUD has considered or has under consideration any mitigation measures addressing the impacts on PC-1's maintenance activities and operations, including in connection with SnoPUD's proposal that in the event of required PC-1 North maintenance in the RNA, the affected cable be recovered to the north of the RNA, and then re-laid to the southwest of the existing location of PC-1 North.**

RESPONSE:

Considerable communication with the U.S. Coast Guard, the Army Corps of Engineers and the Puget Sound Maritime Safety Committee has taken place over the past three years. At the request of USCG, a detailed Risk Assessment was conducted by the District following USCG guidelines to determine the level of navigational risk the turbine installation may represent and to recommend alternatives for USCG consideration (the Assessment is attached). The Commander, Puget Sound CG District has indicated that they do not at this time plan to publish a Restricted Navigation Area as suggested by the Risk Assessment team. Rather, because of the low incidence of commercial vessel traffic through the area, they will manage transiting vessels by controlling passage near the turbines using the Puget Sound Vessel Traffic Service (VTS). Since nearly all transiting vessels use the traffic control lanes for their passage (and *all* are required to use VTS), this plan should not place a significant additional burden on the VTS watch.

Insofar as repairs and maintenance to PC-1 are concerned, there should be no limitations or delays imposed by the presence of the turbines. Coordination with the District and with the USCG VTS should be routinely conducted in order to ensure vessel safety of operations, as would be normal in any repair situation.

4. **Please explain whether SnoPUD has examined or considered whether laying PC-1 North to the southwest of its current location, as suggested by SnoPUD in the event of repair or maintenance of PC-1, would require amendments to the easements and other regulatory approvals granted to PCLC for PC-1, and if so, please provide the results of any such analysis. In particular, please discuss whether SnoPUD has considered the time and resources associated with obtaining such amendments and any information it has from PCLC's permitting agencies on the ease, timing, cost, and likelihood of obtaining such amendments. Also, please describe the basis for and reasoning underlying SnoPUD's recommendation, that in the event of PC-1 North maintenance in the vicinity of**

the turbines, PCLC relay PC-1 North further to the southwest, given SnoPUD's conclusions that there is no risk of damage to PC-1 from the proposed project, or any likely impact that the proposed project would have on PC-1. Laying PC-1 North further to the southwest would also reduce the current separation between PC-1 North and PC-1 East. Please discuss whether SnoPUD has considered the effect this would have on operation, repair and maintenance of PC-1 East and PC-1 North.

RESPONSE:

We do not believe any unusual easement amendments would be required. The current easement is 0.5 foot. In any repair, the cable cannot be placed exactly within the current easement and the cable company would normally provide an "as built" of the repaired section laydown to the regulatory authorities. As a result, we do not anticipate any substantially different regulatory actions required as a result of the proposed project or the proximity to the turbine site.

There is no impact to the potential repair of PC-1 East as it is not in the proximity. The only constraint to PC-1 North is that, due to the proximity of the cable and turbines, PCLC and the District will need to coordinate any repairs so no consequential damage occurs to the other party. A cable repair in any area requires the laydown of the additional length of cable and two universal joints with associated bend radius restrictions and the proposed project simply means that the additional cable will need to be laid that to the west. If PCLC would prefer to lay to the east, that can be accommodated as long as PCLC is satisfied with the closer proximity to the project turbine and power cables. Laydown to the east will run the risk of getting into the cobbled area which makes burial that much harder but that would be a decision up to PCLC. We see no substantial impact on standard operation, repair, or maintenance in either scenario.

5. The turbine project is, in essence, an experiment to determine if power can be generated with the proposed turbines, and to determine what impacts operation and maintenance of the turbines and export cables will have on existing marine facilities and uses such as the PC-1 cables. Please confirm, as we believe is the case, that the only prior installation of the OpenHydro turbine technology, other than in a controlled environment, was in the Bay of Fundy. Please confirm our understanding that the Bay of Fundy pilot project was terminated prematurely due to equipment failure, and provide documents and information sufficient to describe the nature of the equipment failure, including impacts on the surrounding environment, the extent of damage to the turbines, and the distance and velocity associated with the turbine's failure. We also understand that removal of the turbines required multiple attempts due to adverse tides, and weather, and we ask that you provide documents sufficient to describe the recovery operation. Also, in light of the experience with recovery in the Bay of Fundy project, please explain SnoPUD's conclusion in the Individual Cable Installation Concept document as to the ease of recovery in Admiralty Inlet, including the estimated time for turbine removal.

RESPONSE:

Previous OpenHydro turbine installations have been made at the European Marine Energy Center (EMEC), Minas Passage in the Bay of Fundy, and in Brittany, France. None are a "controlled environment" as all have significant tidal current velocities. A summary is shown in Table 1 below.

Table 1 OpenHydro Turbine Installations

Date	Turbine(s)	Location	Comments
2006	6m	EMEC, Orkney Islands, Scotland	Shore connected, mounted on twin pile frame
September, 2008	6m	EMEC	Non-operational turbine mounted on gravity base triframe
November, 2009	10m	Minas Passage, Bay of Fundy, Nova Scotia	Blades failed due to excessive tidal forces, turbine/frame removed in December, 2010, mounted on gravity base triframe
August, 2011	16m	Brittany, France	Additional installation planned in 2012, mounted on gravity base triframe

The Minas Passage installation resulted in a subsequent failure of the blades in the turbine due to 2.5 times higher than expected tidal current velocities. The detailed site characterization work described in the response to Question 1 was undertaken, in part, to prevent this type of failure from recurring.

The removal of the 10 meter turbine took two attempts. Tidal turbines are placed in the most energetic tidal locations in order to maximize power. The recovery operation could only be

carried out at specific tidal windows each month (in Admiralty Inlet, the mixed tidal regime provides similar windows on a daily basis). The first attempt in November 2010 was cancelled due to equipment failure on the tug and deteriorating weather conditions. During the next available tidal window in December the turbine was successfully recovered. The recovery operation from start to finish took approximately six (6) hours from arrival on site.

From arriving on site, the main driver for the speed of installation is the winch speed which will be optimised for the final known weight of the subsea base and turbine. The installation in the Bay of Fundy took 20 - 25 minutes to lower, release and retrieve the recovery frame (this was at a water depth of 30m.) The recent deployment in France took approx. 40mins in a water depth of 45m. The French installation is for 16m machine so the load is much greater and there are four falls of winch wire versus the three for the Puget Sound installation. The Puget Sound Installation is in ~53m -56m depth.

The experience in the Bay of Fundy gives us confidence that a recovery in Puget Sound can be accomplished in a similar fashion and in a similar time frame. In the Puget Sound installation, turbines will be smaller and lighter weight, somewhat deeper, and the tidal conditions provide additional, broader working windows (i.e., turbine deployment, maintenance, and recovery need not take place only during the fortnightly neap tides).

6. SnoPUD's Installation Concept document shows the use of tugs for positioning the cable lay barge and turbine frame. Please provide any environmental/weather analyses you have undertaken to determine the size and power of the tugs, and any contingency plan you have developed in case one of the tugs loses power or is of insufficient power.

RESPONSE:

As we discussed in the previous submittals we will use a conservative approach to the installation and maintenance scenarios. We will not attempt to operate in the area in weather conditions exceeding 20 mph winds or with a deteriorating weather forecast. The turbine installation and retrieval operations will be planned to occur within a ≤ 1.5 knot current window, adding an additional factor of safety. We have done extensive analysis of the weather and tidal induced forces on the entire installation or retrieval set of vessels and equipment. The full analysis is contained in the Appendix.

Each marine operation entailing installation or recovery will always have at least two tugs for the *OH Installer* and two for the Cable Lay Vessel (CLV) as shown in Figure 1.

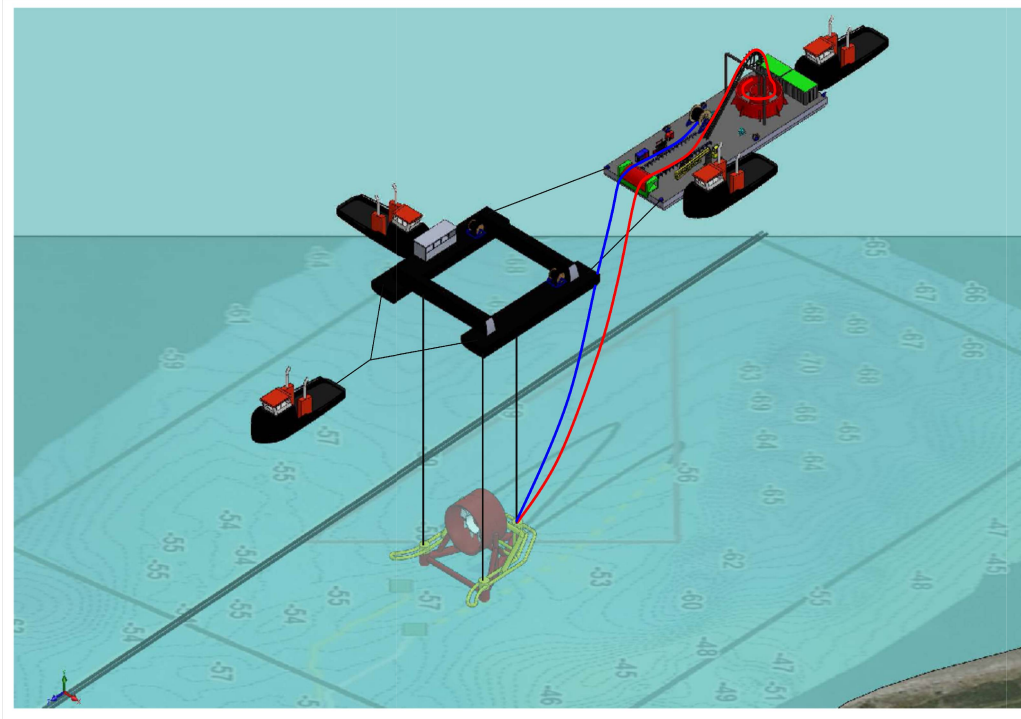


Figure 1 Installation Configuration

The installation force analysis is shown in Table 1. It shows the longitudinal force for our installation constraints are 128,692 lbf resulting in tugboat power of 2800 hp for each of four tugboats. Our plan is to use four 3,500 to 4,000 hp tugs as noted in Figure 1.

Table 1 Installation Force Analysis

Combined Total Longitudinal Forces for 4 Tugboats, OH Installer, CLV & Turbine					
Air Velocity Knots	Current Velocity Knots	Total (4) Tugs, OH Installer, & CLV Longitudinal Wind Force F_{xa} (lbf)	Total (4) Tugs OH Installer, & CLV Longitudinal Current Force (lbf)	Deployed Turbine Total Longitudinal Current Force (lbf)	Total Longitudinal Force (lbf)
0	0	0	0	0	0
2	0.5	61	772	476	1309
4	1	245	3065	1895	5205
6	1.5	551	6870	4253	11673
8	2	979	12184	7547	20710
10	2.5	1529	19004	11776	32310
12	3	2202	27328	16941	46471
14	3.5	2997	37156	23039	63192
16	4	3915	48484	30070	82469
18	4.5	4955	61314	38035	104303
20	5	6117	75643	46932	128692

The analysis for the tug sizing shows that tugs with 2800 HP as indicated in the analysis below:

$$\begin{aligned}
 B_P &= S_f * [(F_{WIND} * f_{GUST}) + F_{CURRENT}] \\
 \text{Current} = 5 \text{ Knots} \ \& \ \text{Wind} = 20 \text{ Knots} \ \rightarrow \ (F_{WIND} * f_{GUST}) + F_{CURRENT} = 128,692 \text{ lbf} \\
 B_P &= 1.3 * 128,692 \text{ lbf} = 167,300 \text{ lbf} \equiv 744.20 \text{ kN} \\
 \text{Horsepower Required } HP_{REQ.} &= 12 * B_P \text{ in kN} = 12 * 744.20 \text{ kN} = 8,930 \text{ HP} \\
 \text{HP Operational Safety Factor of } 1.25 &\therefore 8,930 \text{ HP} * 1.25 = 11,163 \text{ HP} \\
 \text{Individual Tug Horspower} &= \frac{HP_{OPS}}{(4 \text{ Tugs})} = \frac{11,163 \text{ HP}}{(4 \text{ Tugs})} = \mathbf{2,800 \text{ HP Each}} \\
 \text{Towing Capacity} &= \frac{128,692 \text{ lbf}}{2000} = 64.35 \text{ Tons} \\
 \text{Towing Capacity Operational Safety Factor of } 1.25 &\therefore 64.35 \text{ Tons} * 1.25 = 81 \text{ Tons} \\
 \text{Individual Tug Towing Capacity} &= \frac{T_{OPS}}{(4 \text{ Tugs})} = \frac{81 \text{ Tons}}{(4 \text{ Tugs})} = 20 \text{ Tons Each}
 \end{aligned}$$

The full analysis is contained in the Appendix.

7. **The Installation Concept document and responses to PCLC questions indicate that turbine placement operation will be completed in less than 45 minutes and placed to accuracy of +/-5 meters. Has SnoPUD considered the possibility of a "pendulum effect" during turbine installation operation and any impact on placement of the turbine, as the turbine is lowered from the OpenHydro installer and cable lay vessel given currents and weather conditions? Please provide any analysis of such effects completed by SnoPUD. Please provide installation documents related to Bay of Fundy project sufficient to show timing of installation, proximity of siting to target location, number of attempts, and the like. If a turbine is installed more than 5 meters from its intended location and/or installation required more than 45 minutes, what contingency plans does SnoPUD have to abandon and reschedule the installation and/or to remove and relocate a misplaced turbine? Given the experimental nature of this project and numerous unknowns (see 11.xi, below), please provide a reasonable worst case analysis in order to facilitate an adequate impact analysis as required by NEPA and SEPA.**

RESPONSE:

The District has considered the pendulum effect for projected currents in the selected site. We have found that for the installation window planned of 0-1.5 knots we will potentially see up to 0.46m of turbine base displacement. That falls within the $\pm 5\text{m}$ installation accuracy. OpenHydro has not experienced a pendulum effect that detracted from its set down accuracy at other deployment sites.

The following is the analysis for the pendulum effect when the turbine is fully deployed just before touchdown. Typically a pendulum will oscillate through an angle of $L * \sin\theta$ but for long distances with small angles of deflection the $\sin\theta = \theta$.

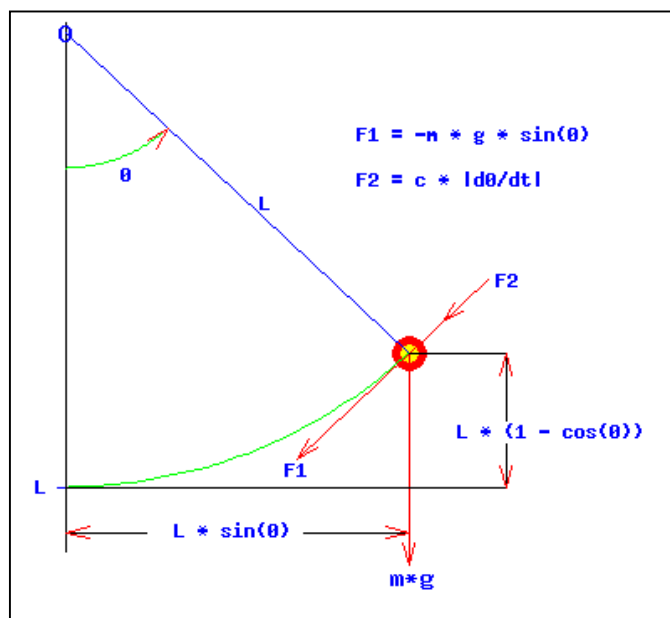


Figure 1 Pendulum Effect Diagram

Table 1 Summary of Pendulum Effects
Horizontal Distance Between OH Installer & OpenHydro™ Turbine

Current Velocity Knots	Current Velocity ft/s	Total Longitudinal Current Force (lbf)	Total Moment at Deployment 196.85 ft Depth (lbf·ft)	Weight of OpenHydro™ in Salt Water (lbf)	Distance of Equalizing Moment (feet)	Distance of Equalizing Moment (meter)
0	0.00	0	0	551897	0.00	0.00
0.5	0.84	476	93795	551897	0.17	0.05
1	1.69	1895	373119	551897	0.68	0.21
1.5	2.53	4253	837175	551897	1.52	0.46
2	3.38	7547	1485609	551897	2.69	0.82
2.5	4.22	11776	2318193	551897	4.20	1.28
3	5.06	16941	3334761	551897	6.04	1.84
3.5	5.91	23039	4535182	551897	8.22	2.50
4	6.75	30070	5919351	551897	10.73	3.27
4.5	7.60	38035	7487179	551897	13.57	4.13
5	8.44	46932	9238590	551897	16.74	5.10

OpenHydro's subsea installations using the *OpenHydro Installer* and sister vessel the *OpenHydro Triskell* have been carried out to a great degree of accuracy both in terms of position and angle relative to the tide. In the 2011 installation in Brittany the 16 meter turbine and subsea base were placed within +/-1.5m of the proposed site and within +/-2.5 degrees

angular accuracy. In the Bay of Fundy it was within +/- 3m and +/- 5 degrees of angular accuracy.

The Puget Sound installation will be deployed within $\pm 5\text{m}$ of the target site or it will not be set down and released. It will not be installed outside the installation parameters previously discussed; good weather window, $\leq 20\text{mph}$ wind and best monthly tidal cycle at tidal velocity window ≤ 1.5 knots. The worst case scenario is that we do not deploy on the scheduled deployment date and have to reschedule.

- 8. In your response, SnoPUD acknowledges that there have been no prior turbine installations near submarine cables, including by OpenHydro. Given that, what is the basis for your conclusions that the proposed placement of the turbines relative to PC-1 North will have no impact on the cable or cable operations (other than the maintenance impacts which you have identified), when industry standards recommend separation of approximately 1500 meters for similar installations and conditions. Provide all analyses and critiques performed regarding the standard industry separation and the basis for your conclusion that such standard should not be applied to the Project. What contingency plans does SnoPUD have for impacts on the cable if the experiment fails to perform as planned?**

RESPONSE:

Although the District is not aware of any prior tidal turbine installations in the proximity of submarine cables elsewhere in the world, tidal energy research is still in its infancy, and as more sites are identified for test installations it is entirely possible that there will be additional cases to be considered. The cable industry standards to which your letter refers are, we believe, originally based on customary submarine cable operating procedures that date to the Paris "Convention for the Protection of Submarine Telegraph Cables" (14 March 1884). Since the international Convention published a recommendation for one nautical mile separation between maritime traffic and vessels conducting cable operations, it has become accepted practice to observe one nm (or more recently, as you indicate, 1.5 km) separation.

However, there are several mitigating circumstances that prevail in the case of the District's Puget Sound project. First, communications cables that pass through Admiralty Inlet are oriented along the axis of current flow, as are tidal energy resources. Available energy resources fall off more rapidly perpendicular to the flow axis. This limits the available channel width to those areas outside of shipping lanes yet far enough from shore to avoid eddies and marine reserves (± 1.5 km laterally from the PC-1 cable is on shore or in the shipping lanes). Second, the turbines are fixed platforms; once set in place they will not drag anchor or otherwise become mobile and disturb the cable. Only during the system's installation and removal is there a risk of damage to PC-1. Finally, the international agreement from the Convention of 1884 was developed at a time when vessel navigation was far less exact than our present capability to locate a ship to within a meter, and dynamic positioning was impossible. The District's intent is to accurately fix the turbine sites, move the units in place during slack

tide using dynamic positioning, and set them precisely on the bottom within $\pm 5\text{m}$ of the designated site.

Many cables entering harbors and transiting coast lines cannot maintain a 1500m separation from all objects which is why it is a recommendation and not a requirement. As discussed above, we have selected a site that balances the technical requirements of the project, the environmental constraints and the navigational uses of the waterway. We have avoided crossing the cable with the project's two cables and have maximized the distance to the cable within these overall constraints. Should the District tidal energy project fail to produce useful output for commercial purposes, the turbines will be removed from the seabed. The same careful process followed during emplacement will be used during the turbines' removal.

In summary, we believe that the closer spacing does not represent a risk to the existing cable installation because (1) OpenHydro has repeatedly demonstrated an ability to deploy turbines within $\pm 5\text{ m}$ accuracy and (2) unlike a power cable, there is no mechanism for the turbine to shift on the seabed after deployment.

9. **An RNA is proposed in order to minimize the risk that a tug cable will ensnare the turbines and drag them out of position and possibly onto PC-1. Please provide any analysis of potential for tug to stray off course given current and weather conditions in Admiralty Inlet, including any details on SnoPUD's mitigation plan in event that a tug were to stray off-course and ensnare a turbine due to engine failure, adverse weather or currents, collision avoidance, or human error.**

RESPONSE:

As noted in the response to Paragraph 3, the Risk Assessment performed for the USCG by the District recommended that a Restricted Navigation Area (RNA) be considered for the turbine site that would restrict ONLY those vessels with tows or with equipment over the side, anchoring, or similar bottom-interactive operations (net fishing is not permitted). However, the Commander, Coast Guard District Puget Sound has indicated that, because of the low density of ship traffic through the area, the 24/7 VTS watch should be capable of managing transiting vessels off Admiralty Head. The concern expressed over tugs with tows dragging a cable over the site and snaring a turbine referred to head-on meeting situations between several tow vessels in which one ship might be required to slow. The frequency of occurrence of such events (~three/month) was evaluated as being well within the preventative management capabilities of the VTS. In any emergent situation involving loss of power, tug operators have the ability to take up slack on their towline, such that contact with the turbines would be extremely unlikely given that there is more than 40 m of overhead clearance between the highest point on the turbine and water surface.

10. **SnoPUD did not respond to PCLC's inquiry if a crossing of PC-1 North had been considered. Please provide all such analyses, and any basis for rejecting a PC-1 cable crossing. We note that with a cable crossing the turbines could be**

located at least 500 meters to the southwest of PC-1 North and still be well outside the shipping lane. We note that SnoPUD may already have to cross at least one cable based on Figure 3-1 of the Draft ER. That figure appears to show an existing "cable crossing" between Whidbey Island and Port Townsend. Does the geophysical study referred to in Figure 3-2 of the Draft ER suggest any usable sites to the southwest of PC-1 North? incorporating all of this data into Figure 2-4 may present a more complete picture of potential turbine sites.

RESPONSE:

The District did consider PC1 North cable crossings and tried to eliminate them as part of our site selection rationale as described in Questions 1 and 8 above. There are many factors dictating site selection and cable routing. Cable crossings are one of those factors. We do all we can to minimize cable crossings. The other cables you describe are, what we believe to be, abandoned power cables and we are in the process of confirming ownership and the status of them. PCLC seems to be suggesting they would prefer us to route our power cables over PC-1 North and locate the turbines to the west. We see no reason to do that since the turbine sites to the west are not viable for the reasons stated in question 1 above. Those reasons are deeper depth, closer to shipping lane, less current, more difficult installation, less acceptable bathymetry, longer cable runs and we still can't achieve 1500m separation.

11. Other Comments on the Draft ER:

- (i) Sec 1.3 should address SEPA (e.g., elements of the built environment such as utilities need to be analyzed) as well as relevant state or local laws such as RCW 79.110 (Aquatic lands — easements and rights of way), RCW 79.125 (Aquatic Lands — tidelands and shorelands), and consistency with the Island County shoreline program for Whidbey (not just CZMA).**

RESPONSE:

The District will separately undertake an independent review under SEPA, with the District as the lead agency. This review will consider all of the elements of the environment identified by SEPA.

- (ii) Sec. 1.4.2 should indicate initial contacts with Pacific Crossing.**

RESPONSE:

The District will update section 1.4 of the Environmental Report to include the large amount of public review and the many discussions that have occurred regarding the Project since the Draft License Application was filed in December 2009, including contacts between Pacific Crossing and the District.

- (iii) **Sec. 2.2.4 — Refers to an adaptive management process that will be employed to "allow for immediate action where necessary to address a critical adverse effect of the Project, should that occur". PCLC should be included in this process given the potential for adverse effects on PC-1 and the experimental nature of the proposal.**

RESPONSE:

PC Landing Corp. will be provided notice of meetings of the Marine Aquatic Resource Committee, the group of federal agencies, state agencies, and tribal governments responsible for adaptively managing the Project. Through this forum, PC Landing Corp. will have an opportunity to provide input on adaptive management measures and their potential impacts.

- (iv) **Sec. 3.3.5.2. — As noted, SnoPUD proposes to request an RNA from the Corps as a way of minimizing tug lines catching on the turbines. Please provide all analyses of the effect the RNA would have on PC-1 repair and maintenance. The RNA is shown on Fig. 3-51.**

RESPONSE:

As stated in response to questions 3 and 9, discussions with the U.S. Coast Guard, Army Corps of Engineers, and the Puget Sound Marine Maritime Safety Commission that have taken place since the Draft License Application was submitted in December 2009 has led the Commander of the Puget Sound Coast Guard District to state that a Restricted Navigation Area is not required at this time. As a result, no impacts on PC-1 repair and maintenance are expected. The Final License Application will be updated to reflect this new information.

- (v) **There is no analysis of other cables in the area, including the "cable crossing" from Whidbey Island to Port Townsend indicated on Figure 3-1.**

RESPONSE:

See response to question 10. The Final License Application will be updated to clarify that locations west of the proposed site were considered and ultimately rejected.

- (vi) **Sec. 4.3 —The section provides estimated costs of "mitigation." It does not address costs that would be borne by others (e.g., PCLC, other cable owners, tug owners, etc.). Please confirm whether such analyses have been completed, and if so please provide copies.**

RESPONSE:

The District is required to provide estimated costs of implementing the various protection, mitigation, and enhancement measures contained in the Final License Application. Those are the costs reflected in section 4.3.

- (vii) **Appendix A includes bathymetric and geophysical data that may be relevant to site selection and avoidance/mitigation of adverse impacts to PC-1. Appendix C includes a "Navigation Safety Plan" that is described as part of the mitigation for repair and maintenance of PC-1. Please provide copies of the appendices, which were not included in the draft ER provided to us.**

RESPONSE:

Appendix A to the Draft Environmental Report contains all of the pre-installation study plans and reports from the execution of those plans. The pre-installation study and final report relevant to PC-1 is the September 2009 Bathymetric and Geophysical Survey Site Characterization Report prepared by Fugro Seafloor Surveys, Inc..¹ In addition, in September 2011 Golder Associates prepared a final report on their geophysical investigation for the Project, which supplements the Fugro report. Both the Fugro and Golder reports are attached. The most recent Navigation Safety Plan is also attached.

- (viii) **Sec. 5.1 only looks at the project and no action, not a comparison/analysis of the alternative sites listed in Sec. 2.3 generally, or potential sites within the Admiralty Inlet "triangle" specifically.**

RESPONSE:

The Final License Application will be updated to include additional discussion of the process that led the District to select the proposed site for the Project.

- (ix) **Sec. 5.3 does not mention unavoidable impacts to PC-1.**

RESPONSE:

Section 5.3 discusses unavoidable adverse impacts the proposed project would have on certain specific resources. As described elsewhere in this document, the District does not believe the Project as proposed will have a material impact to the PC-1 cable or to PC Landing Corp.

¹ The entirety of the appendices to the Draft Environmental Report (Exhibit E) are available on the District's website at <http://www.snopud.com/PowerSupply/tidal/aidla.ashx?p=1732>.

- (x) **Sec. 6 includes a "finding of no significant impact." Without the additional analysis noted in these comments, PCLC disagrees with this conclusion.**

RESPONSE:

Comment noted.

- (xi) **NEPA- and SEPA -required analyses when information is incomplete [40 CFR § 1502.22(b); WAC 197-11-080]. This proposal is highly experimental in nature and a great deal of information is either missing or not obtainable. The Draft ER needs to include the kind of analysis required by 40 CFR § 1502.22(b) and WAC 197-11-080 (attached hereto).**

RESPONSE:

The Draft Environmental Report provides a comprehensive analysis of the proposed project and expected impacts on affected resources. Regarding 40 CFR § 1502.22, based upon the District's extensive analysis to date, the District does not believe that this proposed project will have reasonably foreseeable significant adverse effects on the human environment. Likewise, although the project has experimental components, the District does not believe that there is incomplete or unavailable information. As such, no additional analysis is required by 40 CFR § 1502.22. Regarding WAC 197-11-080, as described above, the District will separately undertake an independent review under SEPA, with the District as the lead agency. This review will consider all of the elements of the environment identified by SEPA. Notwithstanding, WAC 197-11-080 is not applicable to the environmental review for this proposed action because the information available to the District is sufficient to allow it to conclude that the proposed project will not have significant adverse impacts.

APPENDIX

SOUND & SEA TECHNOLOGY, INC.

OpenHydro Pilot Installation

Analysis of Resistance Factors During Deployment

Jared Bell

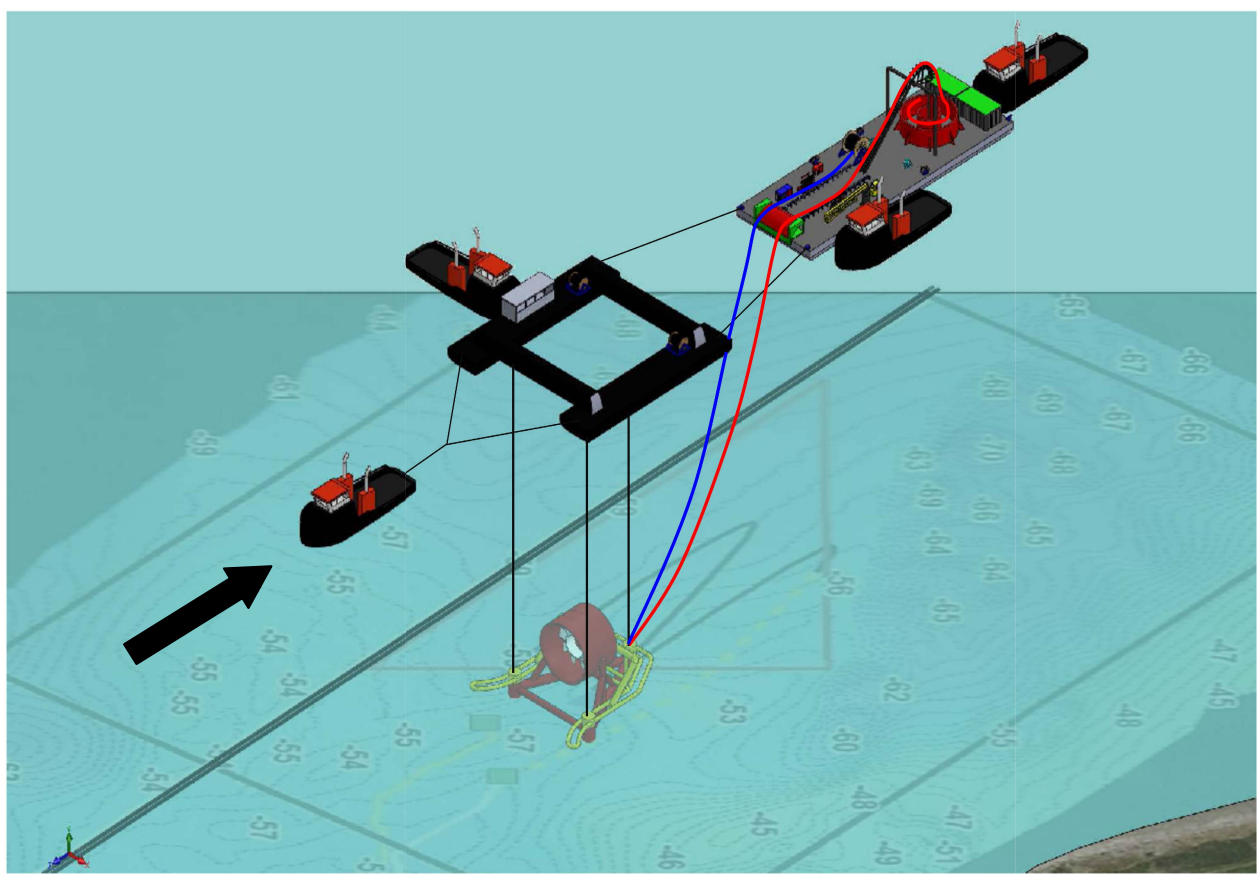
1/3/2012



Objectives: To determine the minimal amount of tugboat horsepower and pulling capability needed during the OpenHydro™ deployment for “worst” case scenario of 5 knot current and 20 knot winds. The following defines the analysis criteria:

Case #1 Analysis: The baseline installation procedure assumes a single tugboat that tows the turbine to the installation site using the *OH Installer*. Additionally, a cable laying vessel, propelled by two tugs will be attached with cables to the *OH Installer*. A fourth, support tug will provide directional control during the installation. During the turbine deployment, the live-boat operation will be susceptible to wind and current forces with a maximum load in the vessels longitudinal direction. This analysis will determine the minimum horsepower and pulling capacity needed for the individual tugboats to maintain position during deployment.

Figure 1: Baseline Installation



The following describes several factors that affect the tugboat's overall performance and they were included in each analysis.

1. The longitudinal forces acting on the vessels due to wind velocity should have an added overall wind gust factor of 1.2 - 1.5.
2. The force required to move a ship against the wind and current is at least 30 percent higher than the forces necessary to hold the ship against the forces due to wind and current.
3. The necessary required tugboat HP is approximately 10-12 times the actual tugboat bollard pull in kN¹.
4. It is recommended that an operational safety factor $S_O > 1.1 - 1.25$ be used due to the actual total available tugboat capacity.
5. It may be approximately assumed that the horsepower a tug boat requires to reach a certain speed is 9% to 10% of the total horsepower needed to perform the tow.

The tugboats will be required to overcome the combined current and wind forces against the individual tugs, CLV, and *OH Installer*. The total required effective tugboat bollard pull, B_P , needed to control a vessel due to environmental forces can be calculated approximately from the following equation:

$$B_P = S_f * [(F_{WIND} * f_{GUST}) + F_{CURRENT}]$$

Where;

$S_f = \text{Tugboat Bollard Pull Factor Coefficient of } 1.3$

$F_{WIND} = F_{xaTUG} + F_{xaOH} \text{ (Acting Longitudinally)}$

$f_{GUST} = \text{Wind Gust Coefficient of } 1.5$

$$F_{CURRENT} = \{F_{xFORM-TUG} + F_{xFORM-OH} + F_{xFORM-TURB} + F_{xFRICTION-TUG} + F_{xFRICTION-OH} + F_{xFRICTION-TURB} + F_{xPROP-TUG} + F_{xPROP-TURB}\}$$

Results: The following tables show the total current and wind forces exerted on the four tugboats, *OH Installer*, CLV, and turbine during deployment.

¹ Thoresen, Carl A. *Port Designer's Handbook: Recommendations and Guidelines*. London: Telford, 2006. Print.



Combined Total Longitudinal Forces for 4 Tugboats, OH Installer, CLV & Turbine					
Air Velocity Knots	Current Velocity Knots	Total (4) Tugs, OH Installer, & CLV Longitudinal Wind Force F_{xa} (lbf)	Total (4) Tugs OH Installer, & CLV Longitudinal Current Force (lbf)	Deployed Turbine Total Longitudinal Current Force (lbf)	Total Longitudinal Force (lbf)
0	0	0	0	0	0
2	0.5	61	772	476	1309
4	1	245	3065	1895	5205
6	1.5	551	6870	4253	11673
8	2	979	12184	7547	20710
10	2.5	1529	19004	11776	32310
12	3	2202	27328	16941	46471
14	3.5	2997	37156	23039	63192
16	4	3915	48484	30070	82469
18	4.5	4955	61314	38035	104303
20	5	6117	75643	46932	128692

Baseline Tugboat Results:

$$B_P = S_f * [(F_{WIND} * f_{GUST}) + F_{CURRENT}]$$

$$Current = 5 \text{ Knots} \& Wind = 20 \text{ Knots} \rightarrow (F_{WIND} * f_{GUST}) + F_{CURRENT} = 128,692 \text{ lbf}$$

$$B_P = 1.3 * 128,692 \text{ lbf} = 167,300 \text{ lbf} \equiv 744.20 \text{ kN}$$

$$Horsepower \text{ Required } HP_{REQ.} = 12 * B_P \text{ in kN} = 12 * 744.20 \text{ kN} = 8,930 \text{ HP}$$

$$HP \text{ Operational Safety Factor of } 1.25 \therefore 8,930 \text{ HP} * 1.25 = 11,163 \text{ HP}$$

$$Individual \text{ Tug Horspower} = \frac{HP_{OPS}}{(4 \text{ Tugs})} = \frac{11,163 \text{ HP}}{(4 \text{ Tugs})} = 2,800 \text{ HP Each}$$

$$Towing \text{ Capacity} = \frac{128,692 \text{ lbf}}{2000} = 64.35 \text{ Tons}$$

$$Towing \text{ Capacity Operational Safety Factor of } 1.25 \therefore 64.35 \text{ Tons} * 1.25 = 81 \text{ Tons}$$

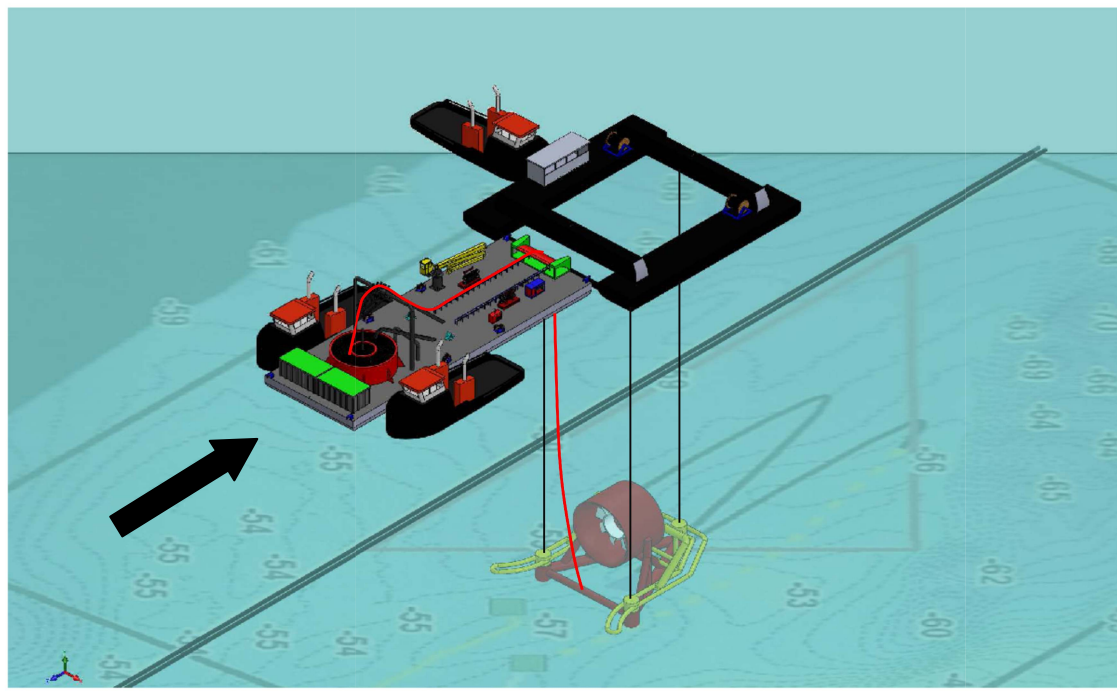
$$Individual \text{ Tug Towing Capacity} = \frac{T_{OPS}}{(4 \text{ Tugs})} = \frac{81 \text{ Tons}}{(4 \text{ Tugs})} = 20 \text{ Tons Each}$$

Suggested individual tugboat size is 2,800 HP with a pulling capability of 20 Tons for installation
"worst" case scenario of 5 knot currents and 20 knot winds.



Alternate Installation Concept: To eliminate the need for the fourth tugboat, an alternative approach is to hard-couple the CLV to the *OH Installer* during deployment as shown in the following figure.

Figure 2: Alternate Baseline Concept



Results: The following table shows the total forces against the three tugs, OH Installer, CLV and turbine during deployment.

Combined Total Longitudinal Forces for 3 Tugboats, <i>OH Installer</i> , CLV & Turbine					
Air Velocity Knots	Current Velocity Knots	Total (3) Tugs, <i>OH Installer</i> , & CLV Longitudinal Wind Force F_{xa} (lbf)	Total (4) Tugs <i>OH Installer</i> , & CLV Longitudinal Current Force (lbf)	Deployed Turbine Total Longitudinal Current Force (lbf)	Total Longitudinal Force (lbf)
0	0	0	0	0	0
2	0.5	50	700	476	1227
4	1	200	2783	1895	4878
6	1.5	450	6240	4253	10943
8	2	800	11070	7547	19417
10	2.5	1250	17270	11776	30296
12	3	1800	24838	16941	43578
14	3.5	2449	33773	23039	59261
16	4	3199	44075	30070	77344
18	4.5	4049	55742	38035	97826
20	5	4999	68774	46932	120705

Alternate Baseline Tugboat Results:

$$B_P = S_f * [(F_{WIND} * f_{GUST}) + F_{CURRENT}]$$

$$Current = 5 \text{ Knots} \& Wind = 20 \text{ Knots} \rightarrow (F_{WIND} * f_{GUST}) + F_{CURRENT} = 120,705 \text{ lbf}$$

$$B_P = 1.3 * 120,705 \text{ lbf} = 156,917 \text{ lbf} \equiv 698.00 \text{ kN}$$

$$Horsepower \text{ Required } HP_{REQ.} = 12 * B_P \text{ in kN} = 12 * 698.00 \text{ kN} = 8,376 \text{ HP}$$

$$HP \text{ Operational Safety Factor of } 1.25 \therefore 8,376 \text{ HP} * 1.25 = 10,470 \text{ HP}$$

$$Individual \text{ Tug Horspower} = \frac{HP_{OPS}}{(3 \text{ Tugs})} = \frac{10,470 \text{ HP}}{(3 \text{ Tugs})} = 3,490 \text{ HP Each}$$

$$Towing \text{ Capacity} = \frac{120,705 \text{ lbf}}{2000} = 60.35 \text{ Tons}$$

$$Towing \text{ Capacity Operational Safety Factor of } 1.25 \therefore 60.35 \text{ Tons} * 1.25 = 76 \text{ Tons}$$

$$Individual \text{ Tug Towing Capacity} = \frac{T_{OPS}}{(3 \text{ Tugs})} = \frac{76 \text{ Tons}}{(3 \text{ Tugs})} = 25 \text{ Tons Each}$$

Suggested individual tugboat size is 3,490 HP with a pulling capability of 25 Tons for installation "worst" case scenario of 5 knot currents and 20 knot winds.

Typical Weather Conditions Installation: The deployment of the turbine will be planned to occur during the mildest weather conditions where the maximum wind and current velocity is below 10 and 2.5 knots, respectively. Based on the data in tables 1 & 2, the average combined force for these weather conditions is approximately 31,500 lbs. Based on the above equations, the following determines the individual tugboat sizes for the two proposed deployment scenarios.

Baseline Concept with 4 Tugboats:

700 HP & 5 Tons Pulling Capacity Each

Alternate Baseline Concept with 3 Tugboats:

910 HP & 7 Tons Pulling Capacity Each



Proposed Tugboats: The following images show various possible vessels for the OpenHydro™ turbine deployment.

Suggested Tugboat: *West Point*

Length: 60'

Beam: 26'

Depth: 10'

Horsepower: 1200



Suggested Tugboat: *Pacific*

Length: 70'

Beam: 24'

Depth: 9'

Horsepower: 1550



Suggested Tugboat: *Wasp*

Length: 65'

Beam: 18'

Depth: 10'

Horsepower: 1000



ATTACHMENT 1

Draft Navigation Safety Plan

ADMIRALTY INLET PILOT TIDAL PROJECT

Navigational Safety Plan

1.0 OVERVIEW

The Admiralty Inlet passage is used by essentially all maritime traffic transiting to and from the ports of Seattle, Tacoma, Olympia, and Everett, as well as U.S. Navy facilities including Naval Station Everett, Puget Sound Naval Shipyard, and the Bangor Submarine Base. Additionally, the Port Townsend-Keystone ferry runs between Port Townsend and Admiralty Head on Whidbey Island. The location of the tidal energy project is near, but well outside of, a regulated and International Maritime Organization established Traffic Separation Scheme (TSS) under United States Coast Guard (USCG) Vessel Traffic Service (VTS) control.

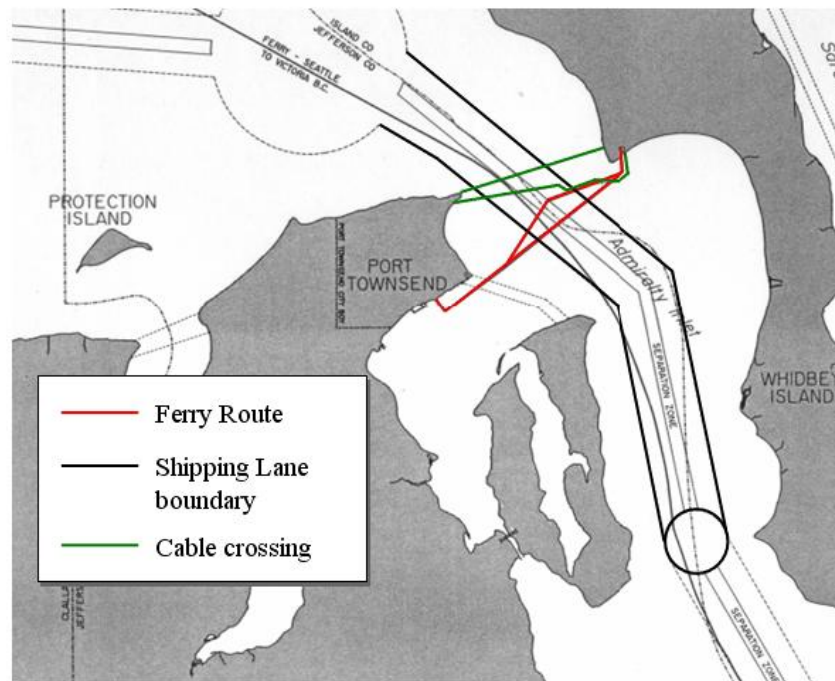


Figure 1. Shipping and ferry lanes in Northern Admiralty Inlet (PSWQA 1992).

Northern Admiralty Inlet has been closed to commercial fishing since 1987 (personal communication, B. Polagye, University of Washington with J. Jordan, WDFW, 2007), though it is within the accustomed fishing areas of several tribes. Recreational anglers use hook and line

from piers, private vessels and charter boats (Palsson et al. 1998). Sportfishing for salmon, sturgeon and other marine fish is a popular activity throughout Puget Sound. Fort Casey State Park is located next to the project and includes an underwater marine component. Marine activities in the park include boating, fishing, and diving. Diving within Northern Admiralty Inlet is primarily near shore (Polagye et al. 2007) and is not expected to conflict with the turbine deployment location. The wreck of the SS GOVERNOR is occasionally visited by advanced divers; however the wreckage is located well outside of the Project area (3-4 miles to the northwest).

Snohomish has engaged in consultation in regard navigational safety with public and private interested parties, including the US Coast Guard, the Puget Sound Pilot's Association, the US Army Corps of Engineers Navigation Division, the Washington Department of Ecology, the Washington Department of Transportation, regional Marine Resource Committees, the American Waterways Operators, and the US Navy. The District has conducted a rigorous navigational safety risk assessment for the project and believes that risks to navigational safety are both modest and readily manageable. The complete risk assessment document is appended to the end of this Project Safeguard Plan.

The Navigation Safety Plan presented here is intended to be consistent with the US Coast Guard's Navigation and Vessel Circular No. 02-07, which provides guidance on Coast Guard policy in regards offshore renewable energy installations. The Circular states in part that navigation risk assessments for such installations should describe the installation's effects on 1) visual navigation and collision avoidance, and 2) communications, radar, and positioning systems. In addition, the Circular states that a project proponent should describe plans for marine navigational marking of the project and surrounding area. Each of these is discussed below.

The purpose of the Navigation Safety Plan is to protect the public and Project facilities from such events as collisions between commercial and recreational vessels and in-water Project facilities; entanglement of fishing gear, anchors, dredging equipment, or other underwater devices that may damage or become entangled with Project transmission, anchoring, and mooring lines; and

electrocution. In the event they occur, any such event will be treated as a public safety hazard to be addressed through Snohomish's Public Safety Plan.

2.0 NAVIGATION AND COLLISION AVOIDANCE

Turbine and cable installation, maintenance, and removal will require barge, tug, and personnel vessels to operate in the Project area for periods of up to six days. All such vessels will comply with the International Rules for Preventing Collisions at Sea (COLREGS) in markings and operation.

The turbines will be deployed outside of the TSS and ferry routes and will be deployed at sufficient depths to allow for acceptable navigational clearances even for deep draft vessels. Navigational clearances for the installation of a 10-meter diameter OpenHydro turbine are presented in Figure 2 for the 58-meter water depth at Lowest Astronomical Tide measured at the deployment site. The maximum draft for ships traveling outside the Admiralty Inlet shipping lane is 6 meters (Polagye et al. 2007; personal communication, Richard McCurdy, Puget Sound Pilots, 2007). The maximum device height off the seabed is 15 meters. This will ensure a minimum clearance of 37 meters for passing ships or tug cables (Figure 2). The AWO has noted however that even this clearance level may be of concern relative to the catenary of tug and barge cables under rare, but potential, circumstances. As a result, this was the primary focus of the navigational risk assessment as well as the existing and recommended safeguards and recommended preventive measures described below.

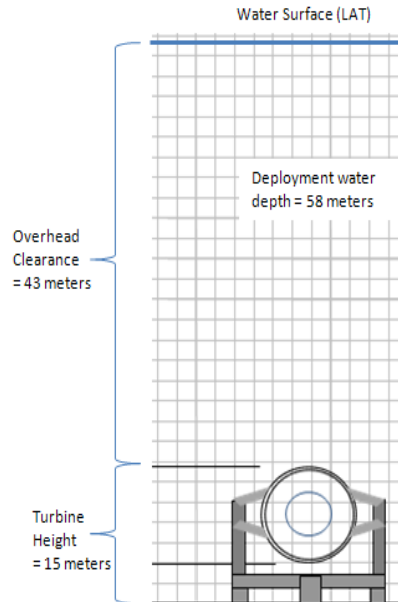


Figure 2. Clearance over installed turbines and turbine foundations.

3.0 COMMUNICATIONS, RADAR, AND POSITIONING SYSTEMS

The Project will be deployed at depth and is not expected to affect any communications, radar, or positioning systems. No concerns regarding these systems have been raised by marine users, the US Navy, or the US Coast Guard.

4.0 EXISTING SAFEGUARDS

VTS

The presence of the U.S. Coast Guard’s Vessel Traffic Service (VTS) in Puget Sound, having the specific duties of monitoring vessel traffic and issuing advisories where appropriate, is a very powerful safeguard against any marine transit accident. VTS effectively monitors, tracks and communicates with all commercial vessel traffic in the Sound, facilitating the secure and efficient flow of commerce and ensuring that potential incidents are not permitted to develop into hazardous situations. Recognition of a tow vessel’s need for early warning of opposing traffic and an understanding of the unique hazards specific to the Admiralty Inlet operating area are critical watchstander skills needed to help prevent the hazardous situations described in the risk assessment from developing.

Reduction of Towline Scope

In the event of a necessary or unexpected reduction in speed, towing vessels have the option of taking up on the span of tow cable in the water, even to the point of bringing the towed barge or vessel alongside temporarily if required. Even in the event vessel power is lost, emergency power is normally available at the tow winch, permitting the towline to be brought in.

Anchor

As a last resort, if the vessel is adrift and no assistance is immediately available, the vessel master may make both anchors ready for letting go and prepare to anchor at closest anchorage or moor at nearest harbor of safe refuge upon direction of the Captain of the Port.

5.0 RECOMMENDATIONS FOR ADDITIONAL PREVENTIVE MEASURES

Regulated Navigation Area (RNA)

In order to preclude the potential for development of a hazardous navigation situation, a request for establishment of a regulated navigation area (RNA) has been submitted in writing to the Captain of the Port, Sector Puget Sound as provided under Subpart A of 33 CFR 165, paragraph 5(b). Figure 3 shows the proposed RNA as submitted for comment. The initial RNA version showed a 500 x 1000 meter restricted area (hatched yellow rectangle in figure), oriented along the axis of the tidal flow. In order to respond to vessel operator and USCG concerns that the proposed RNA is too large and restrictive, a smaller zone (designated by the blue polygon in Figure 3) is suggested, oriented along the tidal current primary axis. In accordance with Subpart B of 33 CFR 165, paragraphs 11-12, the regulated navigation area could be designed so as to only prohibit vessel operators from towing, anchoring, bottom fishing, dredging, spudding, laying cable, and conducting salvage operations or other deep-water activities within the RNA that would disturb the seabed or interfere with the tidal energy test site. Ferry operations would not be affected, since the ferries do not conduct operations involving the subsurface waters.

Designation of a RNA would provide parameters for VTS to recommend diversionary routes to

vessels in potential meeting situations, and would provide clear guidance to vessel operators relative to the turbine site location. Given the presence of exceptionally high tidal currents and turbulence in this area, it does not appear to be too restrictive of normal use of the waterway.

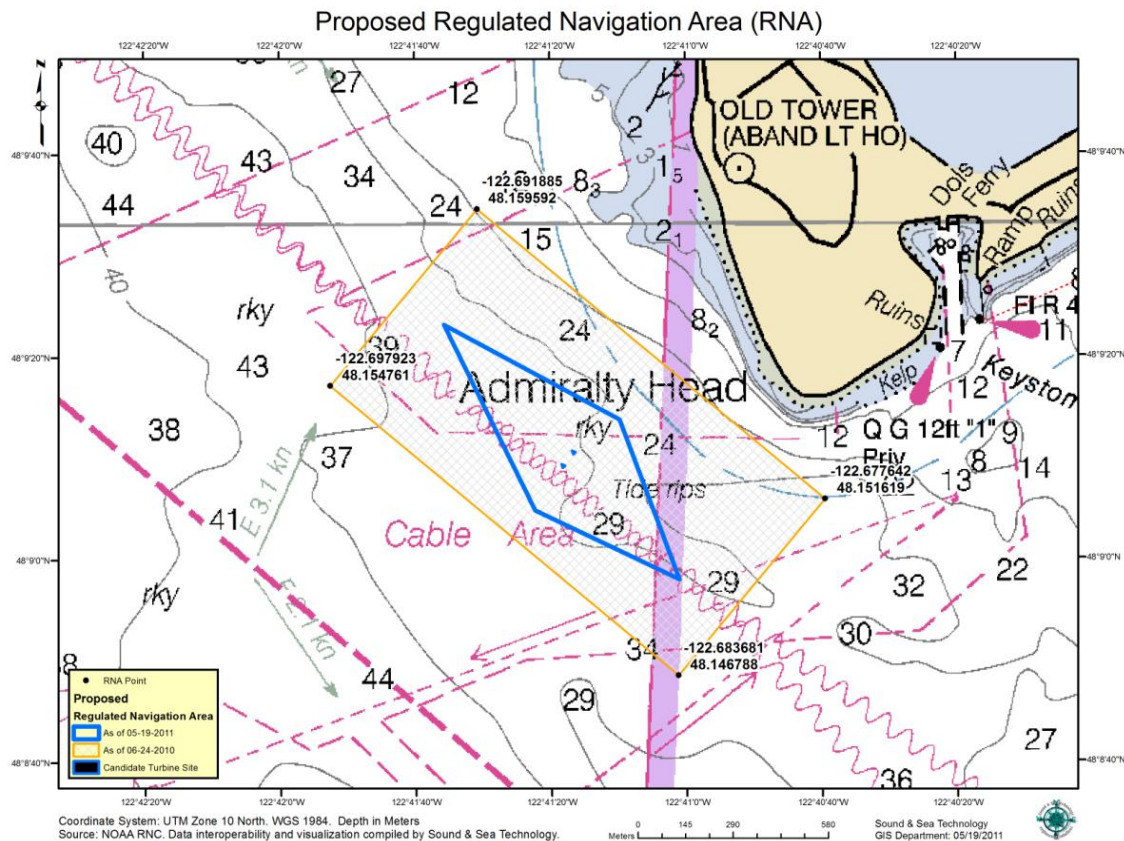


Figure 3. Proposed Regulated Navigation Area Options.

VTS Monitoring of Tugs in Test Area

VTS authority exists to control vessel traffic during conditions of vessel congestion or other hazardous circumstances. No additional monitoring requirements should be necessary.

Tug and tow avoidance of peak tidal flow zone

The project is sited directly in the peak tidal flow where turbulence is at a maximum and vessel steerage control at a minimum. It seems reasonable to suggest that shiphandling – particularly when transiting with the current – would be significantly easier and safer along a track that avoids the peak flow axis for Admiralty Inlet. A trackline farther offshore from Admiralty Head would be advantageous to reducing turbulence, particularly during the tidal ebb. One of the comments made by a towing industry representative in an early meeting to discuss AWO's

concerns mentioned the turbulence in the area and its impact on vessel control.

Tug and tow avoidance of opposing TSS lane

Regulations prohibit vessels from transiting the wrong direction in a TSS, as it is in violation of the Navigation Rules. A southbound tug and tow in a meeting situation with a northbound tug and tow, if required to alter course, should avoid entering the northbound TSS lane unless as a last resort to avoid an imminent collision or close aboard situation. If possible, the northbound vessel should alter course to the west toward or into the northbound TSS lane so as to give the southbound vessel seaway to the east of that lane.

6.0 SUMMARY

Vessel tracking statistics from over one year of Automatic Information System (AIS) monitoring provided as Attachment 1 in the risk assessment document indicate that the frequency of head-on meetings between two towing vessels in the area west of Admiralty Head (i.e., within area 2 miles long by 0.75 mile wide) near the proposed tidal energy test site is less than one occurrence per month. Given the presence in Puget Sound of USCG's VTS, a unit with an exceptional record of safety, it is difficult to envision a scenario in which advance coordination between VTS and towing vessels moving through the test site could not easily accomplish a safe passage with sea room to spare. The risk assessment also indicates that traffic in the northbound TSS lane east of the site is easily sparse enough that in most cases a small diversion of the northbound tow vessel nearer to or even across the boundary into the lane would not be likely to cause any restriction of faster-moving commercial traffic in the system. Overtaking situations between tugs operating with tows are slow enough to develop that VTS monitoring and coordination should easily preclude the necessity for close passage of two vessels in the vicinity of the tidal energy pilot project site.

Based on the observed one head-on encounter each month in the area of concern, we believe that the risk of the project to tugs and tows is easily manageable, and that required monitoring will not cause an undue burden on VTS watchstanders.

Attachment 1 – 33 C.F.R. Chapter 1

Title 33: Navigation and Navigable Waters

PART 165—REGULATED NAVIGATION AREAS AND LIMITED ACCESS AREAS

Subpart A—General

[Browse Previous](#) | [Browse Next](#)

§ 165.5 Establishment procedures.

(a) A safety zone, security zone, or regulated navigation area may be established on the initiative of any authorized Coast Guard official.

(b) Any person may request that a safety zone, security zone, or regulated navigation area be established. Except as provided in paragraph (c) of this section, each request must be submitted in writing to either the Captain of the Port or District Commander having jurisdiction over the location as described in Part 3 of this chapter, and include the following:

- (1) The name of the person submitting the request;
- (2) The location and boundaries of the safety zone, security zone, or regulated navigation area;
- (3) The date, time, and duration that the safety zone, security zone, or regulated navigation area should be established;
- (4) A description of the activities planned for the safety zone, security zone, or regulated navigation area;
- (5) The nature of the restrictions or conditions desired; and
- (6) The reason why the safety zone, security zone, or regulated navigation area is necessary.

(c) Safety Zones and Security Zones. If, for good cause, the request for a safety zone or security zone is made less than 5 working days before the zone is to be established, the request may be made orally, but it must be followed by a written request within 24 hours.

(Requests for safety zones, security zones, and regulated navigation areas are approved by the Office of Management and Budget under control number 1625–0020)

[CGD 79–034, 47 FR 29660, July 8, 1982, as amended by CGD 79–026, 48 FR 35408, Aug. 4, 1983; USCG–2006–25150, 71 FR 39211, July 12, 2006]

Subpart B—Regulated Navigation Areas

§165.10 Regulated navigation areas.

A regulated navigation area is a water area within a defined boundary for which regulations for vessels navigating within the area have been established under this part.

§165.11 Vessel operating requirements (regulations).

Each District Commander may control vessel traffic in an area which is determined to have hazardous conditions, by issuing regulations:

- (a) Specifying times of vessel entry, movement, or departure to, from, within, or through ports, harbors, or other waters;
- (b) Establishing vessel size, speed, draft limitations, and operating conditions; and
- (c) Restricting vessel operation, in a hazardous area or under hazardous conditions, to vessels which have particular operating characteristics or capabilities which are considered necessary for safe operation under the circumstances.

§165.13 General regulations.

- (a) The master of a vessel in a regulated navigation area shall operate the vessel in accordance with the regulations contained in Subpart F.
- (b) No person may cause or authorize the operation of a vessel in a regulated navigation area contrary to the regulations in this part.

Attachment 2 - Vessels passing within a 200 m radius of the proposed turbine site (92 total in 2010)

Vessel MMSI	Time of Passage	Direction	Vessel Name	Vessel Type
367408890	'Apr 03 2010 12:36'	'S'	ANNE CARLANDER	Tug/Towing
303398000	'Apr 04 2010 11:45'	'S'	TAURUS	Tug/Towing
367153930	'Aug 06 2010 07:41'	'S'	STEILACOOM 2	Ferry
366980220	'Aug 11 2010 11:10'	'S'	ALYSSA ANN	Tug/Towing
367408890	'Aug 12 2010 11:19'	'S'	ANNE CARLANDER	Tug/Towing
367010430	'Aug 15 2010 12:29'	'S'	JENNIFER H	Tug/Towing
367374350	'Aug 17 2010 19:14'	'S'	R/V Jack Robertson	Research
367444560	'Aug 20 2010 09:55'	'S'	RELISH	? 6m x 20m
366751770	'Aug 21 2010 19:04'	'S'	BILLIE H	Tug/Towing
367317770	'Aug 22 2010 14:26'	'N'	ELLIS BRUSCO	Tug/Towing
366893620	'Aug 22 2010 19:46'	'N'	CALEB	Tug/Towing
366695810	'Aug 25 2010 07:53'	'S'	WESTRAC II	Tug/Towing
366866930	'Aug 31 2010 20:33'	'N'	RESPONSE	Tug/Towing
367083650	'Dec 04 2010 17:26'	'S'	HARVESTOR	Fishing
367408890	'Dec 07 2010 21:05'	'S'	ANNE CARLANDER	Tug/Towing
366866930	'Dec 11 2010 19:52'	'S'	RESPONSE	Tug/Towing
366751770	'Dec 19 2010 18:15'	'S'	BILLIE H	Tug/Towing
303442000	'Dec 21 2010 12:02'	'S'	HERCULES	Tug/Towing
367408890	'Dec 21 2010 21:03'	'S'	ANNE CARLANDER	Tug/Towing
367153930	'Feb 02 2010 13:36'	'N'	STEILACOOM 2	Ferry
366887970	'Feb 03 2010 12:09'	'S'	PROTECTOR	Tug/Towing
366980170	'Feb 04 2010 00:50'	'S'	PACIFIC	Tug/Towing
367374350	'Feb 10 2010 17:46'	'N'	R/V Jack Robertson	Research
338033478	'Feb 16 2010 12:26'	'N'	BERING	Fishing

Vessel MMSI	Time of Passage	Direction	Vessel Name	Vessel Type
316006374	'Feb 16 2010 21:29'	'N'	WEE HAUL	Tug/Towing
367083650	'Feb 18 2010 21:26'	'S'	HARVESTOR	Fishing
366972050	'Feb 24 2010 06:12'	'N'	SWINOMISH	Tug/Towing
367408890	'Feb 25 2010 04:50'	'S'	ANNE CARLANDER	Tug/Towing
367103880	'Jan 05 2010 11:26'	'S'	TRIUMPH	Tug/Towing
366751770	'Jan 26 2010 16:03'	'S'	BILLIE H	Tug/Towing
367408890	'Jan 28 2010 19:42'	'S'	ANNE CARLANDER	Tug/Towing
366751770	'Jul 01 2010 20:41'	'N'	BILLIE H	Tug/Towing
303362000	'Jul 07 2010 19:01'	'S'	PACIFIC STAR	Tug/Towing
367408890	'Jul 09 2010 20:20'	'S'	ANNE CARLANDER	Tug/Towing
366751770	'Jul 10 2010 07:07'	'S'	BILLIE H	Tug/Towing
303442000	'Jul 12 2010 10:57'	'N'	HERCULES	Tug/Towing
319193000	'Jul 12 2010 18:16'	'N'	VANGO	Pleasure
367145330	'Jul 14 2010 12:35'	'S'	FALCON	Tug/Towing
366918910	'Jul 21 2010 11:10'	'N'	CLIFFORD A BARNES	Research
367001680	'Jul 24 2010 04:07'	'S'	VULCAN	Tug/Towing
303297000	'Jul 26 2010 09:09'	'S'	UNKNOWN	?
367367880	'Jul 28 2010 10:23'	'N'	ONLINE	Pleasure
366993250	'Jul 30 2010 11:49'	'S'	REDWOOD CITY	Tug/Towing
366980170	'Jul 31 2010 11:00'	'S'	PACIFIC	Tug/Towing
367070410	'Jun 10 2010 18:06'	'N'	LUTHER	Tug/Towing
303362000	'Jun 10 2010 21:26'	'S'	PACIFIC STAR	Tug/Towing
367145330	'Jun 12 2010 02:08'	'N'	FALCON	Tug/Towing
367114810	'Jun 19 2010 06:20'	'N'	VICTORIOUS	Pleasure
366893620	'Jun 21 2010 02:53'	'N'	CALEB	Tug/Towing
366993250	'Jun 21 2010 12:01'	'N'	REDWOOD CITY	Tug/Towing

Vessel MMSI	Time of Passage	Direction	Vessel Name	Vessel Type
366740920	'Jun 21 2010 17:14'	'N'	SHANNON	Tug/Towing
366993810	'Jun 22 2010 05:44'	'N'	WASP	Tug/Towing
303362000	'Jun 24 2010 06:40'	'N'	PACIFIC STAR	Tug/Towing
367131890	'Jun 30 2010 17:50'	'N'	VAERDAL	?
367103880	'Mar 03 2010 08:59'	'S'	TRIUMPH	Tug/Towing
368631000	'Mar 08 2010 13:38'	'N'	CAPE CAUTION	Tug/Towing
366993810	'Mar 10 2010 15:57'	'N'	WASP	Tug/Towing
316005498	'Mar 15 2010 18:12'	'S'	SEASPAN COMMANDER	Tug/Towing
367408890	'Mar 18 2010 22:26'	'S'	ANNE CARLANDER	Tug/Towing
366764740	'Mar 19 2010 10:22'	'S'	CHIEF	Tug/Towing
366751770	'Mar 21 2010 11:53'	'S'	BILLIE H	Tug/Towing
303398000	'Mar 21 2010 12:51'	'S'	TAURUS	Tug/Towing
367579000	'Mar 30 2010 09:04'	'S'	WESTERN RANGER	Tug/Towing
367374350	'May 06 2010 06:10'	'N'	R/V Jack Robertson	Research
367001680	'May 06 2010 17:50'	'N'	VULCAN	Tug/Towing
367408890	'May 10 2010 18:44'	'S'	ANNE CARLANDER	Tug/Towing
0	'May 12 2010 12:04'	'N'	Glitch	?
366751770	'May 15 2010 08:07'	'S'	BILLIE H	Tug/Towing
366811310	'Nov 01 2010 15:19'	'S'	JAMES T QUIGG	Tug/Towing
366345000	'Nov 02 2010 00:40'	'N'	THOMAS G THOMPSON	UNOLS Research
367083650	'Nov 02 2010 17:08'	'S'	HARVESTOR	Fishing
366866930	'Nov 03 2010 10:34'	'N'	RESPONSE	Tug/Towing
369514000	'Nov 06 2010 07:48'	'S'	GULF TITAN	Tug/Towing
367083650	'Nov 06 2010 20:01'	'N'	HARVESTOR	Fishing
367153930	'Nov 07 2010 19:08'	'S'	STEILACOOM 2	Ferry
367374350	'Nov 08 2010 11:05'	'N'	R/V Jack Robertson	Research

Vessel MMSI	Time of Passage	Direction	Vessel Name	Vessel Type
367083650	'Nov 09 2010 21:54'	'S'	HARVESTOR	Fishing
367374350	'Nov 10 2010 07:13'	'S'	R/V Jack Robertson	Research
367083650	'Nov 23 2010 22:00'	'S'	HARVESTOR	Fishing
366994760	'Oct 02 2010 21:37'	'N'	ALISON S	ROV Survey
366757740	'Oct 27 2010 12:51'	'S'	PETER M	Tug/Towing
367313410	'Oct 29 2010 13:19'	'S'	WINDFLIGHT	Pleasure
367153930	'Sep 05 2010 18:37'	'N'	STEILACOOM 2	Ferry
366918910	'Sep 08 2010 15:54'	'N'	CLIFFORD A BARNES	Research
366623050	'Sep 09 2010 22:14'	'S'	KIRSTEN H	Tug/Towing
367103880	'Sep 10 2010 04:59'	'S'	TRIUMPH	Tug/Towing
366980220	'Sep 12 2010 16:53'	'N'	ALYSSA ANN	Tug/Towing
303442000	'Sep 17 2010 14:57'	'S'	HERCULES	Tug/Towing
366740920	'Sep 18 2010 20:29'	'N'	SHANNON	Tug/Towing
366751770	'Sep 19 2010 17:31'	'S'	BILLIE H	Tug/Towing
366893620	'Sep 22 2010 18:46'	'N'	CALEB	Tug/Towing
366994760	'Sep 29 2010 13:03'	'N'	ALISON S	ROV Survey

The following attachments were included in the January 12, 2012, response to PC Landing Corp. but can be found in Appendix L:

ATTACHMENT 2 – *Tidal Energy Resource Characterization Journal Paper*

ATTACHMENT 3 – *Habitat Characterization Report*

ATTACHMENT 4 – *Assessment of Marine Safety Risk*

ATTACHMENT 5 – *Fugro Geophysical Report*

ATTACHMENT 6 – *Golder Geophysical Report*



November 17, 2011

Mr. Kim Moore
Assistant General Manager for the Generation Department
Mr. Craig Collar
Senior Manager of Energy Resource Development,
Public Utility District No. 1 of Snohomish County
2320 California St.
Everett, WA 98201

Re: FERC Project P-12690, Admiralty Inlet Pilot Tidal Project

Dear Messrs. Moore and Collar:

Thank you for having Sound and Sea respond to PC Landing Corp.'s initial questions regarding the proposed Admiralty Inlet Pilot Tidal Project. After reviewing the responses and the additional documents provided, PCLC has a number of follow-up questions, and also notes that there was certain essential information that we requested, which was not provided or was not available. We would appreciate your providing this information as soon as possible.

In addition, in reviewing your responses we note that SnoPUD is now proposing a slight shift in the location of the turbines to the east relative to the location of the PC-1 North cable. Nonetheless, further considering the new proposed placement of the two turbines relative to PC-1 North (104 meters and 150 meters, respectively), our understanding of the installation process, and impacts that the proximity of the turbines to PC-1 would have on our ongoing maintenance activities, we continue to have concerns with the potentially significant impact of the project on the cable.

We note that this is the first time in the planning and development of the turbine project that PCLC has had an opportunity to review any information specifically relating to the potential impact of the proposed turbine project on the existing fiber optic cable. Consequently, we may have additional information requests in order to facilitate our understanding of potential impacts and in an effort to resolve these concerns.

1. The Draft Environmental Report ("ER"), pp. 56-57, refers to several factors considered by SnoPUD in selecting a specific project location within Admiralty Inlet. As noted in Figure 1-1 of the Draft ER you provided, Admiralty Inlet is a very large area bounded by Admiralty Head, Marrowstone Point and Point Wilson. The factors articulated in the materials all appear to relate solely to the operation of the proposed turbines, such as currents, bathymetry, and proximity to existing transmission infrastructure. What other factors were considered in selecting a specific project location within Admiralty Inlet depicted in Figure 2-4? For example, were potential adverse impacts on marine species, marine traffic, contaminated sediments, commercial fisheries, and pre-existing submarine uses and facilities such as PC-1, considered?



In order to respond in a meaningful manner to the proposed location of the turbines within Admiralty Inlet, PCLC needs to be provided with and better understand SnoPUD's analysis of and rejection of other locations within Admiralty Inlet, including sediment, benthic environment, bathymetry, etc. Specifically, in the ER and your response, we see no detailed analysis of other sites within Admiralty Inlet, including between the current site and the eastern edge of the shipping lane, and the basis for the rejection of those sites in favor of the current preferred location. Please provide any such detailed analysis that has been completed by SnoPUD or its consultants. We are particularly interested as to whether other sites in Admiralty Inlet, including west of the current location, have been analyzed for suitability in terms of substrate and benthic environment, and the basis for rejection of these sites.

2. It appears that no detailed studies have been completed of sediments at the proposed project location, or alternative locations within Admiralty Inlet (including locations to the west of the current proposed location), and no proposed Route Position Lists for the export cables are available. Will that information be obtained and made available to the agencies and the public before the application is filed with FERC?

3. No exclusion zones are proposed but the ER indicates that a "Restricted Navigation Area" (RNA) will be imposed, and maintenance activities for PC-1 North will be "constrained." Please provide any analyses you have performed of how this proposal will limit or delay repairs and maintenance of PC-1, affect the cost of repairs and maintenance for PC-1, affect reliability of the PC-1 system, including the ability to respond to service interruptions and to expeditiously repair the cable in response to an emergency outage in the vicinity of the RNA. Please describe whether SnoPUD has considered any other sites within Admiralty Inlet that would avoid similar impacts on PC-1 maintenance activities, and the basis for rejection of those sites. Finally, please explain whether SnoPUD has considered or has under consideration any mitigation measures addressing the impacts on PC-1's maintenance activities and operations, including in connection with SnoPUD's proposal that in the event of required PC-1 North maintenance in the RNA, the affected cable be recovered to the north of the RNA, and then re-laid to the southwest of the existing location of PC-1 North.

4. Please explain whether SnoPUD has examined or considered whether laying PC-1 North to the southwest of its current location, as suggested by SnoPUD in the event of repair or maintenance of PC-1, would require amendments to the easements and other regulatory approvals granted to PCLC for PC-1, and if so, please provide the results of any such analysis. In particular, please discuss whether SnoPUD has considered the time and resources associated



with obtaining such amendments and any information it has from PCLC's permitting agencies on the ease, timing, cost, and likelihood of obtaining such amendments. Also, please describe the basis for and reasoning underlying SnoPUD's recommendation, that in the event of PC-1 North maintenance in the vicinity of the turbines, PCLC relay PC-1 North further to the southwest, given SnoPUD's conclusions that there is no risk of damage to PC-1 from the proposed project, or any likely impact that the proposed project would have on PC-1. Laying PC-1 North further to the southwest would also reduce the current separation between PC-1 North and PC-1 East. Please discuss whether SnoPUD has considered the effect this would have on operation, repair and maintenance of PC-1 East and PC-1 North.

5. The turbine project is, in essence, an experiment to determine if power can be generated with the proposed turbines, and to determine what impacts operation and maintenance of the turbines and export cables will have on existing marine facilities and uses such as the PC-1 cables. Please confirm, as we believe is the case, that the only prior installation of the OpenHydro turbine technology, other than in a controlled environment, was in the Bay of Fundy. Please confirm our understanding that the Bay of Fundy pilot project was terminated prematurely due to equipment failure, and provide documents and information sufficient to describe the nature of the equipment failure, including impacts on the surrounding environment, the extent of damage to the turbines, and the distance and velocity associated with the turbine's failure. We also understand that removal of the turbines required multiple attempts due to adverse tides, and weather, and we ask that you provide documents sufficient to describe the recovery operation. Also, in light of the experience with recovery in the Bay of Fundy project, please explain SnoPUD's conclusion in the Individual Cable Installation Concept document as to the ease of recovery in Admiralty Inlet, including the estimated time for turbine removal.

6. SnoPUD's Installation Concept document shows the use of tugs for positioning the cable lay barge and turbine frame. Please provide any environmental/weather analyses you have undertaken to determine the size and power of the tugs, and any contingency plan you have developed in case one of the tugs loses power or is of insufficient power.

7. The Installation Concept document and responses to PCLC questions indicate that turbine placement operation will be completed in less than 45 minutes and placed to accuracy of +/-5 meters. Has SnoPUD considered the possibility of a "pendulum effect" during turbine installation operation and any impact on placement of the turbine, as the turbine is lowered from the OpenHydro installer and cable lay vessel given currents and weather conditions? Please provide any analysis of such effects completed by SnoPUD. Please provide installation



documents related to Bay of Fundy project sufficient to show timing of installation, proximity of siting to target location, number of attempts, and the like. If a turbine is installed more than 5 meters from its intended location and/or installation required more than 45 minutes, what contingency plans does SnoPUD have to abandon and reschedule the installation and/or to remove and relocate a misplaced turbine? Given the experimental nature of this project and numerous unknowns (see 11.xi, *below*), please provide a reasonable worst case analysis in order to facilitate an adequate impact analysis as required by NEPA and SEPA .

8. In your response, SnoPUD acknowledges that there have been no prior turbine installations near submarine cables, including by OpenHydro. Given that, what is the basis for your conclusions that the proposed placement of the turbines relative to PC-1 North will have no impact on the cable or cable operations (other than the maintenance impacts which you have identified), when industry standards recommend separation of approximately 1500 meters for similar installations and conditions. Provide all analyses and critiques performed regarding the standard industry separation and the basis for your conclusion that such standard should not be applied to the Project. What contingency plans does SnoPUD have for impacts on the cable if the experiment fails to perform as planned?

9. An RNA is proposed in order to minimize the risk that a tug cable will ensnare the turbines and drag them out of position and possibly onto PC-1. Please provide any analysis of potential for tug to stray off course given current and weather conditions in Admiralty Inlet, including any details on SnoPUD's mitigation plan in event that a tug were to stray off-course and ensnare a turbine due to engine failure, adverse weather or currents, collision avoidance, or human error.

10. SnoPUD did not respond to PCLC's inquiry if a crossing of PC-1 North had been considered. Please provide all such analyses, and any basis for rejecting a PC-1 cable crossing. We note that with a cable crossing the turbines could be located at least 500 meters to the southwest of PC-1 North and still be well outside the shipping lane. We note that SnoPUD may already have to cross at least one cable based on Figure 3-1 of the Draft ER. That figure appears to show an existing "cable crossing" between Whidbey Island and Port Townsend. Does the geophysical study referred to in Figure 3-2 of the Draft ER suggest any usable sites to the southwest of PC-1 North? Incorporating all of this data into Figure 2-4 may present a more complete picture of potential turbine sites.



11. Other Comments on the Draft ER:

- (i) Sec 1.3 should address SEPA (e.g., elements of the built environment such as utilities need to be analyzed) as well as relevant state or local laws such as RCW 79.110 (Aquatic lands – easements and rights of way), RCW 79.125 (Aquatic Lands – tidelands and shorelands), and consistency with the Island County shoreline program for Whidbey (not just CZMA).
- (ii) Sec. 1.4.2 should indicate initial contacts with Pacific Crossing.
- (iii) Sec. 2.2.4 – Refers to an adaptive management process that will be employed to “allow for immediate action where necessary to address a critical adverse effect of the Project, should that occur”. PCLC should be included in this process given the potential for adverse effects on PC-1 and the experimental nature of the proposal.
- (iv) Sec. 3.3.5.2. – As noted, SnoPUD proposes to request an RNA from the Corps as a way of minimizing tug lines catching on the turbines. Please provide all analyses of the effect the RNA would have on PC-1 repair and maintenance. The RNA is shown on Fig. 3-51.
- (v) There is no analysis of other cables in the area, including the “cable crossing” from Whidbey Island to Port Townsend indicated on Figure 3-1.
- (vi) Sec. 4.3 – The section provides estimated costs of “mitigation.” It does not address costs that would be borne by others (e.g., PCLC, other cable owners, tug owners, etc.). Please confirm whether such analyses have been completed, and if so please provide copies.
- (vii) Appendix A includes bathymetric and geophysical data that may be relevant to site selection and avoidance/mitigation of adverse impacts to PC-1. Appendix C includes a “Navigation Safety Plan” that is described as part of the mitigation for repair and maintenance of PC-1. Please provide copies of the appendices, which were not included in the draft ER provided to us.
- (viii) Sec. 5.1 only looks at the project and no action, not a comparison/analysis of the alternative sites listed in Sec. 2.3 generally, or potential sites within the Admiralty Inlet “triangle” specifically.
- (ix) Sec. 5.3 does not mention unavoidable impacts to PC-1.
- (x) Sec. 6 includes a “finding of no significant impact.” Without the additional analysis noted in these comments, PCLC disagrees with this conclusion.
- (xi) NEPA- and SEPA -required analyses when information is incomplete [40 CFR § 1502.22(b); WAC 197-11-080]. This proposal is highly experimental in nature and a great deal of information is either missing or not obtainable. The Draft ER needs to include the kind of analysis required by 40 CFR § 1502.22(b) and WAC 197-11-080 (attached hereto).



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We look forward to your further response to our questions and concerns, and as noted, may have follow-up requests given that this is the first time that PCLC has had an opportunity to review information on the proposed impact of the Project on its cable system. Once such information is made available, we would be available, as suggested by Sound & Sea, for a follow-up technical meeting to discuss our continued concerns with the Project and the placement of the turbines relative to PC-1 North.

Sincerely,

PC Landing Corp

Kurt Johnson
Chief Financial Officer



Attachment
40 CFR § 1502.22(b)

(b) If the information relevant to reasonably foreseeable significant adverse impacts cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known, the agency shall include within the environmental impact statement:

(1) A statement that such information is incomplete or unavailable; (2) a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment; (3) a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment, and (4) the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community. For the purposes of this section, "reasonably foreseeable" includes impacts which have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason.

WAC 197-11-080

WAC 197-11-080

Incomplete or unavailable information.

(1) If information on significant adverse impacts essential to a reasoned choice among alternatives is not known, and the costs of obtaining it are not exorbitant, agencies shall obtain and include the information in their environmental documents.

(2) When there are gaps in relevant information or scientific uncertainty concerning significant impacts, agencies shall make clear that such information is lacking or that substantial uncertainty exists.

(3) Agencies may proceed in the absence of vital information as follows:

(a) If information relevant to adverse impacts is essential to a reasoned choice among alternatives, but is not known, and the costs of obtaining it are exorbitant; or

(b) If information relevant to adverse impacts is important to the decision and the means to obtain it are speculative or not known;

Then the agency shall weigh the need for the action with the severity of possible adverse impacts which would occur if the agency were to decide to proceed in the face of uncertainty. If the agency proceeds, it shall generally indicate in the appropriate environmental documents its worst case analysis and the likelihood of occurrence, to the extent this information can reasonably be developed.

(4) Agencies may rely upon applicants to provide information as allowed in WAC 197-11-100.

[Statutory Authority: RCW 43.21C.110, 84-05-020 (Order DE 83-39), § 197-11-080, filed 2/10/84, effective 4/4/84.]

From: [CLUER, SIMON \(SIMON\)](#)
To: [Larry Armbruster](#)
Cc: [Kallstrom, Jeffrey](#); [Kurt Johnson](#)
Subject: PC-1 Cable and the Snohomish County PUD Tidal Energy Project
Date: Friday, August 12, 2011 8:41:28 AM

Hi Larry,

Following discussions with PCLC we have developed the following set of questions based on our initial conference call on 12th July, 2011. As we discussed, our purpose in participating in the call was to share technical information relevant to each other's needs, which our respective principals have discussed and which PCLC has explained in correspondence. PCLC cannot meaningfully consider the planned location of the cables without this information.

To be certain you are using the appropriate RPLs for PC-1, please use this link:

www.cableawareness.info

The requested information will allow us to understand the proposed Project and its potential impacts so that we can assist our respective clients to evaluate the appropriate separation distance and other mitigation measures that may be needed to avoid potential interaction and interference by the Project with the existing authorised cable.

=====

Questions/Information Request for Sound and Sea

- 1) Please provide maps of the "triangle" within which the turbines are proposed to be located, as provided to the consulted agencies, and the specific location currently being proposed. If this area has changed in project planning, please provide all versions provided to other agencies and interested parties.
- 2) Please provide existing ROV surveys in the proposed Project area including the ROV surveys conducted in 2010.
- 3) Please send a Plan of Work (POW) for the next diver ROV survey, which will be to further characterize sediment cover at the turbine location.
- 4) Please provide the approximate positions for the 4 point mooring anchors for each of the turbines.
- 5) Please send the planned Route Position List for the export cable (between turbine and shore).
- 6) Please provide the detail of how the wires attached to the pre-installed anchors will be recovered for mooring the barge, and provide description of all grappling operations that will be conducted, or potentially conducted, in connection with the installation of the turbines and the export cables, and the circumstances under which such grappling operations will be conducted
- 7) Will there be an exclusion zone around the turbines and export cable, what will the exclusion zone restrict, and how will mariners be notified and compliance with the exclusion zone assured? How would such exclusion zone potentially affect vessel operations associated with repairs and maintenance of the PC1 cables?
- 8) The current Project documents are not definitive on the duration of the project and indicate the duration may change based on various factors. What are these factors, and what is the longest time period the turbines could be present? Recognizing that additional permits may be needed if monitoring indicates the project is working, is it likely that the SnoPUD would keep the turbines in place and/or

apply for a commercial-scale installation in this location?

9) If turbines are connected to export cables, and the cables are surface laid as proposed, and fishing gear or a tug cable or other external interaction snags the export cable, what prevents the cable from pulling the turbine off its location (recognizing that the turbines' weight is not determinative in all conditions)?

10) The PAD and April 2010 technical conference transcript indicate that O&M will be performed, which could include raising the turbines. Exactly how would this be done? What steps will be taken to assure nothing is blown or moved off course by weather or other factors? Please see inquiry on scope of impact analysis below for similar questions about lifecycle impacts and risks associated with planned and contingent activities.

11) Scope of Impact Study.

Please send us a detailed outline of the scope of the impact analysis you plan to perform regarding potential interaction between the Project and the PC-1 cable.

Please indicate the timing for the preparation of a draft of this analysis and of sharing it with PCLC for review prior to submittal to FERC.

Based on standard industry and environmental impact assessment procedures under NEPA and SEPA, we assume this will include the following (please confirm and, as requested above, provide a detailed outline of the impact analysis that will be performed):

A. Identification of Project elements that involve construction work in the proximity of the PC-1 cable, including site preparation and mobilization, turbine installation, cable installation and hook-up to turbines, vessels and ROV's present, ROV surveys or other actions to confirm as-built position and any actions to correct/remediate deficiencies in initial installation, etc. [Simon - add any other components of which you are aware in this item or others below]

B. Construction/installation potential impacts for each of the items in #1 above. This includes factors that could result in deviation from planned methods and mitigation proposed to avoid or otherwise mitigate the identified impacts.

C. Operational potential impacts for each of the items in #1 above. This includes, for example, potential for shifting sediments and effect on turbine location, other risks of turbines moving once in operation, vessels and ROV's involved in monitoring and vibration or other operational factors that could affect quality of PC-1 cable transmission, and mitigation proposed to avoid or otherwise mitigate the identified impacts.

D. Maintenance potential impacts for each of the items in #1 above, This includes planned maintenance as well as maintenance (however unexpected) that may become necessary in the life of the project, including recovery of turbines, repair of its cable, removal of derelict fishing gear, snagging by tug cables, and so on, and mitigation proposed to avoid or otherwise mitigate the identified impacts.

E. Demobilization potential impacts for each of the items in #1 above, and mitigation proposed to avoid or otherwise mitigate the identified impacts.

F. Long term and cumulative impacts if turbines remain in place after the pilot project concludes, and mitigation proposed to avoid or otherwise mitigate the identified impacts. This includes the potential for the area near the turbines to be used for a larger commercial project, including identifying at a general level where additional turbines could be placed.

For the analysis of potential impacts and the analysis of the effectiveness of the proposed mitigation measures of each of the above, include the likely risks and reasonable worst case analysis for unknowns and contingency actions due to the experimental nature of the project and specific conditions

(e.g. currents, substrate, implementation of other mitigation measures relating to Tribal fisheries, sensitive species, navigation, etc.), and disclose where relevant information is not available or needs to be obtained.

The earlier we can review this scope of study, the sooner we can identify questions that may need to be answered to assess adequate separation distance and mitigation plans.

12) Please provide a detailed outline of the avoidance and mitigation plan you propose, if not included in item 12 above.

13) Has a surface laid crossing of the PC1 cable been eliminated from consideration? If so, why?

14) Has OpenHydro ever placed turbines of the type proposed at this distance from an existing in-service trans-oceanic fibre optic cable of this type (i.e., not a heavily armoured surface laid cable), and if so, please identify all such cables? Do you have any data regarding location of any tidal turbines being installed in proximity to existing fibre optic cables of this type?

15) Please provide us with your analysis of alternative sites within Admiralty Inlet and in Puget Sound?

Please be advised that I am on vacation from 20th August for 2 weeks returning to the office on 5th September, therefore I would be grateful if you can keep Kurt Johnson form PCLC in cc of all correspondence.

Many thanks and Best Regards

Simon

Simon Cluer

Project Manager Marine Maintenance
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*****Please Note New E-mail Address*****

From: [Larry Armbruster](#)
To: ["CLUER, SIMON \(SIMON\)"](#)
Cc: [Kallstrom, Jeffrey](#); ["Kurt Johnson"](#); [Moore, Kim](#); [Collar, Craig](#); [Schneider, Eric](#); [Spahr, Scott](#)
Subject: RE: PC-1 Cable and the Snohomish County PUD Tidal Energy Project
Date: Wednesday, September 14, 2011 4:39:35 PM
Attachments: [Pacific Crossing PC-1 Questions and Answers 091411 - jrk.docx](#)

Simon,

I have attached our responses to your questions. You will find references to our Basecamp site that has the larger documents for you to download. I will be happy to walk you through the installation sequence charts when you wish as they may need some explanation to understand fully what is planned.

If you would like to add others to access the Basecamp site let me know and we can provide that for you.. I have already added Kurt.

Please let me know if you have any questions.

Regards,
Larry Armbruster
Mobile: 206 595-5781



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Pacific Crossing Questions

Questions/Information Request for Sound and Sea

A description of the entire project is provided in the Draft Environmental Report for the project provided on the Basecamp site (<https://soundandsea.basecampHQ.com/projects/5667125-snopud-tidal-energy-project-external/log>). This is part of the document slated to be issued to FERC in the near future. Figures included in the response are from that document.



Exhibit E Environmental Report

[Document superseded by version included in the Final License Application and filed with FERC]

- 1) Please provide maps of the "triangle" within which the turbines are proposed to be located, as provided to the consulted agencies, and the specific location currently being proposed. If this area has changed in project planning, please provide all versions provided to other agencies and interested parties.

Maps and Charts are located on the Basecamp site.



SnoPUD_Turbine_DistanceToShippingLane_jk_08222011

[Attachment 1]



SnoPUD_DeploymentArea_Monuments Extent_jk_08152011

[Attachment 2]

- 2) Please provide existing ROV surveys in the proposed Project area including the ROV surveys conducted in 2011

A DVD of the video with the chart of the track lines of interest has been mailed to Simon Cluer on 13 September 2011. This will cover the area of turbine T2a which is the closest turbine to PC-1 (100m). Turbine site T1a requires additional ROV survey not done yet. Once it is completed that video will be provided.

- 3) Please send a Plan of Work (POW) for the next diver ROV survey, which will be to further characterize sediment cover at the turbine location.

There is no sediment cover at the site. The site is covered with 6-8 inch cobbles with estimated thickness of 0.5 to 1 m. The ROV survey is to complete the habitat map to cover the new area not covered previously. Since we moved the turbines east we have additional area to survey. The survey is a video only survey. There is a potential that a future geotechnical survey will be planned and if so the plan will be provided.

- 3) Please provide the approximate positions for the 4 point mooring anchors for each of the turbines.

There are no anchors for the turbines. The turbines are on a tri-frame gravity base requiring no anchors. We will place anchors for other non installation tasks such as future ROV surveys required under the environmental permitting requirements. The anchors are pre-installed and proof tested to maximum loading due to spring tides and storm surge.

We show the two anchors we plan to install on the chart on the Basecamp site.



SnoPUD_AnchorLocation_jk_08252011

[Attachment 3]

- 4) Please send the planned Route Position List for the export cable (between turbine and shore).

Pacific Crossing Questions

That list will be sent as soon as prepared. We have held off preparing it until the ROV survey is completed. The chart in the answer to Question 1 is a precise representation of the route pending video confirmation of the route.



SnoPUD_DeploymentArea_Monuments Extent_jk_08152011 [Attachment 2]

- 5) Please provide the detail of how the wires attached to the pre-installed anchors will be recovered for mooring the barge, and provide description of all grappling operations that will be conducted, or potentially conducted, in connection with the installation of the turbines and the export cables, and the circumstances under which such grappling operations will be conducted.

The two point mooring is not used for installation since we have selected to install one cable from each turbine to shore. We plan to install and proof test two anchors well to the east of PC-1 to use for ROV or maintenance operations. However, the previous installation two point mooring approach is detailed on the Basecamp site. It describes how the mooring cables are retrieved without grappling. Slides 1-10 describe the process for retrieving the mooring lines and securing the barge which will be the ROV barge on periodic inspections and not the installation sequence described in A above. We recommend a conference call to go over the installation process so you may understand the entire process. It should be noted that the two cable option has been selected and that the turbines and cables are installed without utilizing anchors anywhere in the vicinity of PC-1. The only anchor evolution is near the exit point of the Horizontal Directional Drilled (HDD) cable landing well away from PC-1.



Open Hydro Two-Point Mooring Installation Concept Drawing (JWB 080...

[Attachment 4]

- 6) Will there be an exclusion zone around the turbines and export cable, what will the exclusion zone restrict, and how will mariners be notified and compliance with the exclusion zone assured? How would such exclusion zone potentially affect vessel operations associated with repairs and maintenance of the PC1 cables?

At this time the USCG is not requiring an exclusion area. There will be no surface buoys, PATONs or other markers of the area. USCG Sector Puget Sound that the CG is comfortable at this time with NOT issuing a formal Regulated Navigation Area (RNA) for the SNO-PUD tidal energy site, instead allowing their Vessel Traffic Service command center to manage any transiting vessels operating in the area outside the TSS. Because of the currents and fishing restrictions, there is little reason that anyone would attempt to anchor in the area. Any repair ship operations would be coordinated with the Vessel Traffic Control system as a normal protocol and they would coordinate activity with the normal ferry and shipping traffic in the immediate vicinity. The only constraint to repair operations is the grappling would be somewhat constrained to an area north of the turbine site or south of it so as not to impact the turbine or power cables. Lay down following splicing of the repair segment would be better if done on the west side of PC-1. No other constraints are anticipated.

- 7) The current Project documents are not definitive on the duration of the project and indicate the duration may change based on various factors. What are these factors, and what is the longest time period the turbines could be present? Recognizing that additional permits may be needed if monitoring indicates the project is working, is it likely that the SnoPUD would keep the turbines in place and/or apply for a commercial-scale installation in this location?

The turbines are to be installed in 2013 and the license for the pilot project is for a maximum of ten years (though the District is considering a shorter duration). The project could be terminated earlier due to a number of factors including equipment failure and environmental concerns. Any extension of time would require re-licensing. No commercial use is planned by the District at this time.

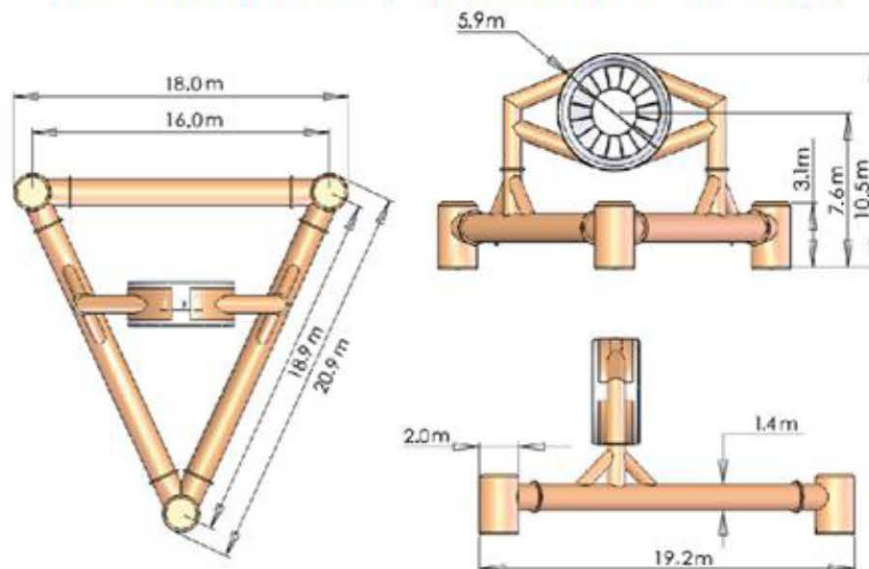
Pacific Crossing Questions

- 8) If turbines are connected to export cables, and the cables are surface laid as proposed, and fishing gear or a tug cable or other external interaction snags the export cable, what prevents the cable from pulling the turbine off its location (recognizing that the turbines' weight is not determinative in all conditions)?

There are no bottom trawl fisheries in this area. The subsea base weighs 240 tons in seawater and the cable breaking strength is expected to be at least two orders of magnitude less than the subsea base weight. In addition the cable termination to the subsea base is significantly below the CG so overturning from cable snags is not possible.

Pacific Crossing Questions

FIGURE 2-2
OPENHYDRO TURBINE (PLAN, FRONT, AND SIDE VIEWS)



Note: Dimensions in meters

FIGURE 2-3
TRIAL ASSEMBLY OF 10 METER OPENHYDRO TURBINE & SUBSEA BASE
(DARTMOUTH, NOVA SCOTIA, CANADA)



- 9) The PAD and April 2010 technical conference transcript indicate that O&M will be performed, which could include raising the turbines. Exactly how would this be done? What steps will be taken to assure nothing is blown or moved off course by weather or other factors? Please see inquiry on scope of impact analysis below for similar questions about lifecycle impacts and risks associated with planned and contingent activities.

Pacific Crossing Questions

Turbine recovery is expected to be accomplished with the OpenHydro Installer barge, the same one used for deployment. A recovery frame is deployed while the barge is maintained in position by Z-drive tugs. No anchoring is required. The whole recovery operation has been demonstrated by OpenHydro in the Bay of Fundy in recovery of a 10 m turbine. It takes less than 45 minutes and does not drag anything on the bottom. From the time of connection to the turbine until the turbine is off the bottom is less than 10 minutes. Recovery will only be scheduled in good weather conditions. See the installation slides for a pictorial view of how installation and recovery is accomplished.

 [Open Hydro Single Cable Installation Concept Drawing \(JWB 080511\)](#) [Attachment 5]

11) Scope of Impact Study.

Please send us a detailed outline of the scope of the impact analysis you plan to perform regarding potential interaction between the Project and the PC-1 cable.

The planned operations are:

- Surveys for resource assessment, bathymetry, geotechnical and habitats
- Environmental baseline data collection
- Installation of the two turbines
- Installation of the power export cables
- Operations; ROV surveys and Maintenance
- Decommissioning

Please indicate the timing for the preparation of a draft of this analysis and of sharing it with PCLC for review prior to submittal to FERC.

Based on standard industry and environmental impact assessment procedures under NEPA and SEPA, we assume this will include the following (please confirm and, as requested above, provide a detailed outline of the impact analysis that will be performed):

- A. Identification of Project elements that involve construction work in the proximity of the PC-1 cable, including site preparation and mobilization, turbine installation, cable installation and hook-up to turbines, vessels and ROV's present, ROV surveys or other actions to confirm as-built position and any actions to correct/remediate deficiencies in initial installation, etc. [Simon - add any other components of which you are aware in this item or others below]

There is no on site mobilization work nor any site preparation work required. Mobilization of the installation vessels occurs at a local shipyard.

The work planned for installation is described in the MS PowerPoint charts on the Basecamp site. It would be useful to have a web meeting for us to go over the detailed plans with you so you may gain an understanding of the operations.

 [Open Hydro Single Cable Installation Concept Drawing \(JWB 080511\)](#) [Attachment 5]

- B. Construction/installation potential impacts for each of the items in #1 above. This includes factors that could result in deviation from planned methods and mitigation proposed to avoid or otherwise mitigate the identified impacts.

Pacific Crossing Questions

The description and web meeting for Item A above will address how we mitigate potential impacts. Also we have prepared a MS PowerPoint addressing potential impacts posted on the Basecamp site.



Considerations for PC-1 Protection 062411

[Attachment 6]

- C. Operational potential impacts for each of the items in #1 above. This includes, for example, potential for shifting sediments and effect on turbine location, other risks of turbines moving once in operation, vessels and ROV's involved in monitoring and vibration or other operational factors that could affect quality of PC-1 cable transmission, and mitigation proposed to avoid or otherwise mitigate the identified impacts.

Operations threats will not involve shifting sediments as the bottom is cobbles generally 2-6 inches of 1 to 3 feet thick over the entire area of the turbines.

FIGURE 3-3
NNMREC GRAB SAMPLES IN THE TURBINE DEPLOYMENT AREA



Source: NNMREC 2009a

Turbine movement is monitored real time by accelerometers and tilt sensors and the base is designed conservatively to assure there is no sliding or overturning potential. The base has a wide stance and is ballasted to 240 tons in water. In addition the nearest turbine is 100m east of PC-1 and the prevailing current direction is approximately parallel to PC-1. As previously mentioned ROV operations for validating the installation and cable lay will be done on installation and at least quarterly for the first year to assure no unexpected shifting or settling is occurring. The initial ROV operations are done from a live boat requiring no anchoring. No ad hoc anchoring for any maintenance operation is planned nor will it be allowed. Turbine removal is accomplished via the live boat scenario described in A above.

Pacific Crossing Questions

- D. Maintenance potential impacts for each of the items in #1 above, This includes planned maintenance as well as maintenance (however unexpected) that may become necessary in the life of the project, including recovery of turbines, repair of its cable, removal of derelict fishing gear, snagging by tug cables, and so on, and mitigation proposed to avoid or otherwise mitigate the identified impacts.

No ad hoc anchoring for any maintenance operation is planned nor will it be allowed. Turbine removal is accomplished via the live boat scenario described in A above. The environmental monitoring system is mounted on the turbine subsea base and not separately deployed on the sea floor. Maintenance of the environmental system is accomplished by ROV and surface vessels using the pre-installed anchors. An ROV firm will be retained for planned and unplanned inspections and any derelict fishing gear removal. Natural Resource Consultants has been retained by state agencies for derelict gear removal in the area for many years and has reported that it has been in steep decline and may not be allowed in the turbine area by the USCG. Puget Sound Vessel Traffic Control will monitor the tug traffic in the vicinity as described in 6 above. In the event of a snag by a tow cable the turbines would likely be damaged but tugs run north and south not east to west (from shore to seaward) as would be required to drag the turbines over PC-1.

- E. Demobilization potential impacts for each of the items in #1 above, and mitigation proposed to avoid or otherwise mitigate the identified impacts.

Demobilization is accomplished via the live boat scenario described in the response to A above. If the power cables are recovered as opposed to left in place they will be recovered using the reverse of the cable lay approach described in A above.

- F. Long term and cumulative impacts if turbines remain in place after the pilot project concludes, and mitigation proposed to avoid or otherwise mitigate the identified impacts. This includes the potential for the area near the turbines to be used for a larger commercial project, including identifying at a general level where additional turbines could be placed.

The demonstration permit is for five to ten years and two turbines. Any future use would have to be repurposed. Turbine locations would have to be readdressed during that scoping and permitting activity. The two turbines must be removed at the end of the demonstration period, unless an additional license is received. The focus of the project is an environmental, engineering, and economic assessment of tidal turbines and future commercial viability is speculative at this point.

For the analysis of potential impacts and the analysis of the effectiveness of the proposed mitigation measures of each of the above, include the likely risks and reasonable worst case analysis for unknowns and contingency actions due to the experimental nature of the project and specific conditions (e.g. currents, substrate, implementation of other mitigation measures relating to Tribal fisheries, sensitive species, navigation, etc.), and disclose where relevant information is not available or needs to be obtained.

The earlier we can review this scope of study, the sooner we can identify questions that may need to be answered to assess adequate separation distance and mitigation plans.

- 12) Please provide a detailed outline of the avoidance and mitigation plan you propose, if not included in item 12 above.

Our mitigation plans are in the PowerPoint presentation on the Basecamp site. Mitigation and avoidance steps have included moving the turbine sites further east to avoid the electrical cables crossing the existing cables and to increase separation to PC-1 to 100 m. Turbine and cable installation is done without the use of anchors. Maintenance and environmental monitoring with an ROV will be done with

Pacific Crossing Questions

two semi-permanent anchors installed and proof tested at the onset of the pilot project. They are located as shown in the answer to Question 4.



Considerations for PC-1 Protection 062411

[Attachment 6]

13) Has a surface laid crossing of the PC1 cable been eliminated from consideration? If so, why?

There is no crossing of PC-1. The turbine sites have been moved further to the east as shown in the answer to Question 1. The current sites maintain a separation of 104 m or more and the cables to shore run to the south east away from PC-1. There are several aspects to the decision of sitting which include: tidal resource, bathymetry, geophysical/geotechnical, proximity to shore landing, adequacy of shore facilities, avoidance of crossing PC-1, navigation, and cable routing.

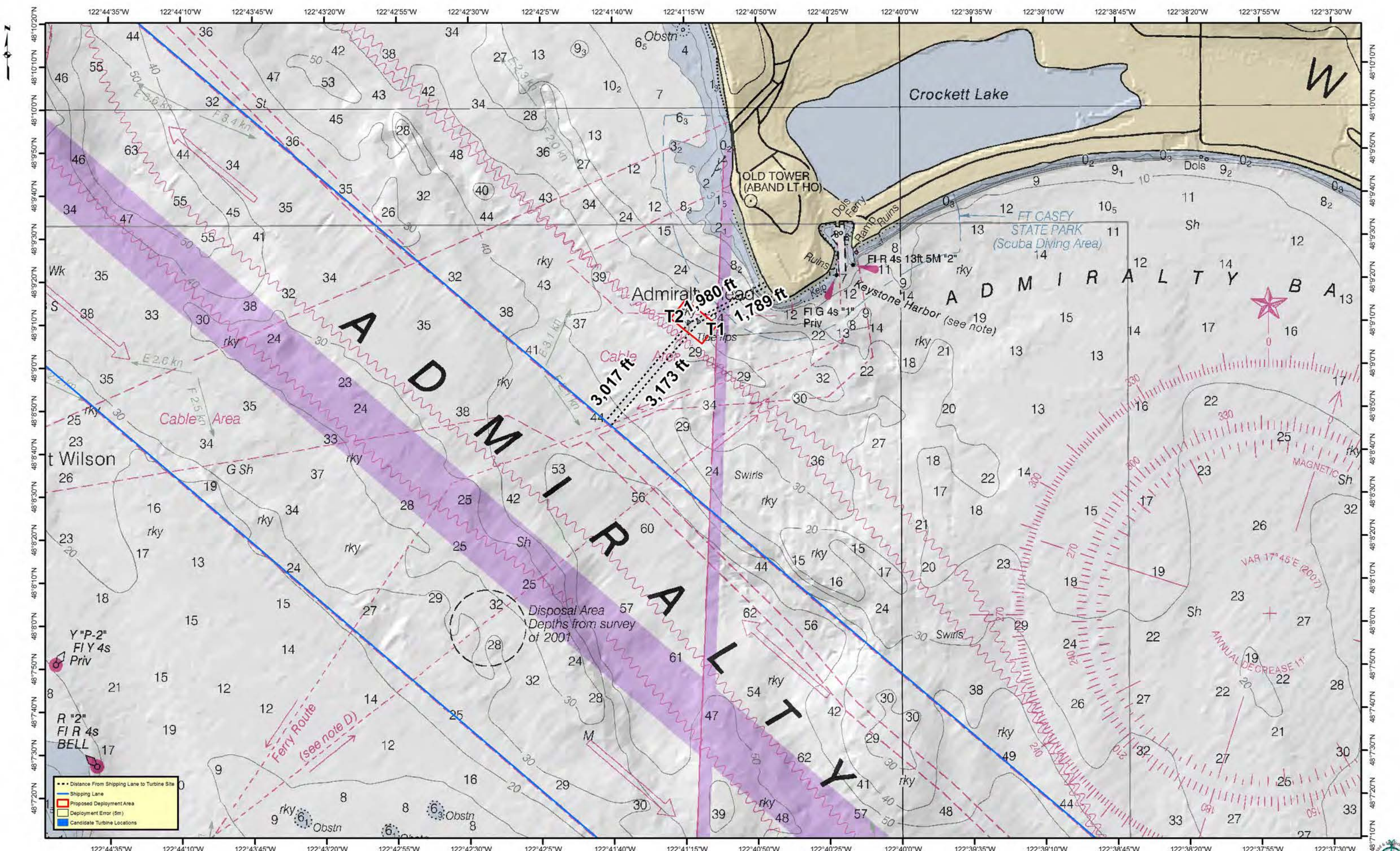
14) Has OpenHydro ever placed turbines of the type proposed at this distance from an existing in-service trans-oceanic fibre optic cable of this type (i.e., not a heavily armoured surface laid cable), and if so, please identify all such cables? Do you have any data regarding location of any tidal turbines being installed in proximity to existing fibre optic cables of this type?

No, OpenHydro installations have not been adjacent to telecommunications cables. At this time we have no other data on tidal installations adjacent to telecommunications cables.

15) Please provide us with your analysis of alternative sites within Admiralty Inlet and in Puget Sound?

The sites are identified on the chart provided on the Basecamp site and are also described in the DRAFT Environmental Report provided on the Basecamp site. Also, detailed rationale for the selection of the site is dealt within the FLA.

ATTACHMENT 1



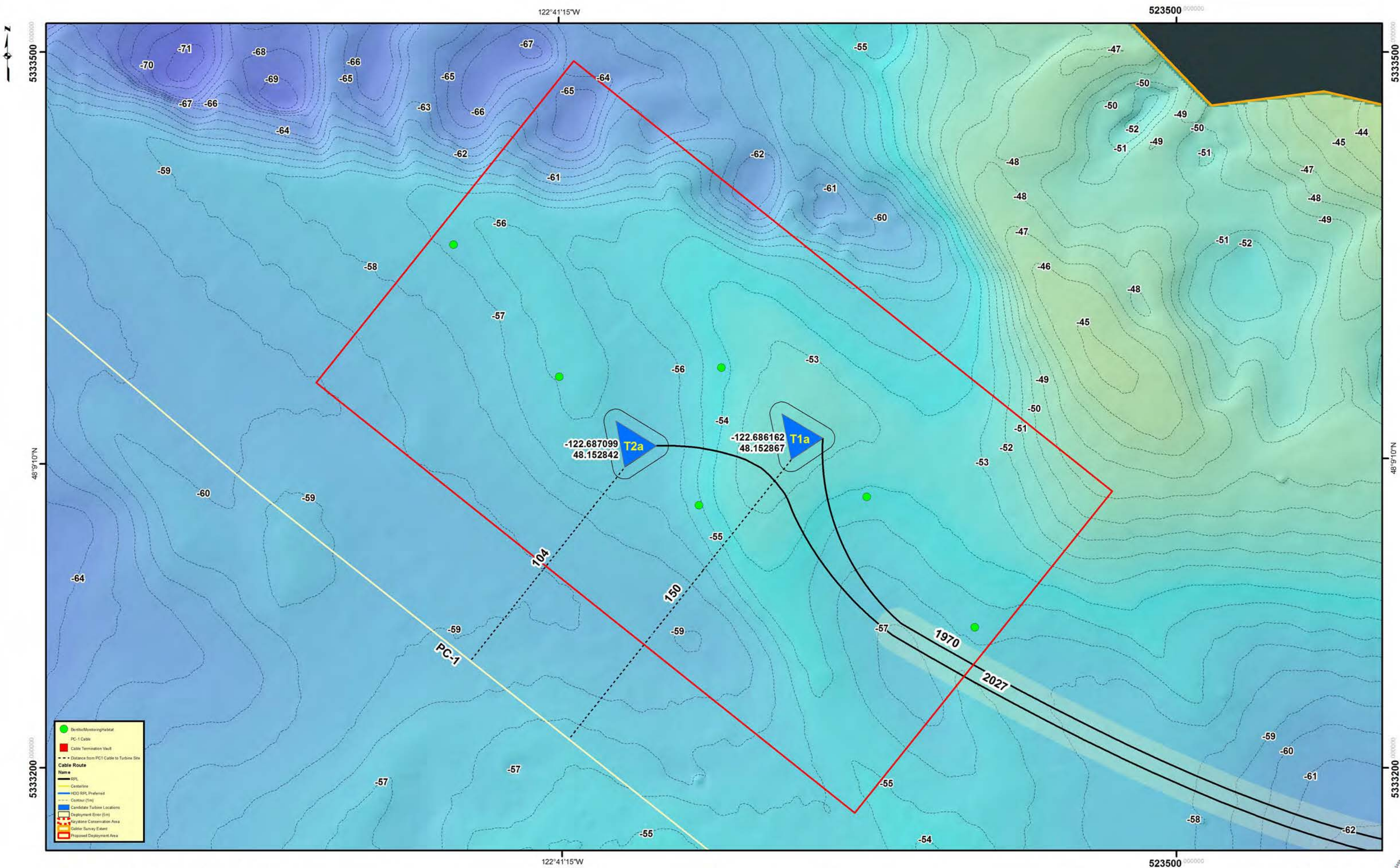
Source: NOAA, Sound & Sea Technology, Inc.
Coordinate System: UTM Zone 10 North. WGS 1984. Sounding in Fathoms.

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Kilometers

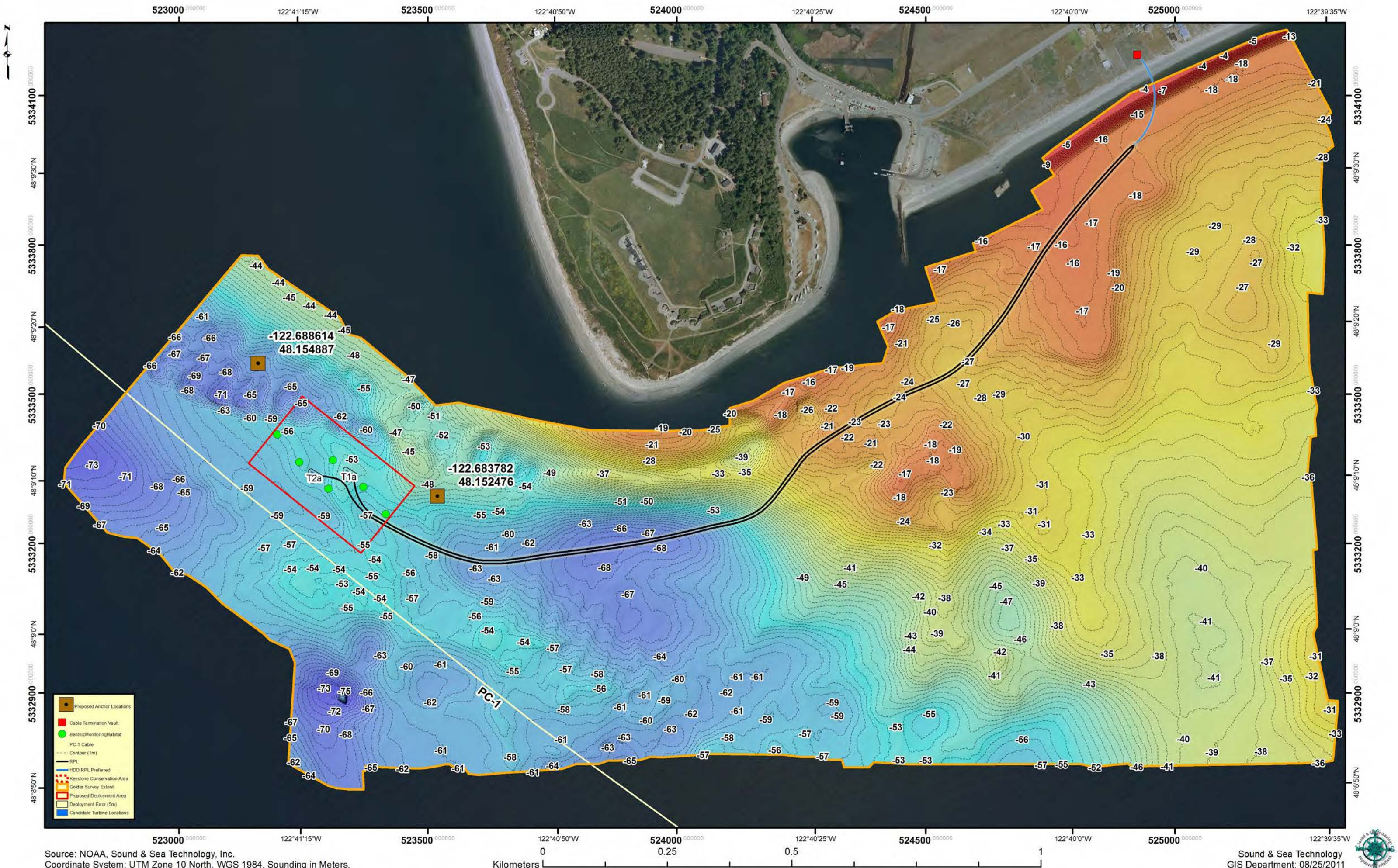
Sound & Sea Technology
GIS Department: 08/22/2011



ATTACHMENT 2



ATTACHMENT 3



ATTACHMENT 4



OpenHydro SnoPud Project

Turbine Deployment & Cable Planning
Two-Point Mooring Installation Concept
August 5, 2011



Installation Conditions

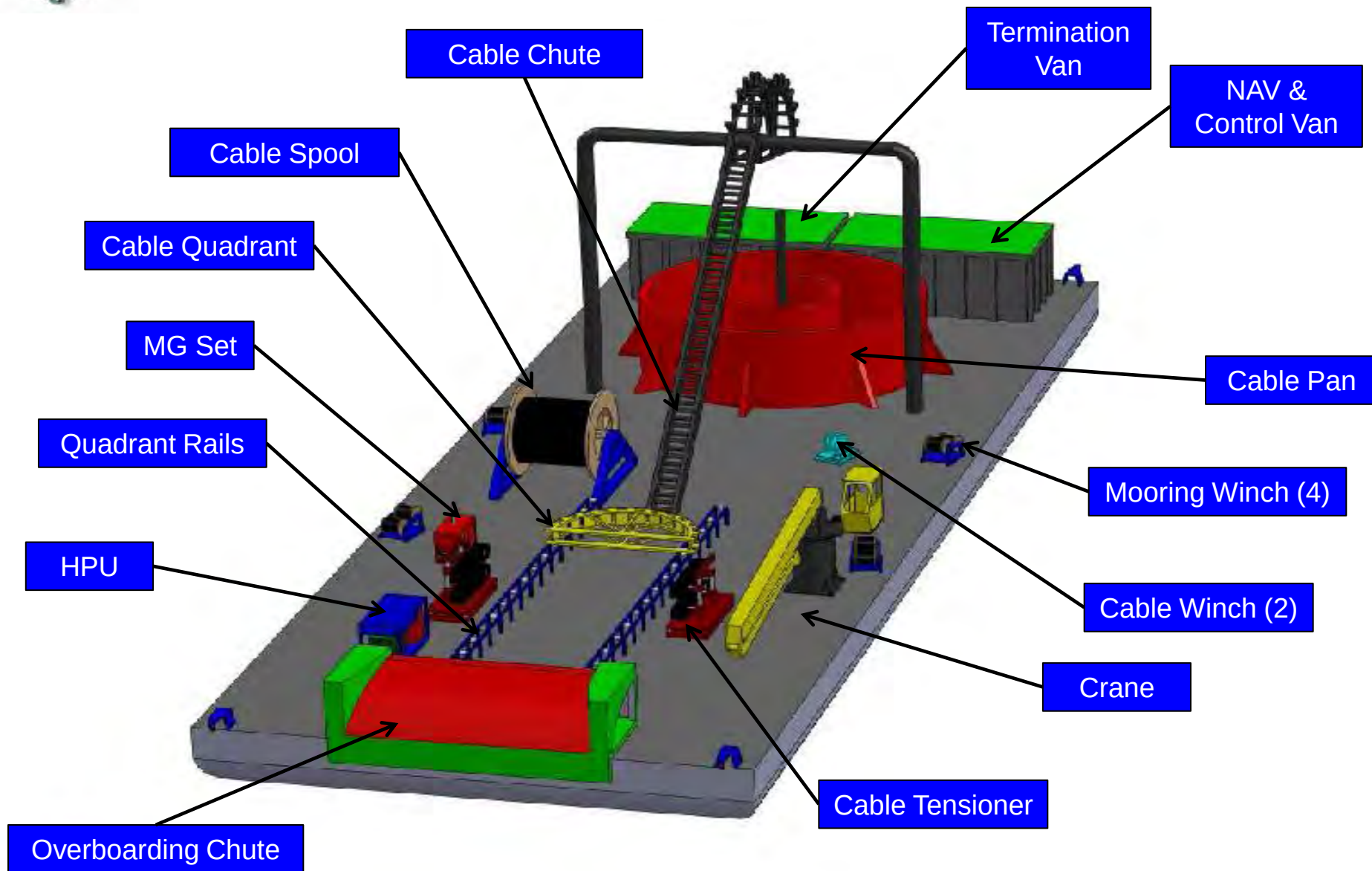
- ✓ Two anchors and mooring lines preinstalled and proofed
- ✓ Use of OpenHydro Installer for turbine installation
- ✓ Barges used for cable lay of turbine pigtails and jointing
- ✓ Trunk cable prelaid
- ✓ PC-1 cable precludes:
 - ✓ anchor set to west of or close to PC-1 cable
 - ✓ any incidental anchoring
 - ✓ grappling
- ✓ Install turbines on weakening ebb flow, nominally 1kt
- ✓ East most turbine installed first and connected to trunk cable
- ✓ Assume cable is heavy enough to preclude additional cable stabilization
- ✓ ROV support available during entire operation
- ✓ All tugs used to position are tractor tugs
- ✓ System health checks verify performance at each critical stage



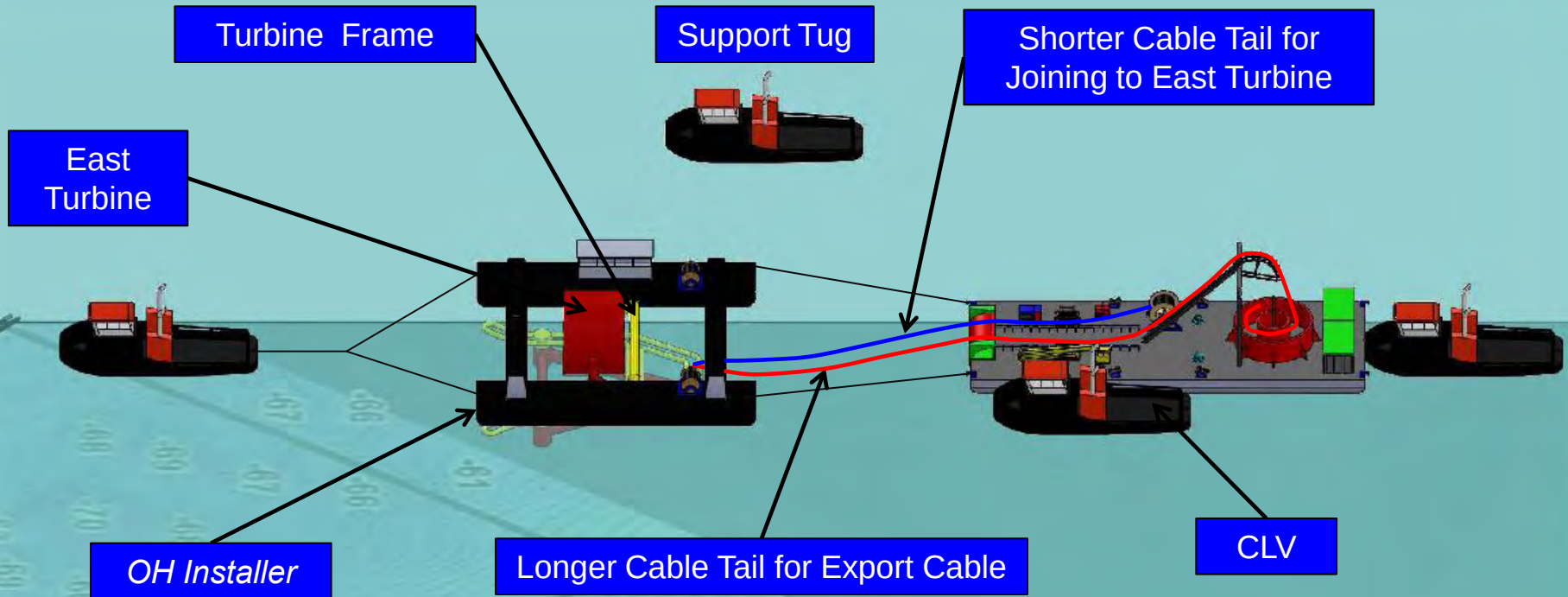
Appendix of Acronyms

<u>Description</u>	<u>Acronym</u>
Cable Laying Vessel	CLV
Openhydro	OH
Hydraulic Power Unit	HPU
Pacific Crossing Cables	PC-1

CLV Layout

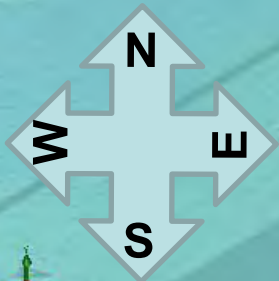


Open Hydro Original Installation Concept

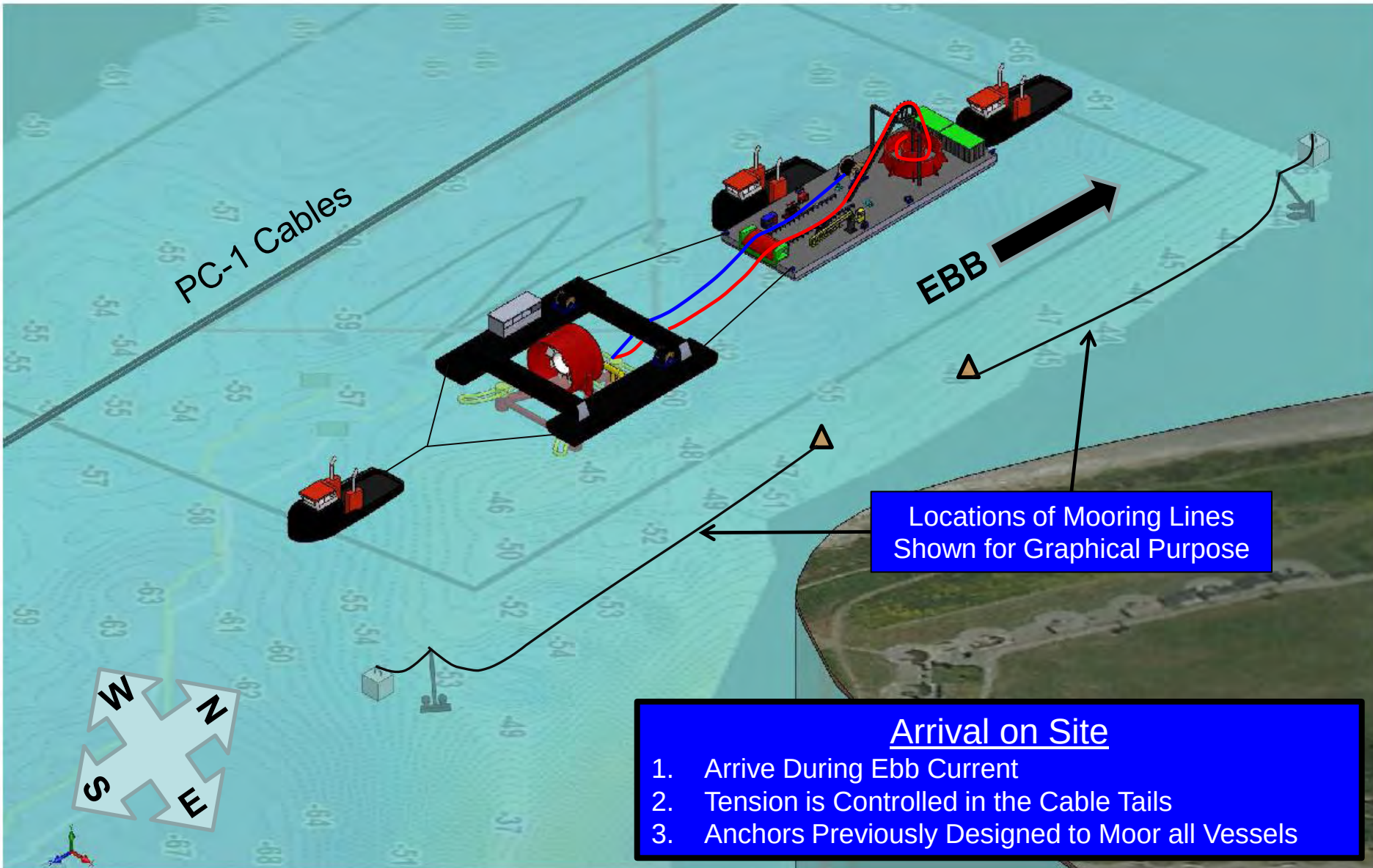


Transportation to Site

1. Tug Boat is Coupled to *OH Installer*
2. CLV is Coupled to *OH Installer*
3. East to West Turbine Joining Cable Tail is Aboard CLV
4. Export Cable Tail is Aboard CLV
5. Steering and Pushing Tugs Assist CLV
6. Support Tug in Standby Position

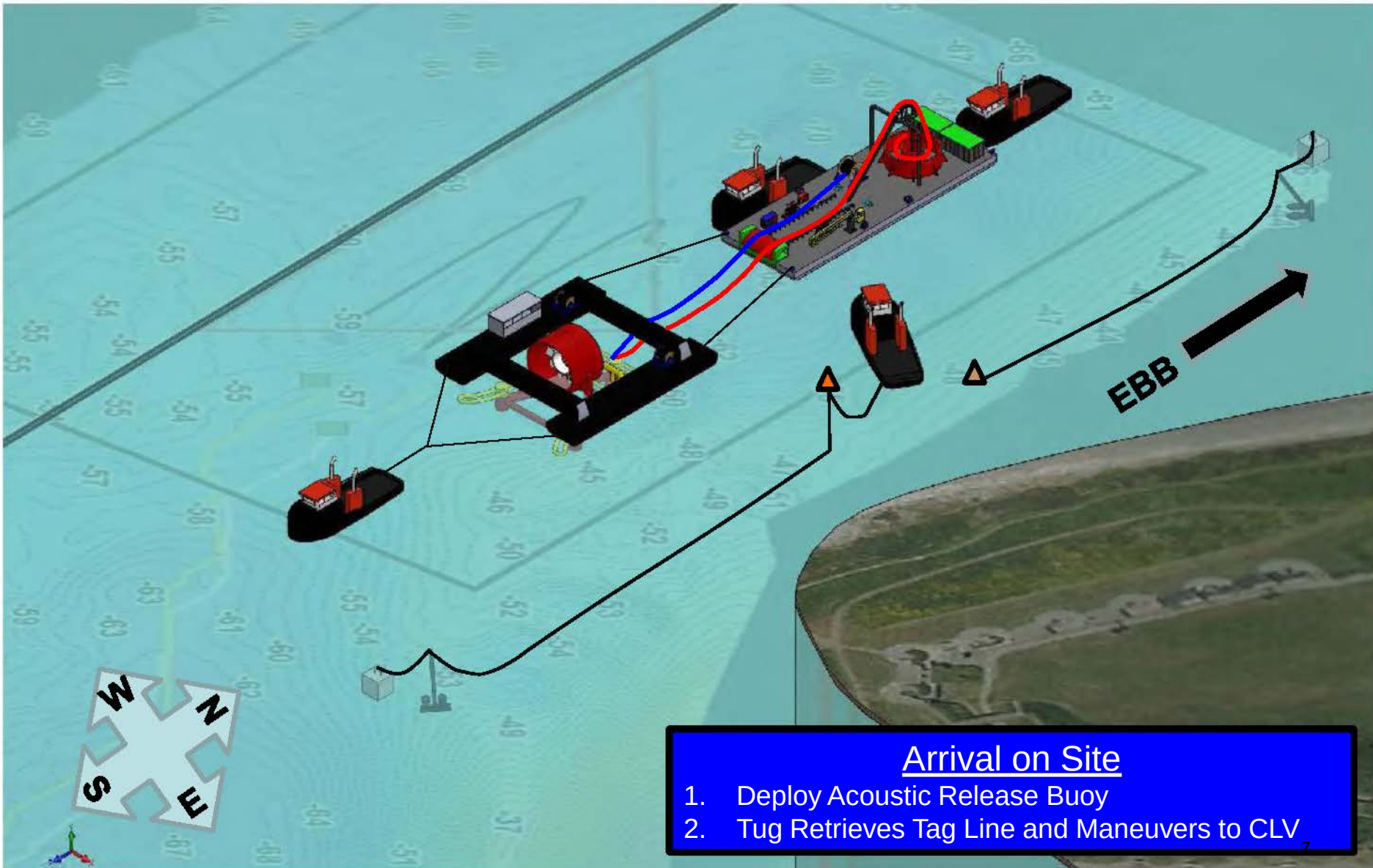


Open Hydro Two-Point Moor Installation Concept





Open Hydro Two-Point Moor Installation Concept



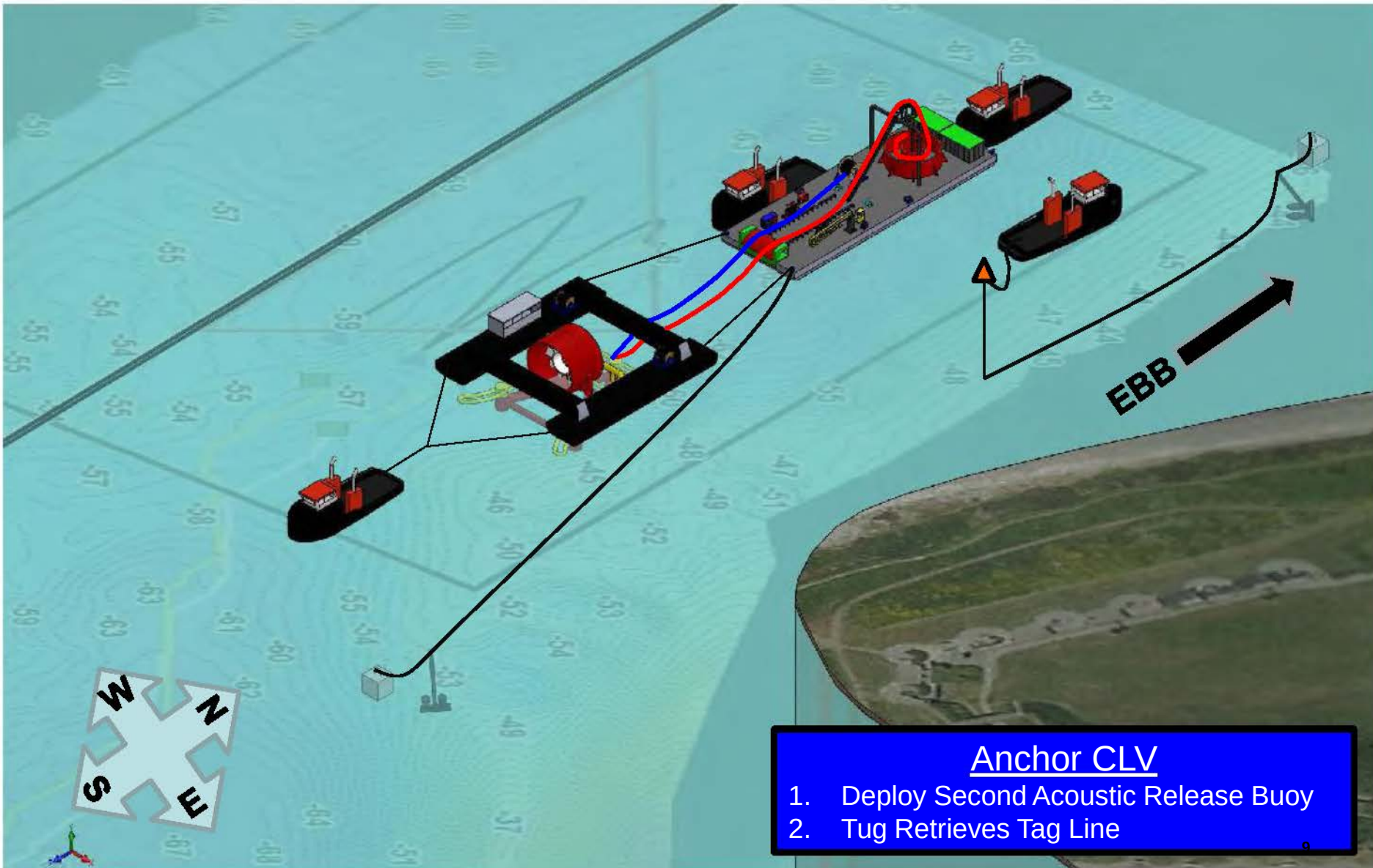


Open Hydro Two-Point Moor Installation Concept





Open Hydro Two-Point Moor Installation Concept

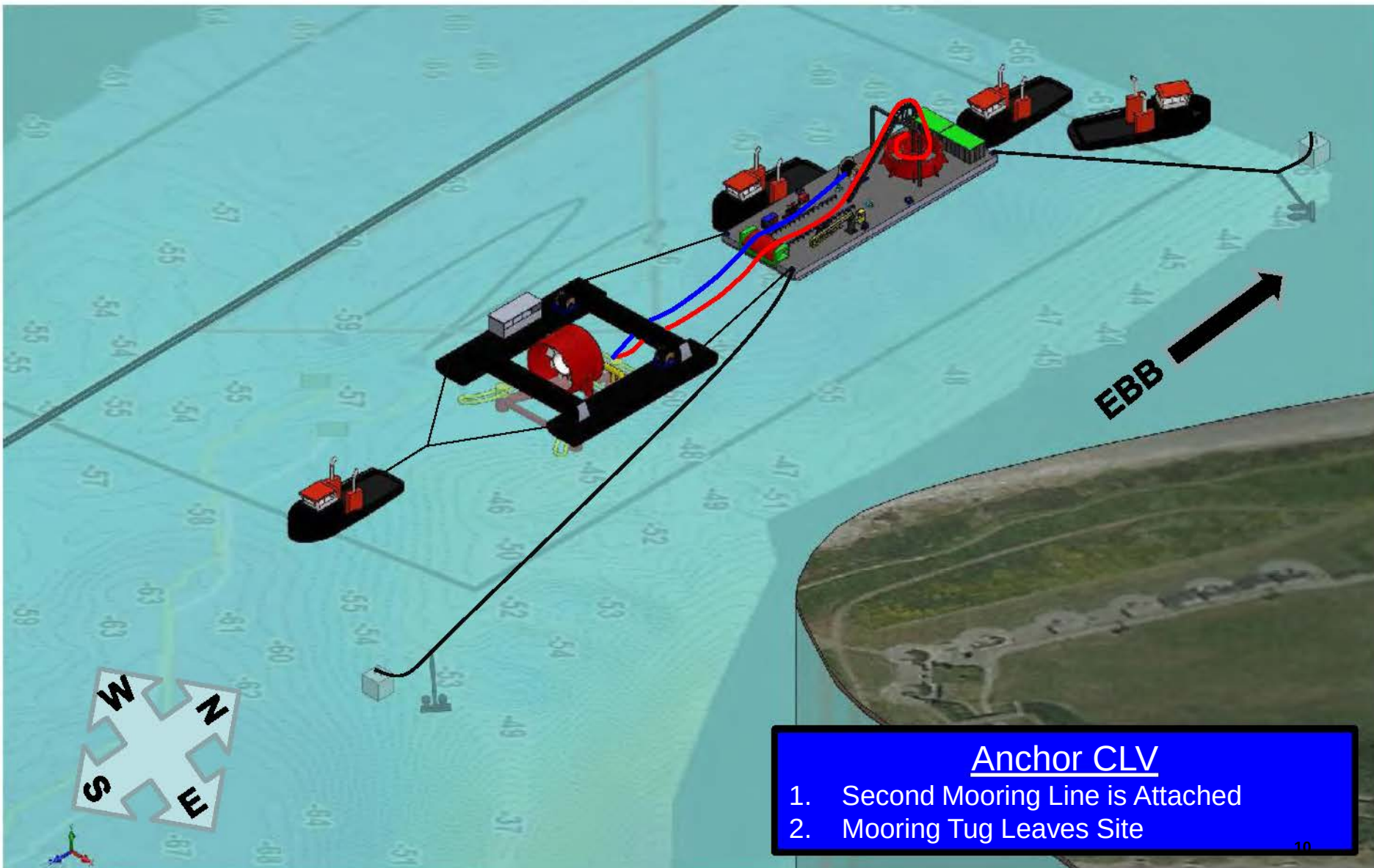


Anchor CLV

1. Deploy Second Acoustic Release Buoy
2. Tug Retrieves Tag Line

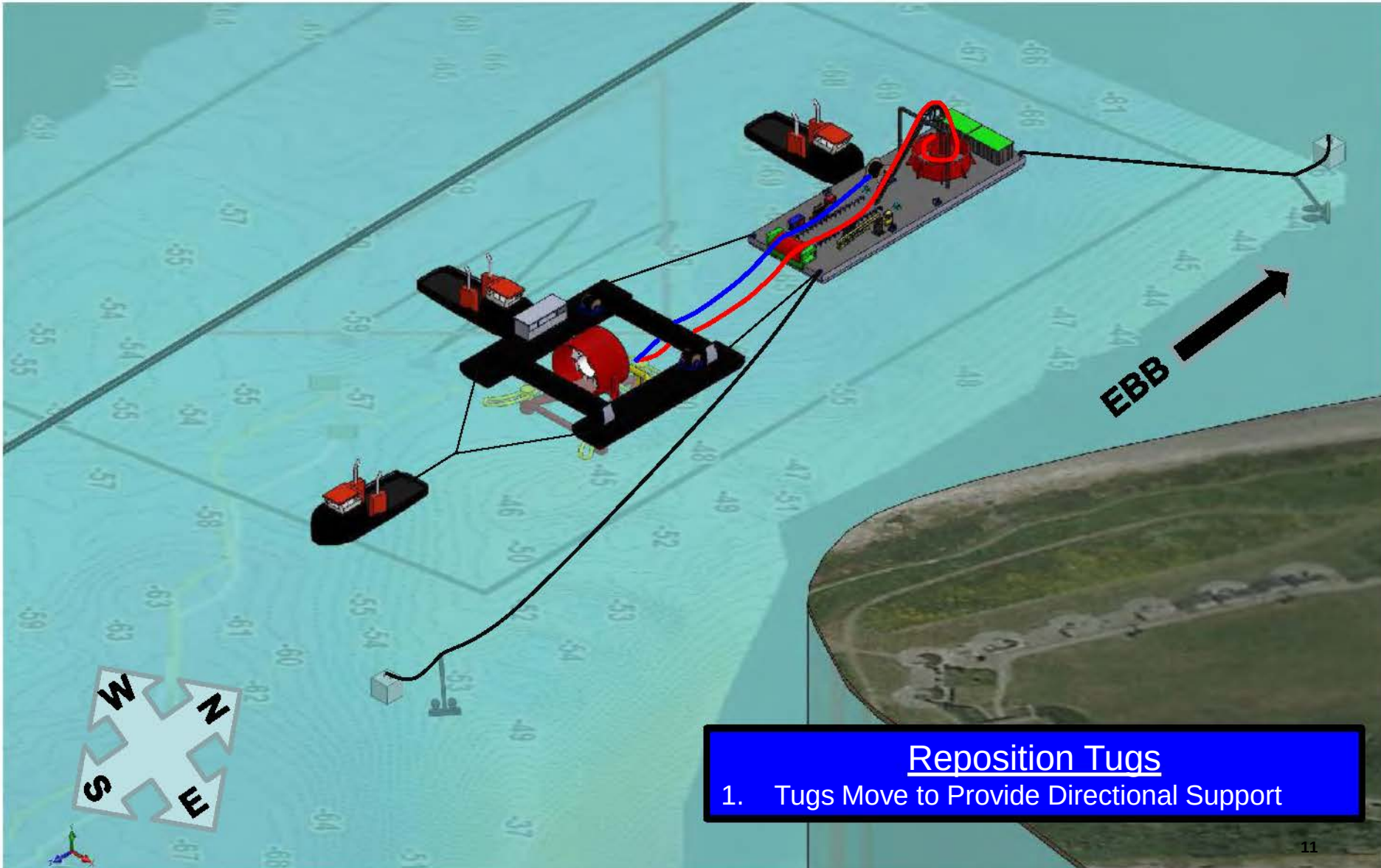


Open Hydro Two-Point Moor Installation Concept





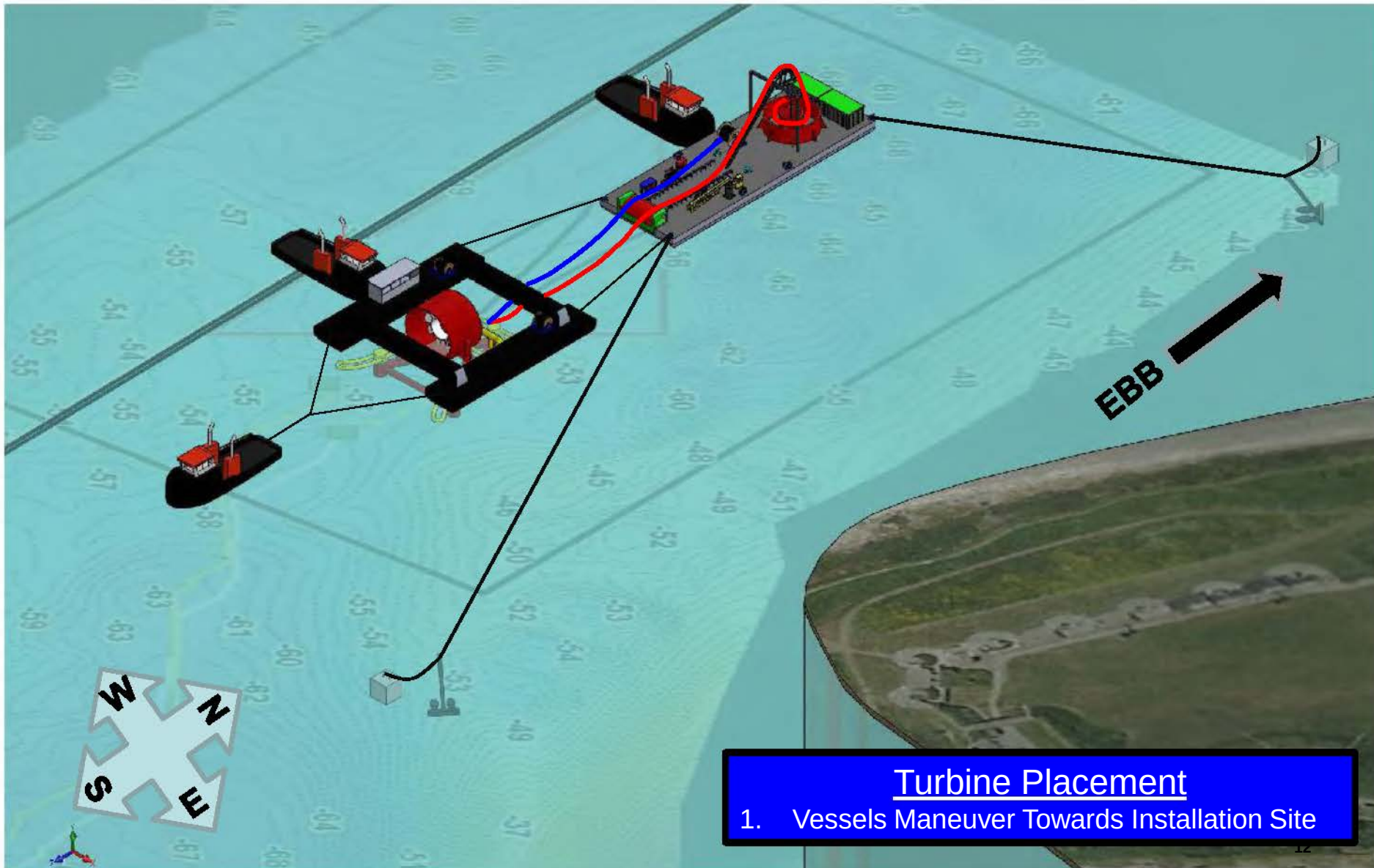
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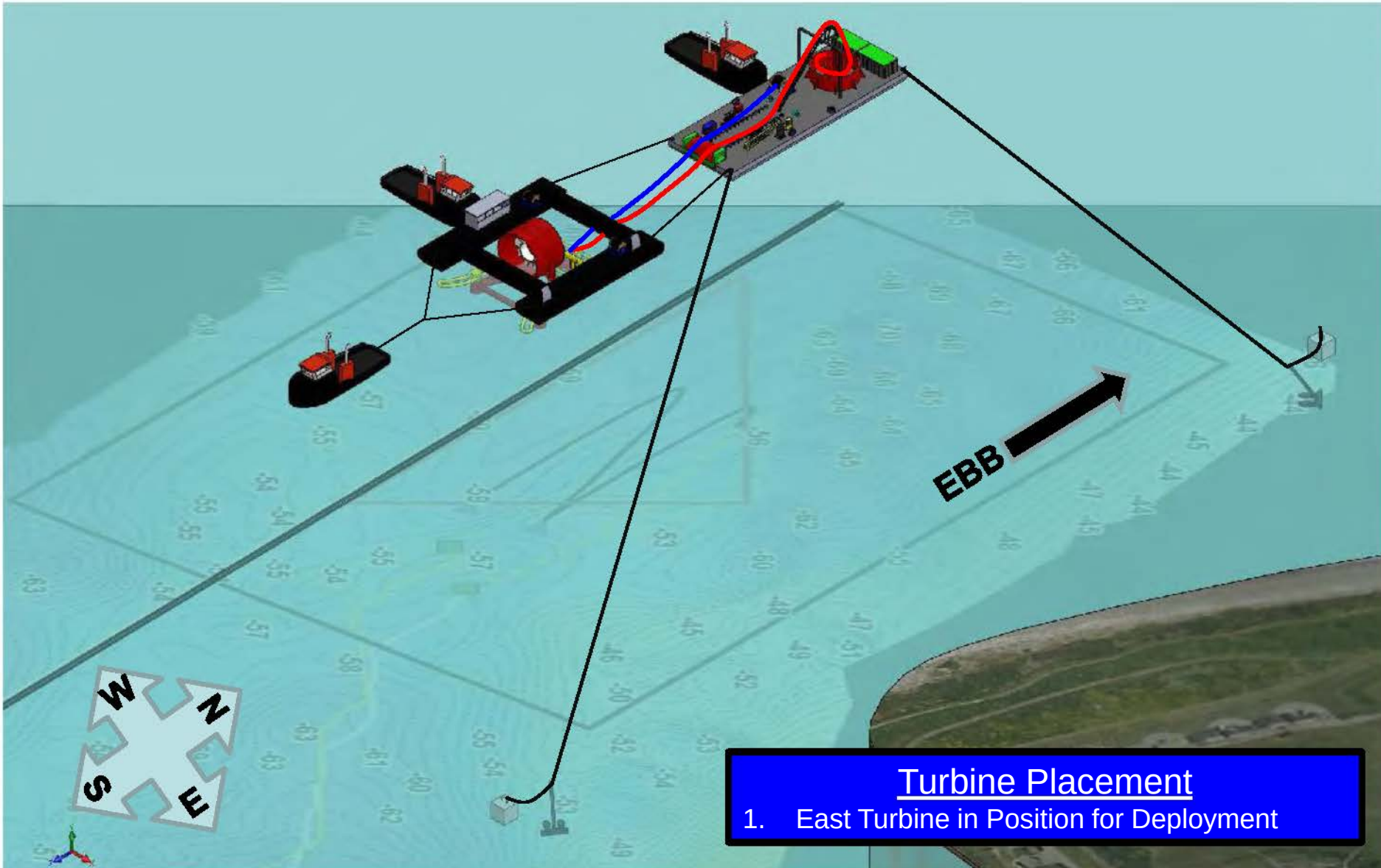
Reposition Tugs

1. Tugs Move to Provide Directional Support

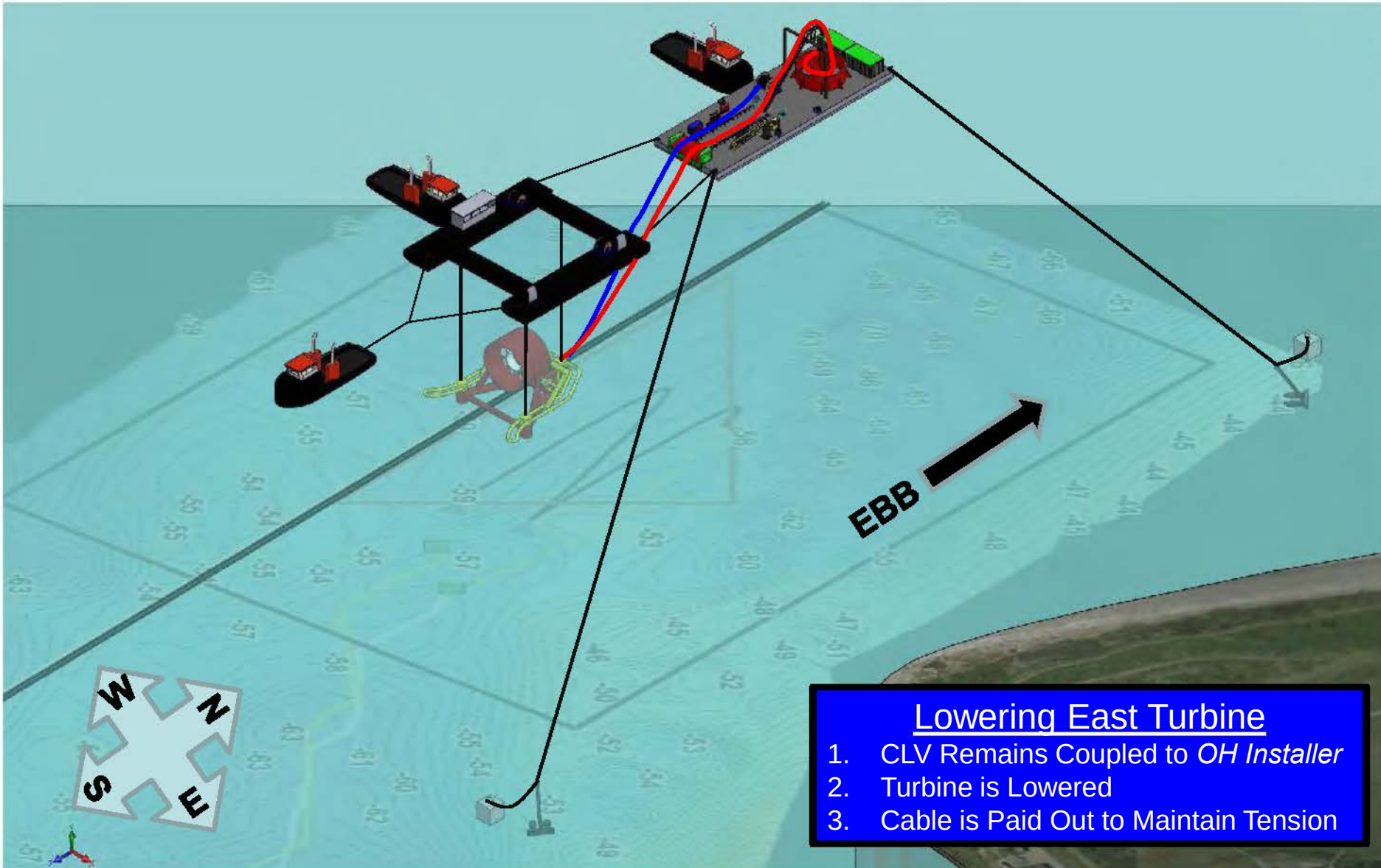
Open Hydro Two-Point Moor Installation Concept



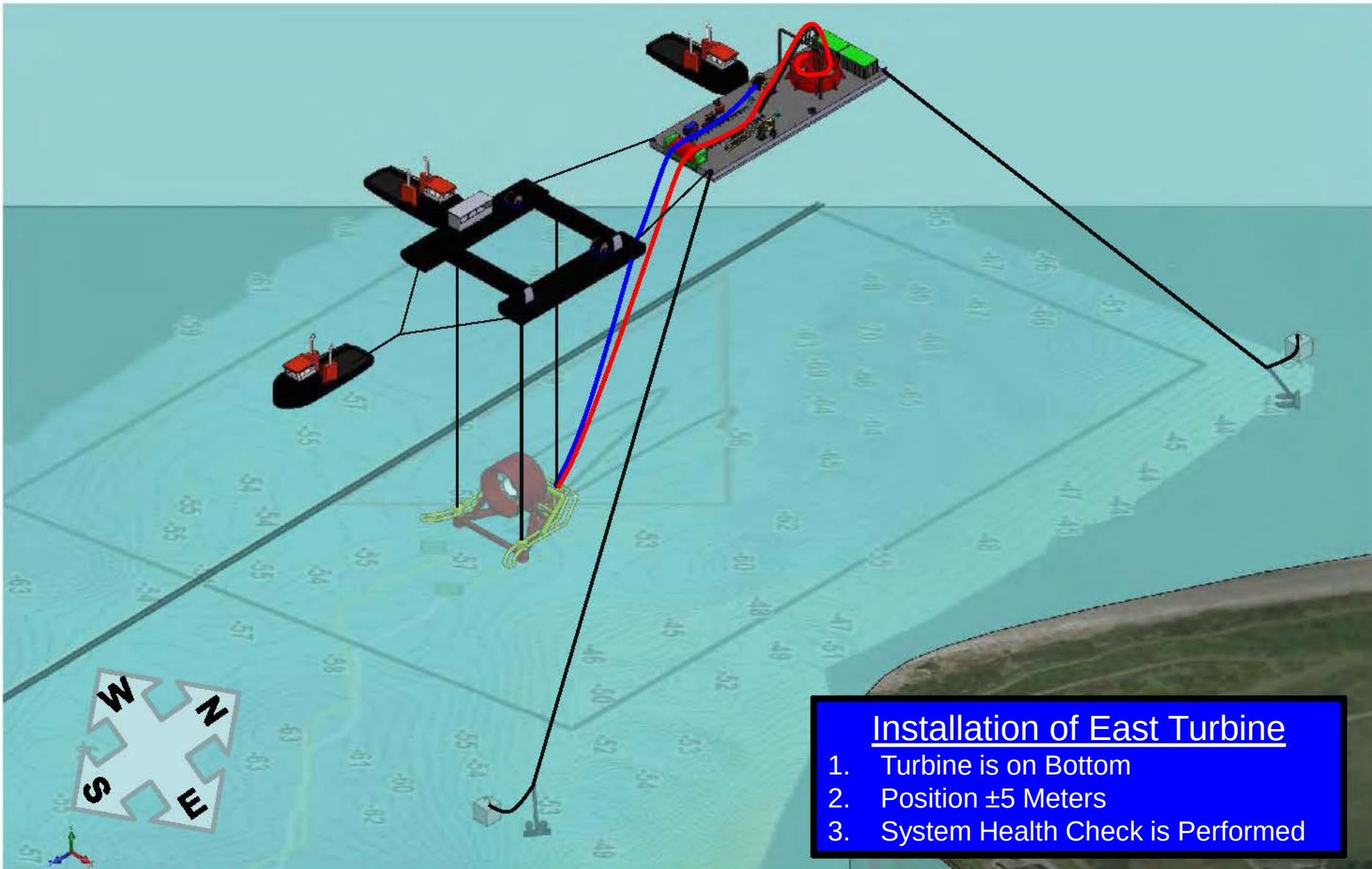
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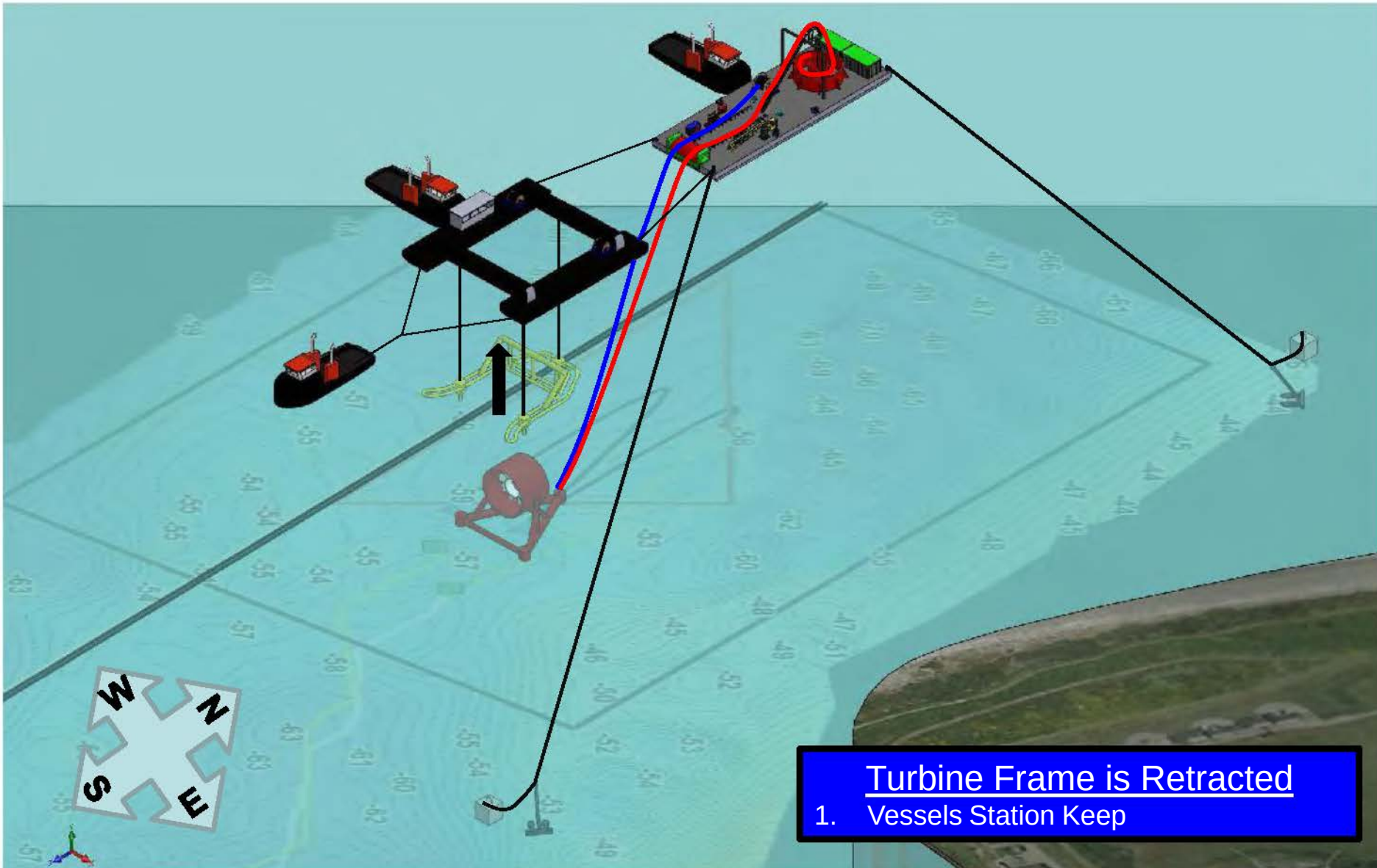
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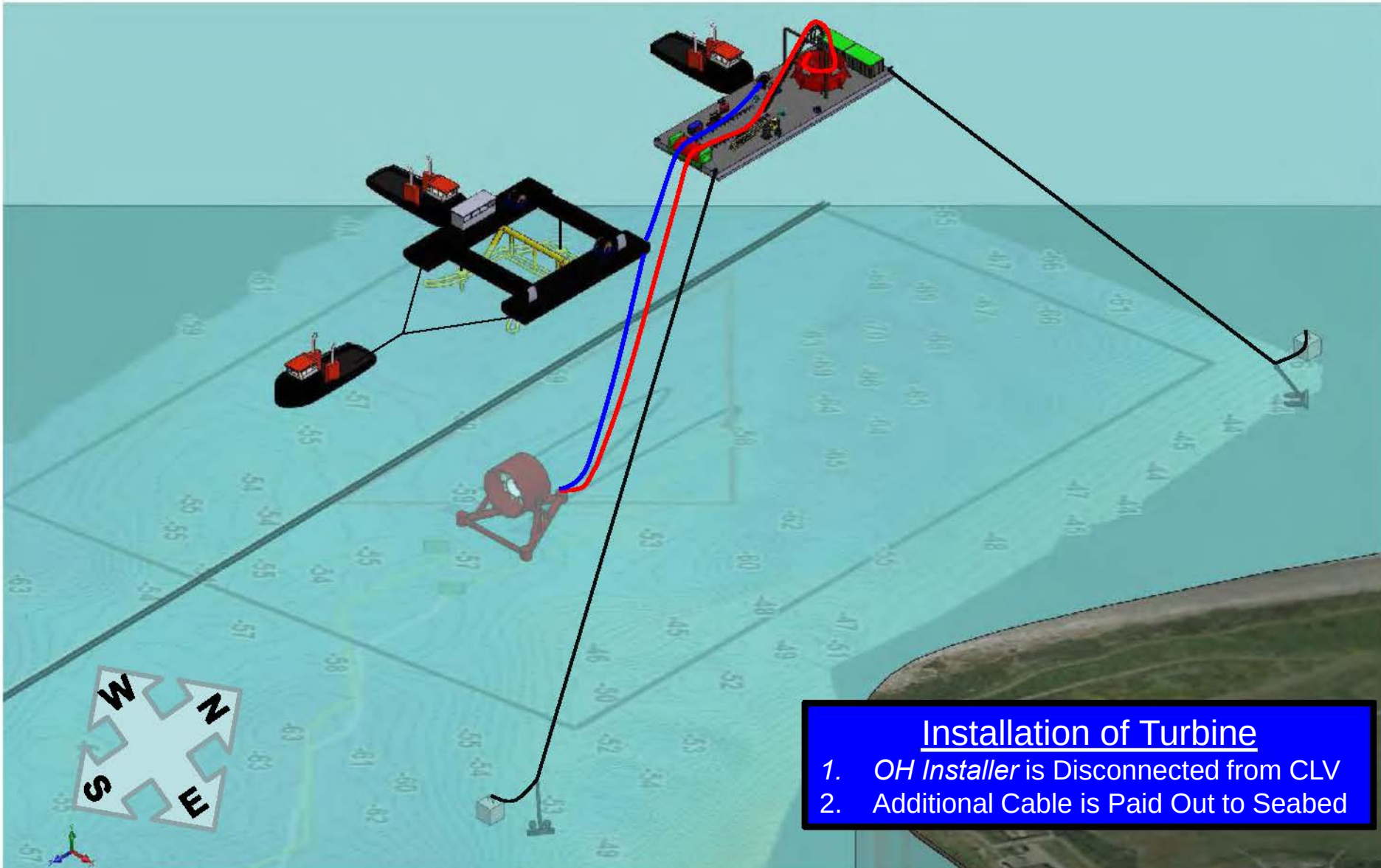
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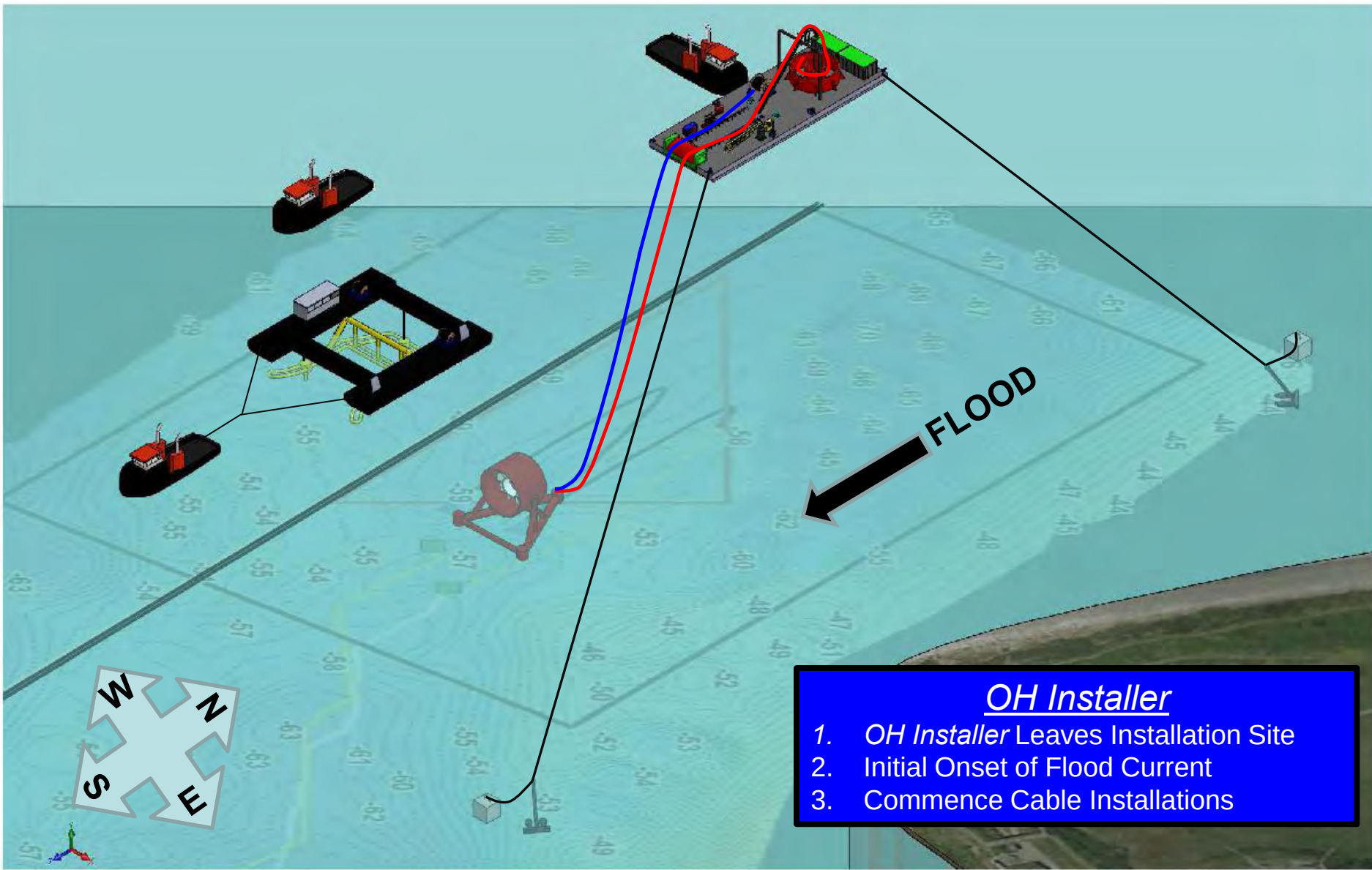
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Open Hydro Two-Point Moor Installation Concept



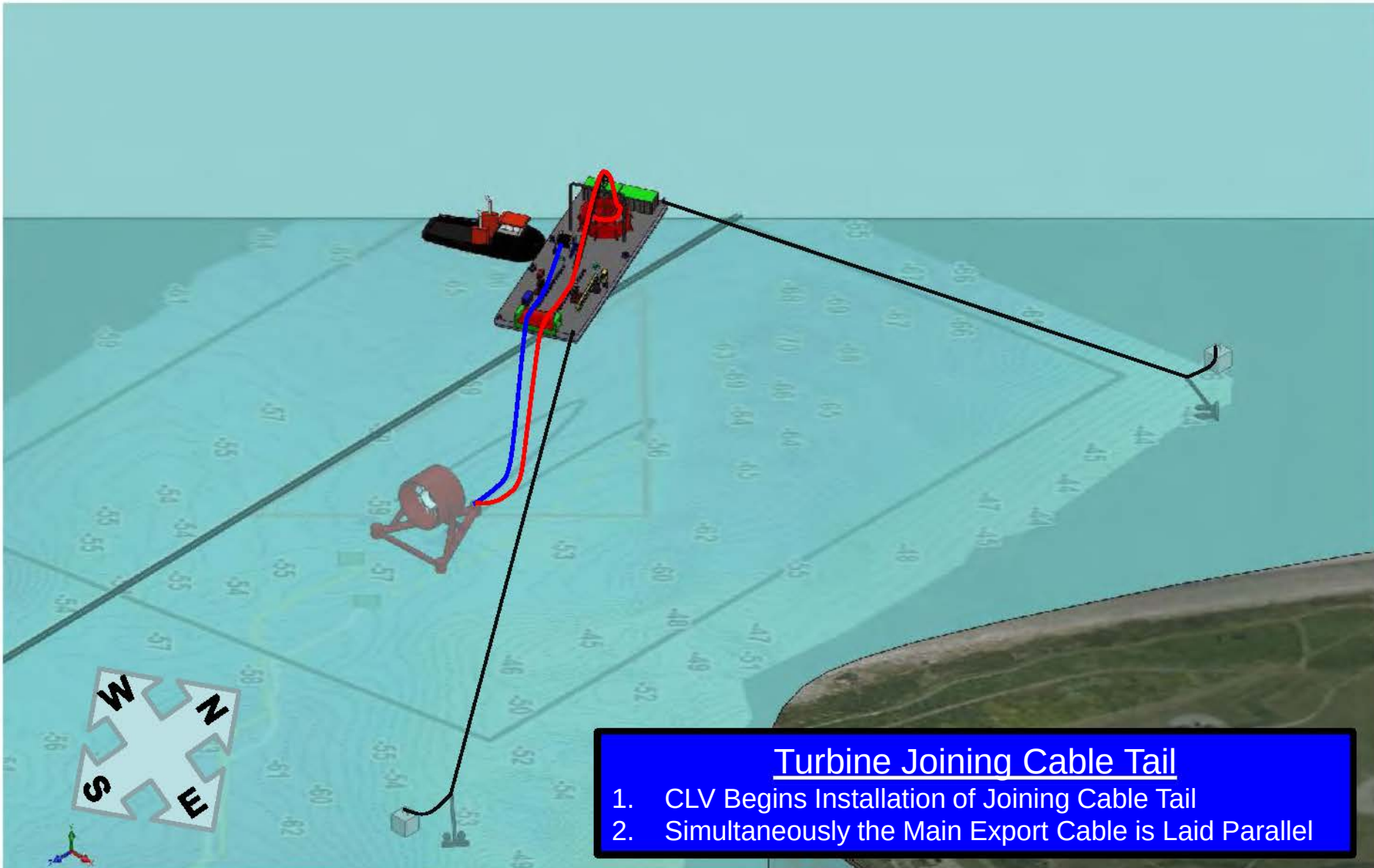
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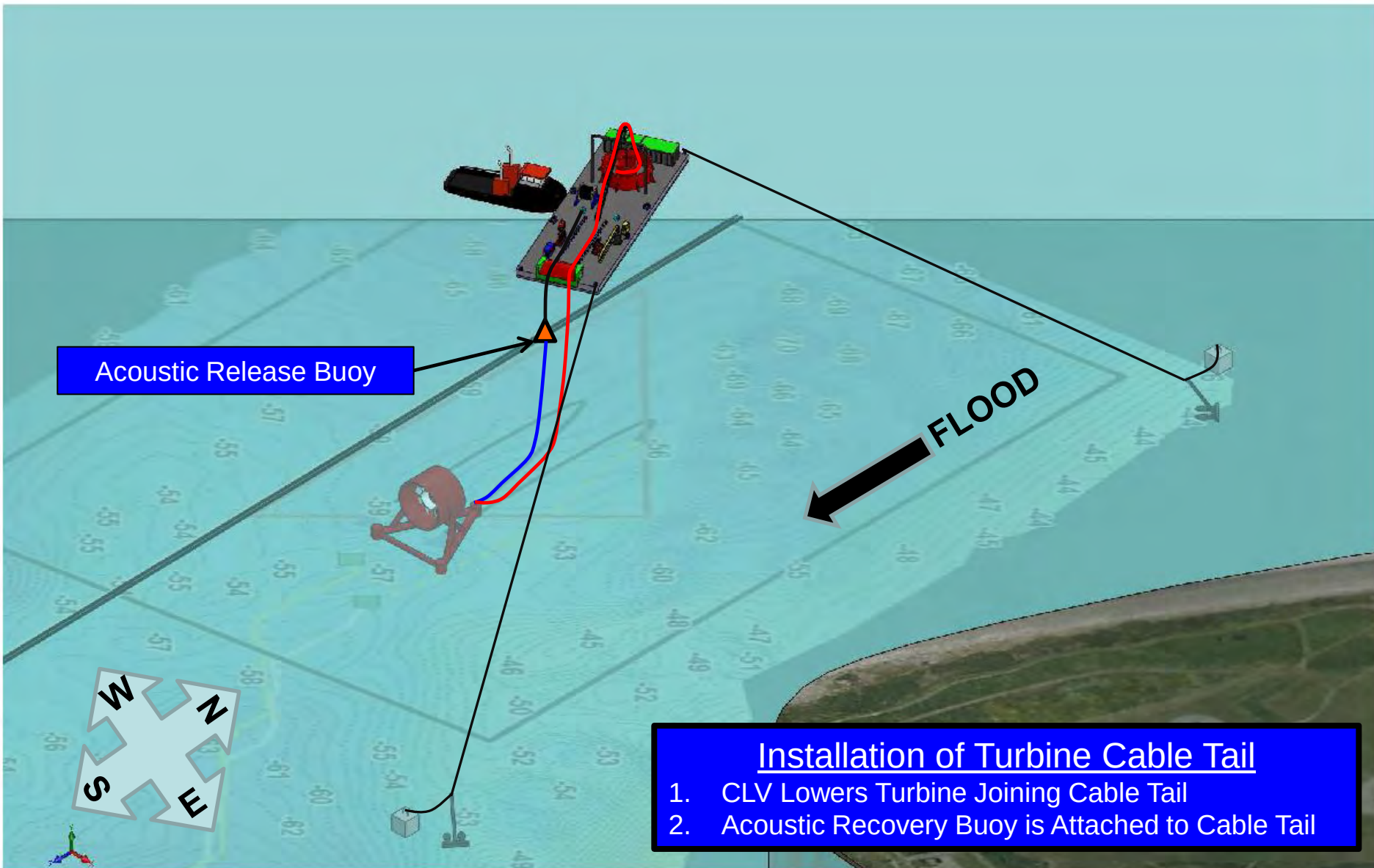
OH Installer

1. *OH Installer* Leaves Installation Site
2. Initial Onset of Flood Current
3. Commence Cable Installations

Open Hydro Two-Point Moor Installation Concept

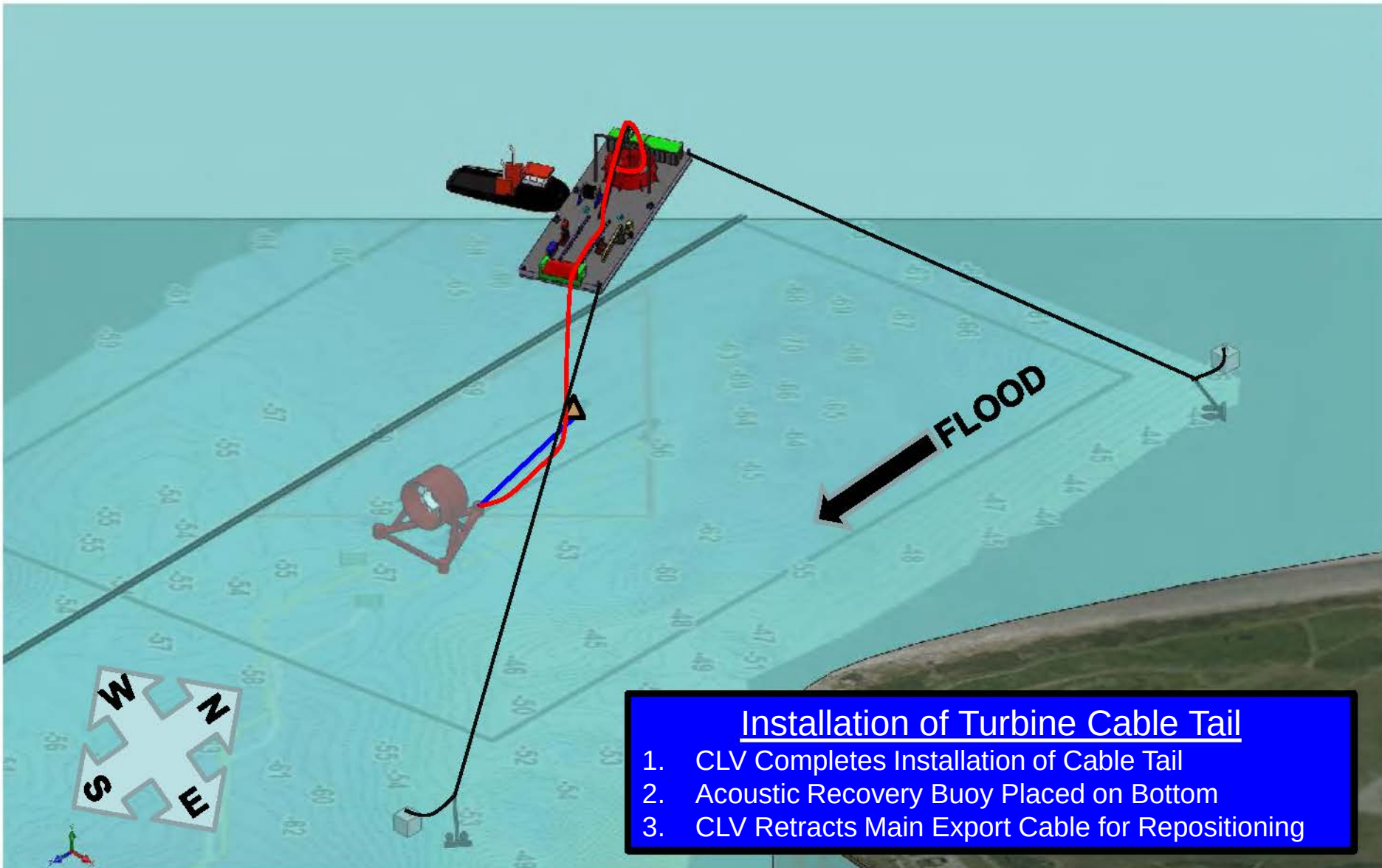


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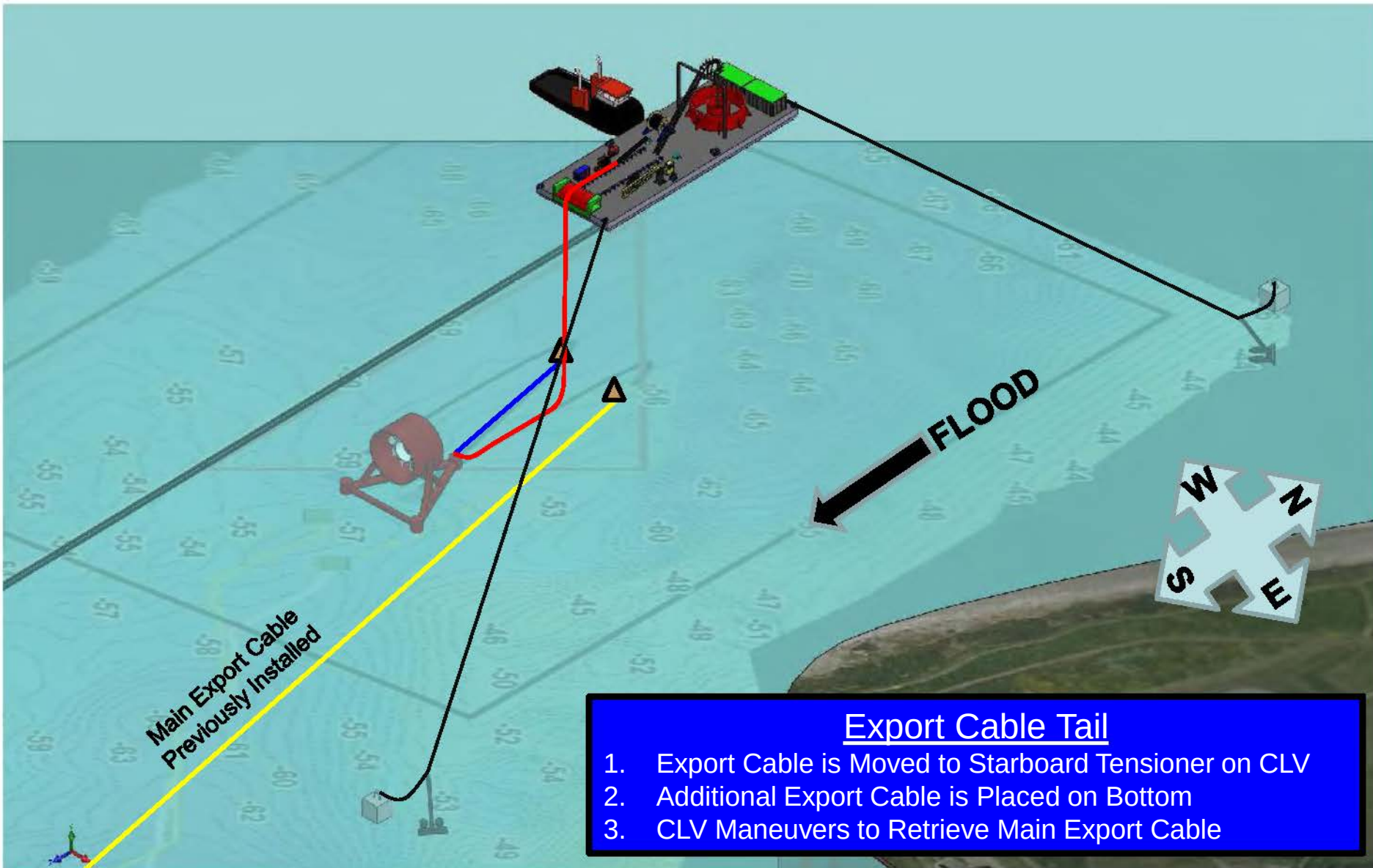




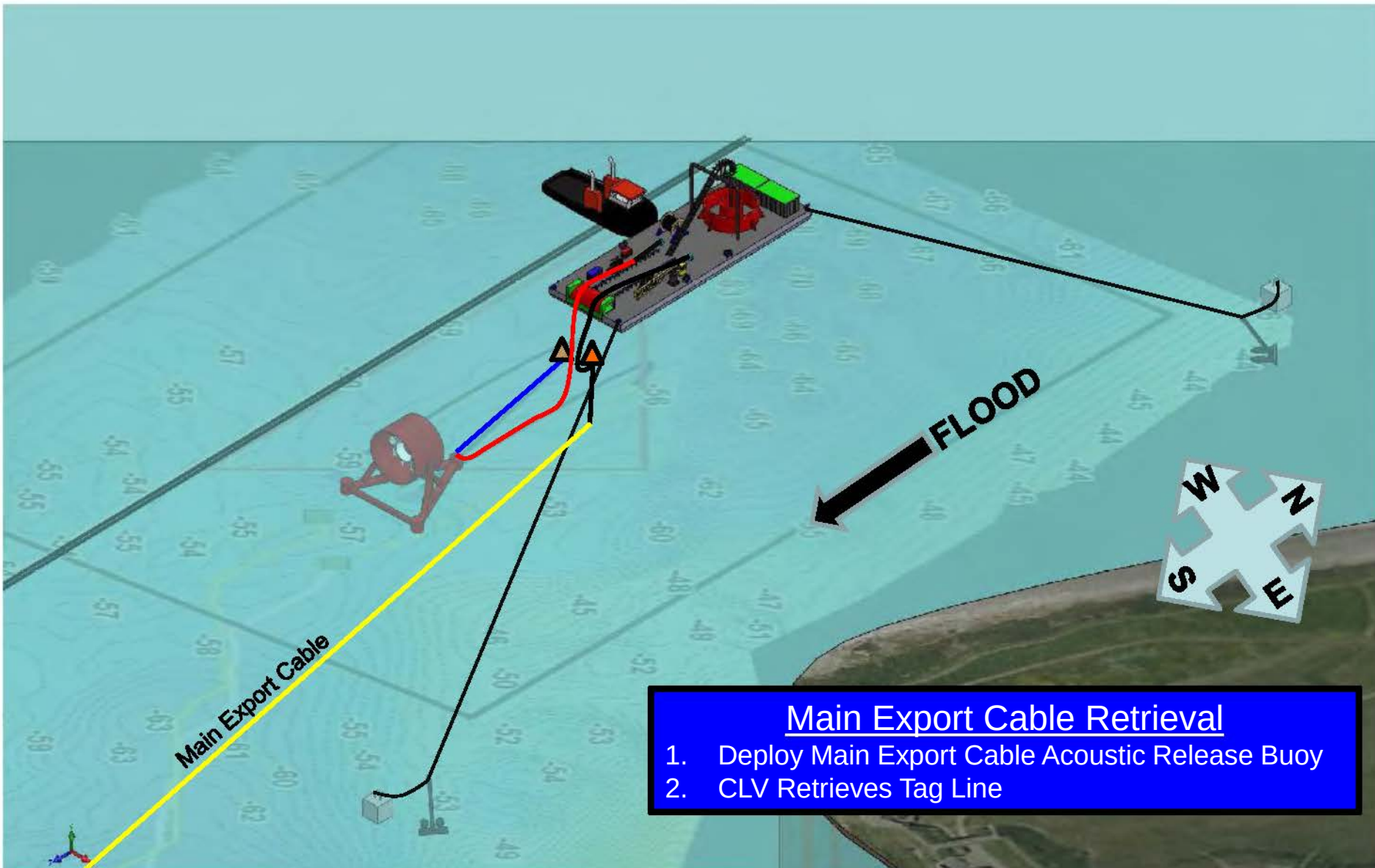
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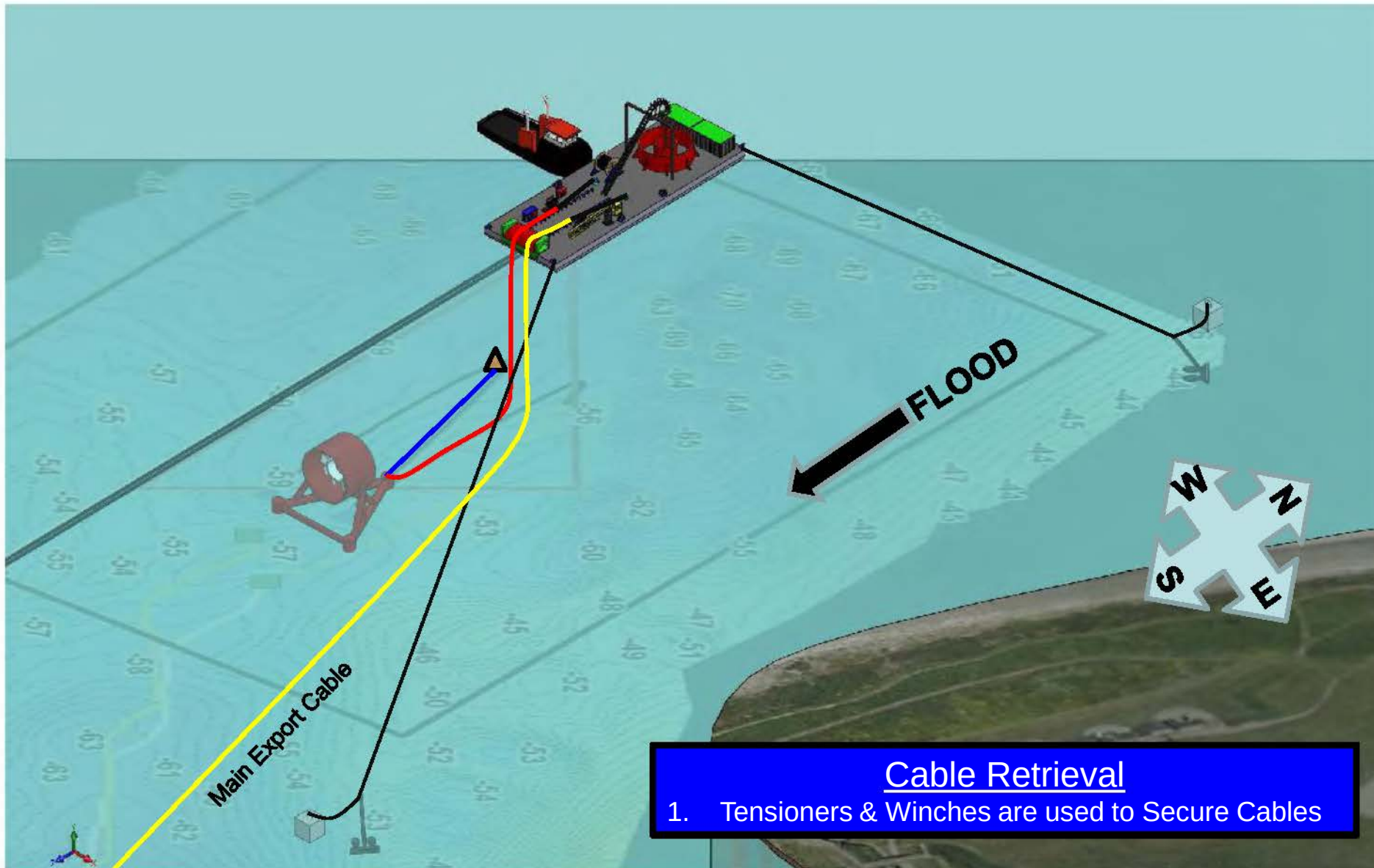


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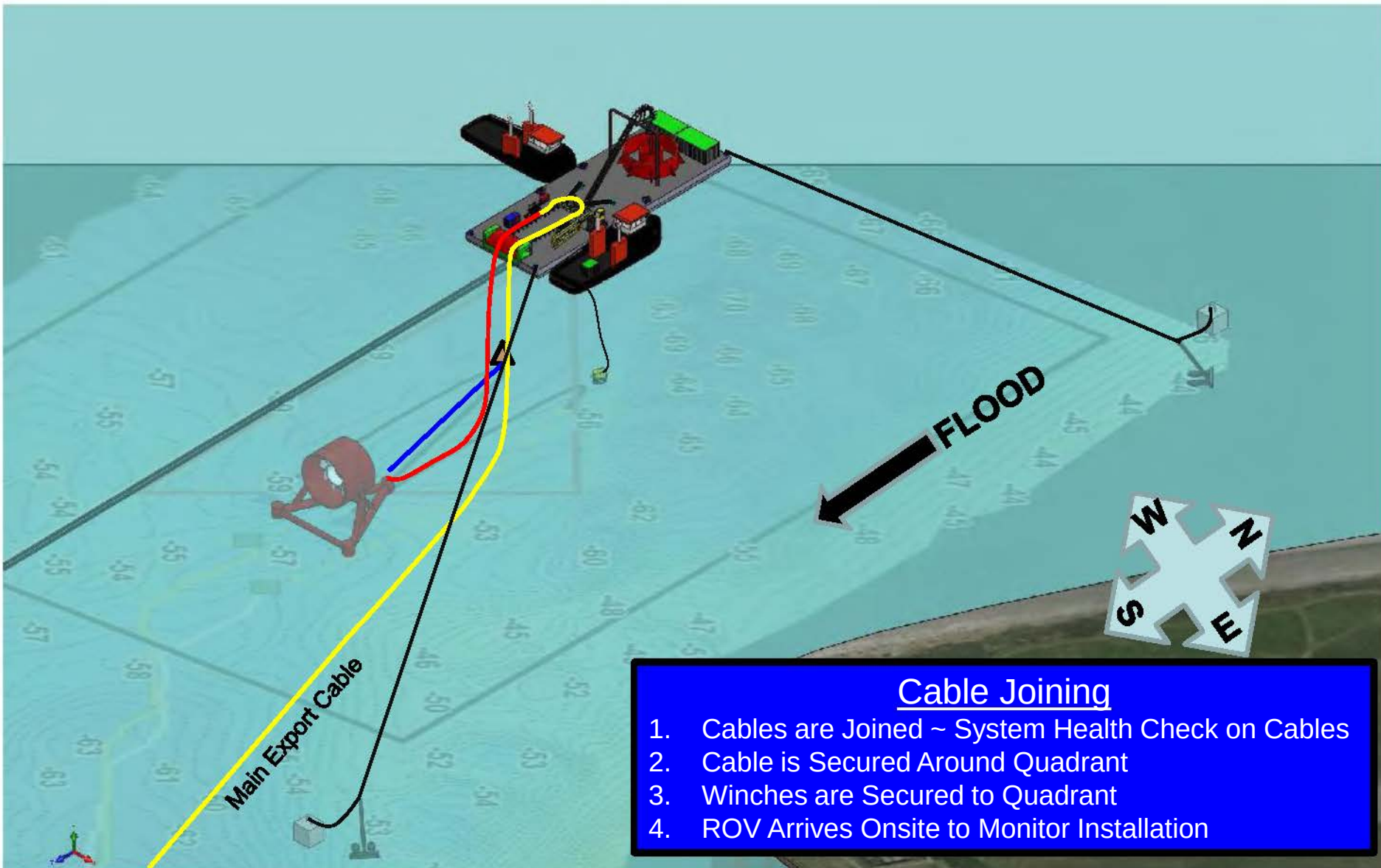




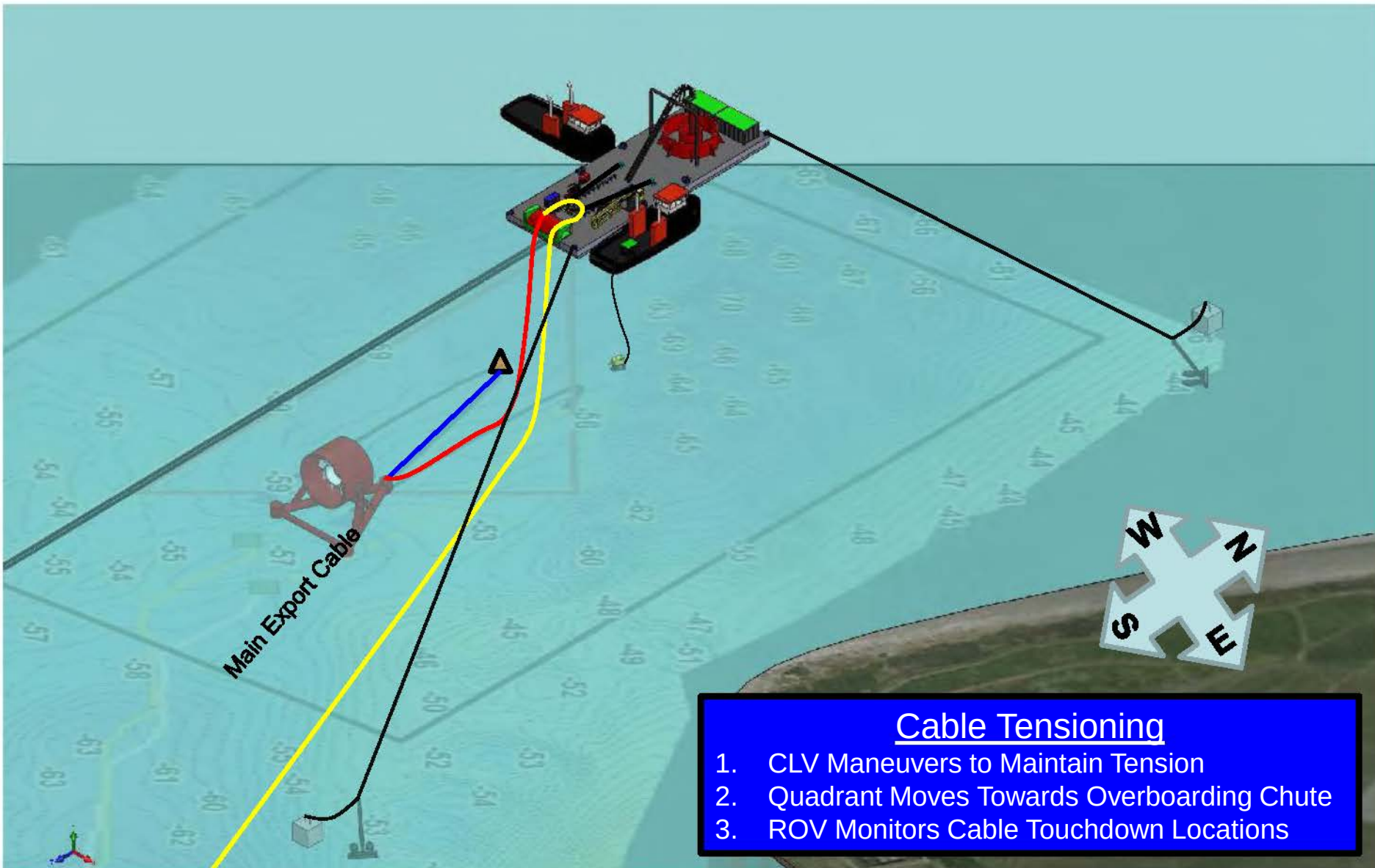
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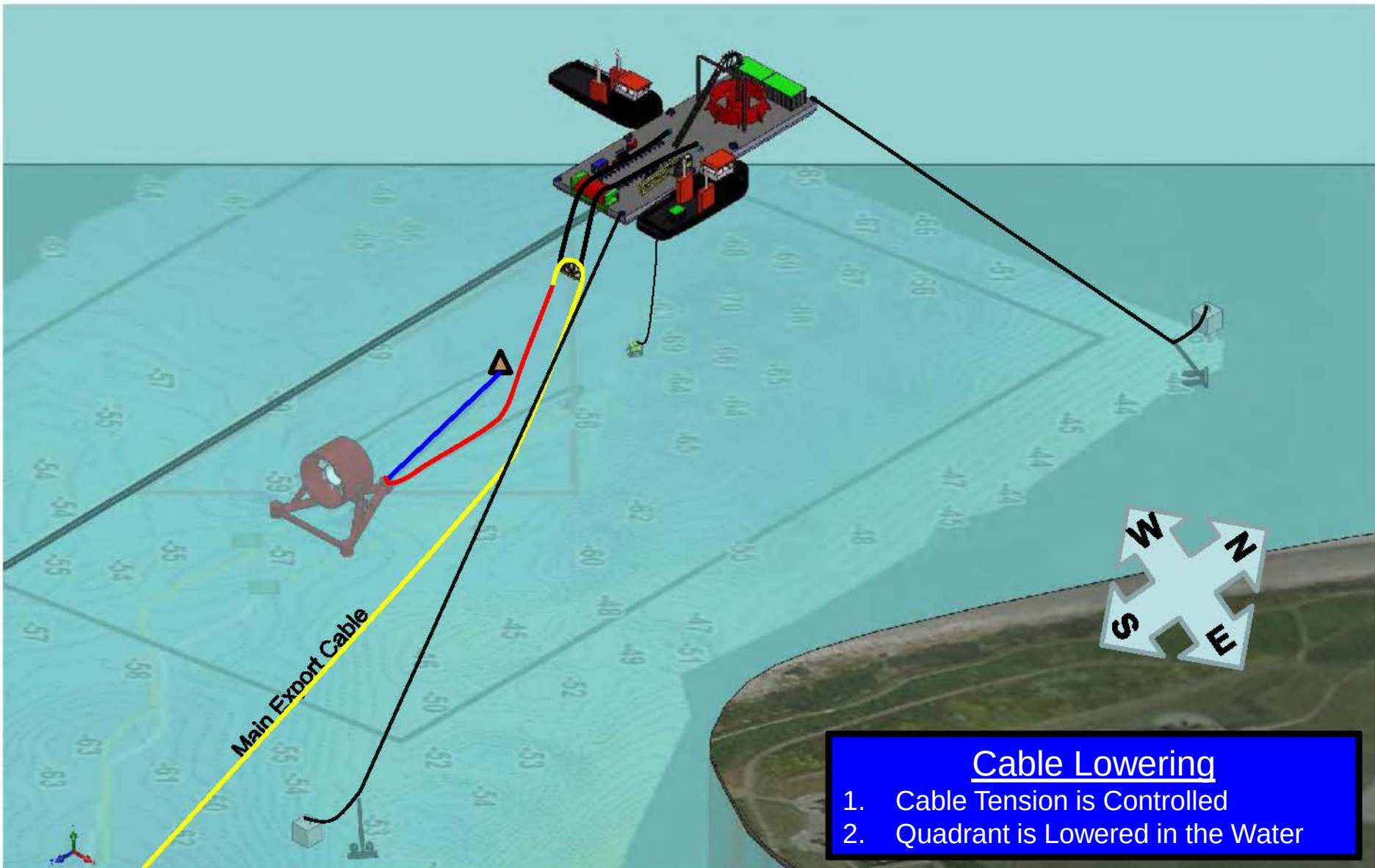
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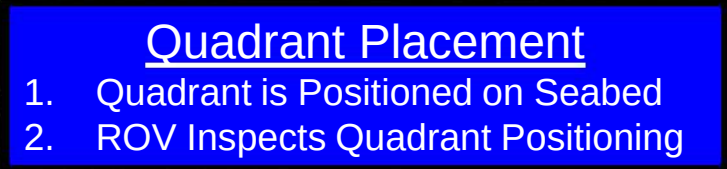


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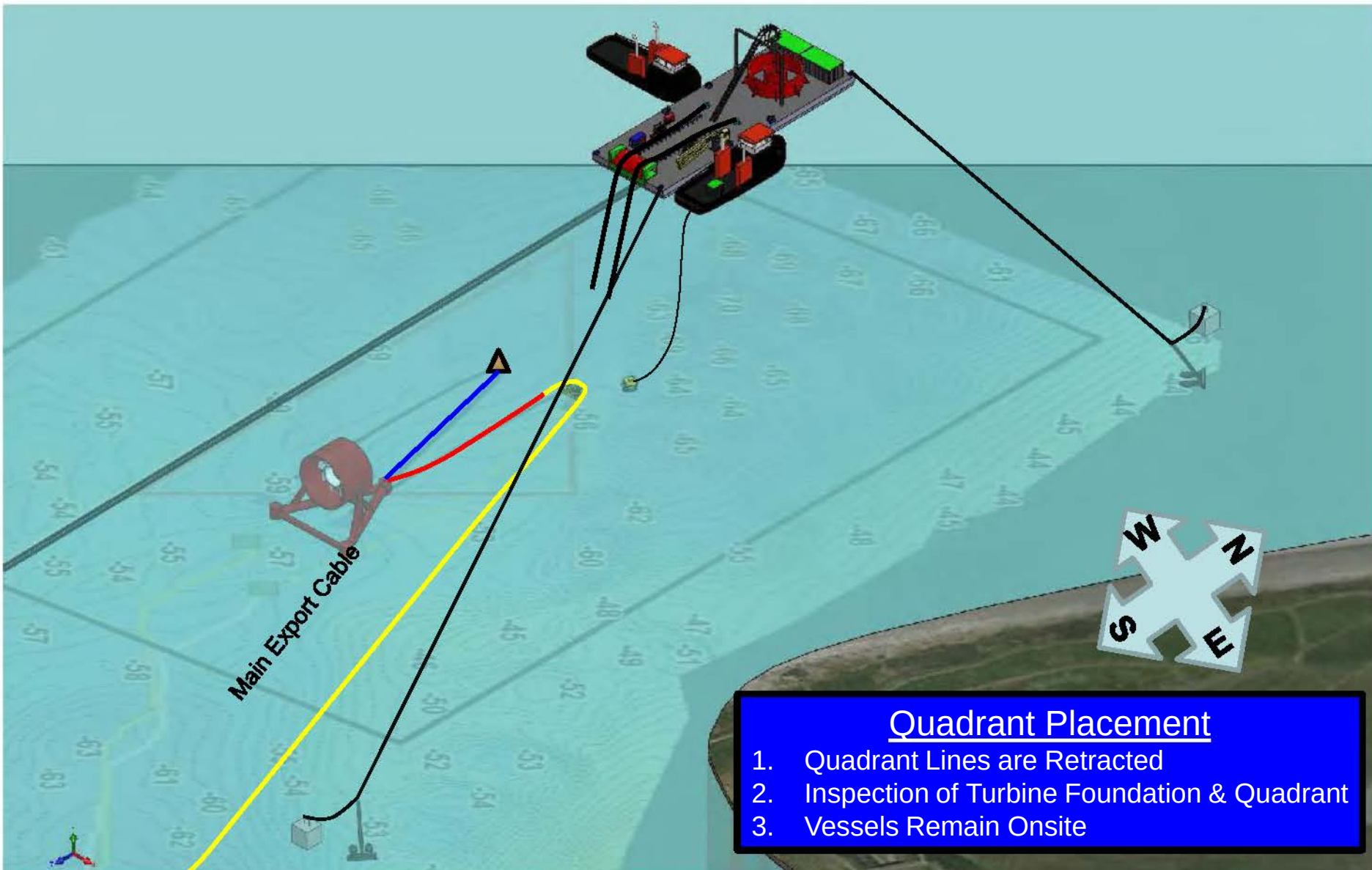


Open Hydro Two-Point Moor Installation Concept





Open Hydro Two-Point Moor Installation Concept

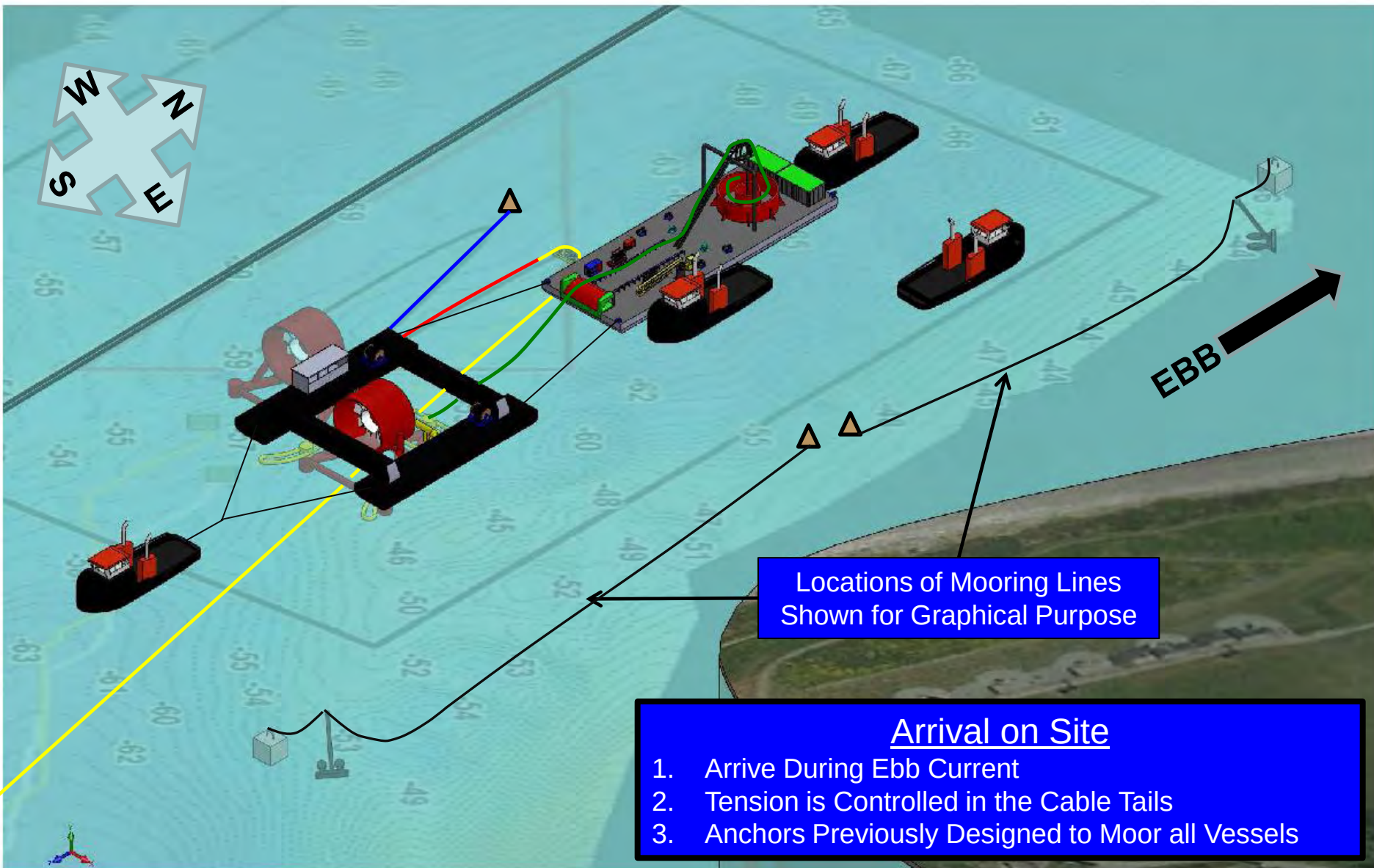




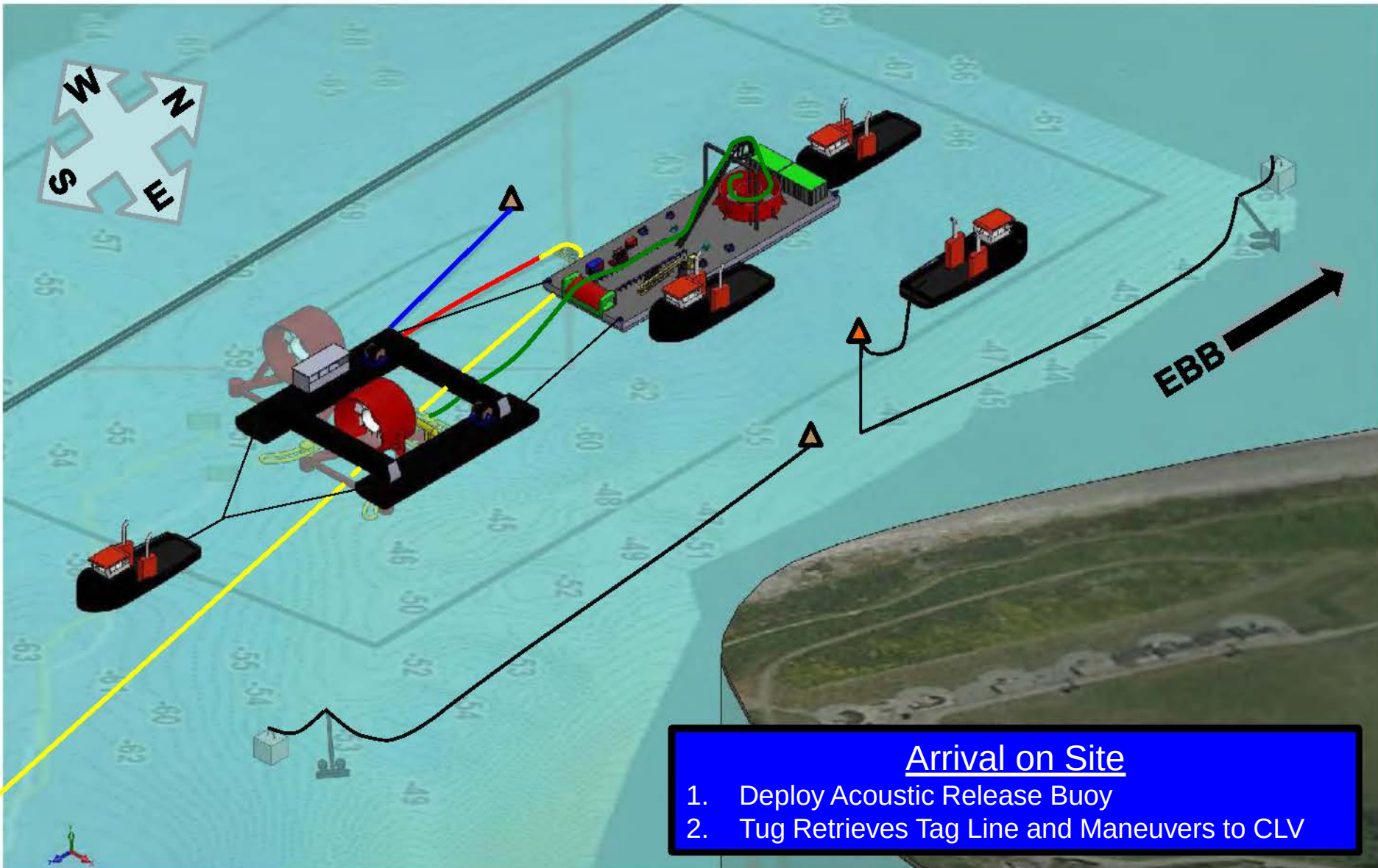
Open Hydro Two-Point Moor Installation Concept

Commence Installation of West Turbine

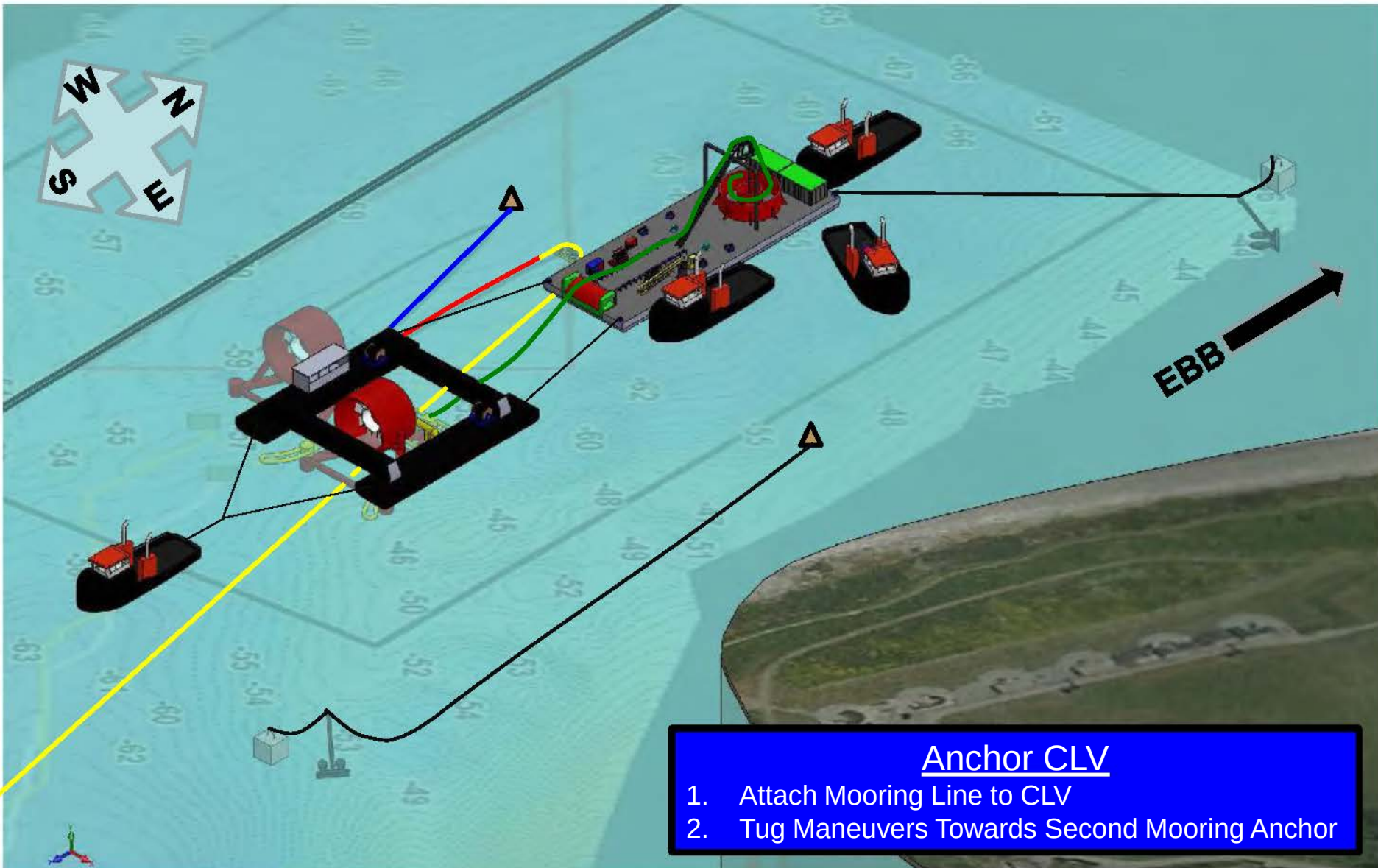
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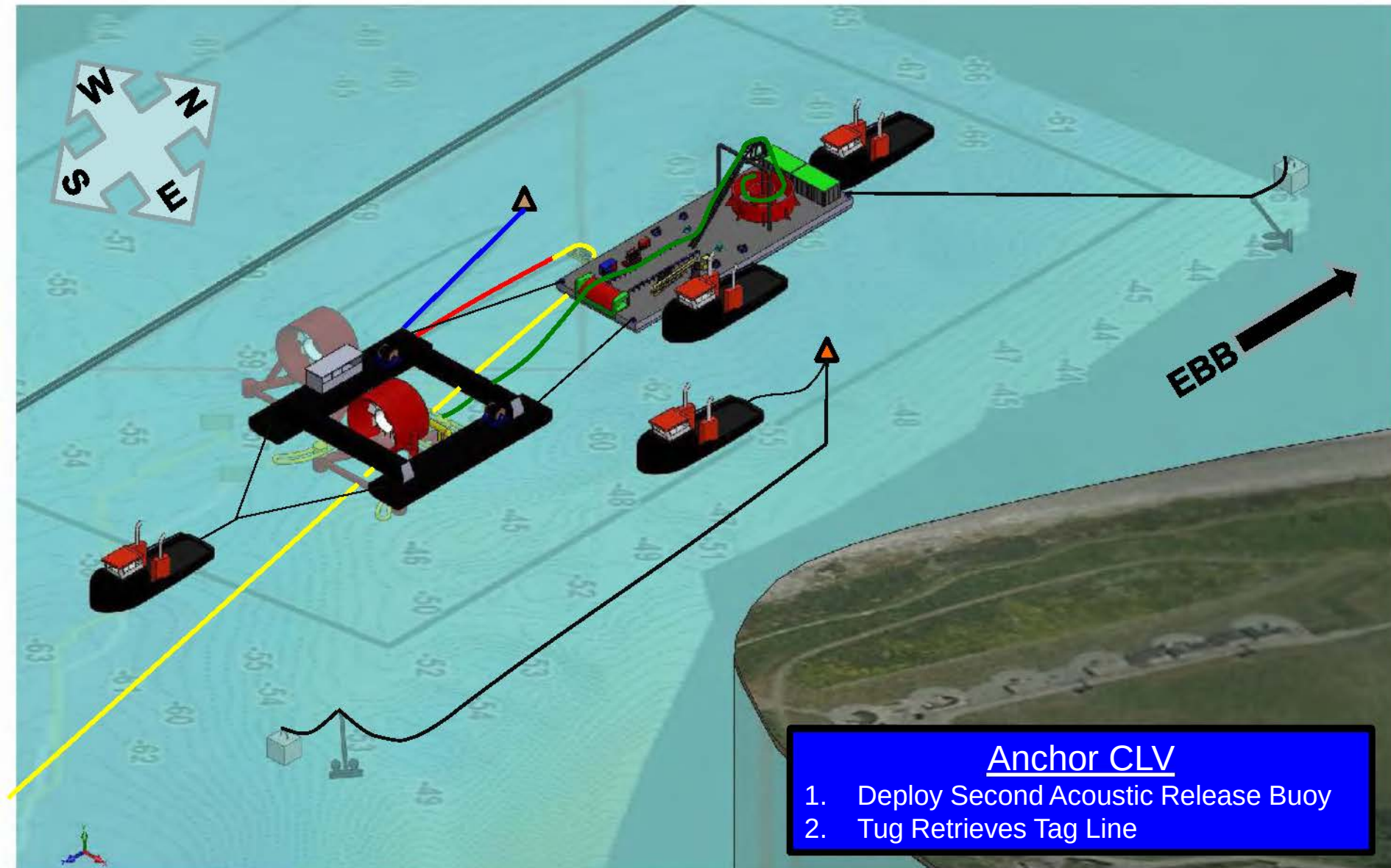
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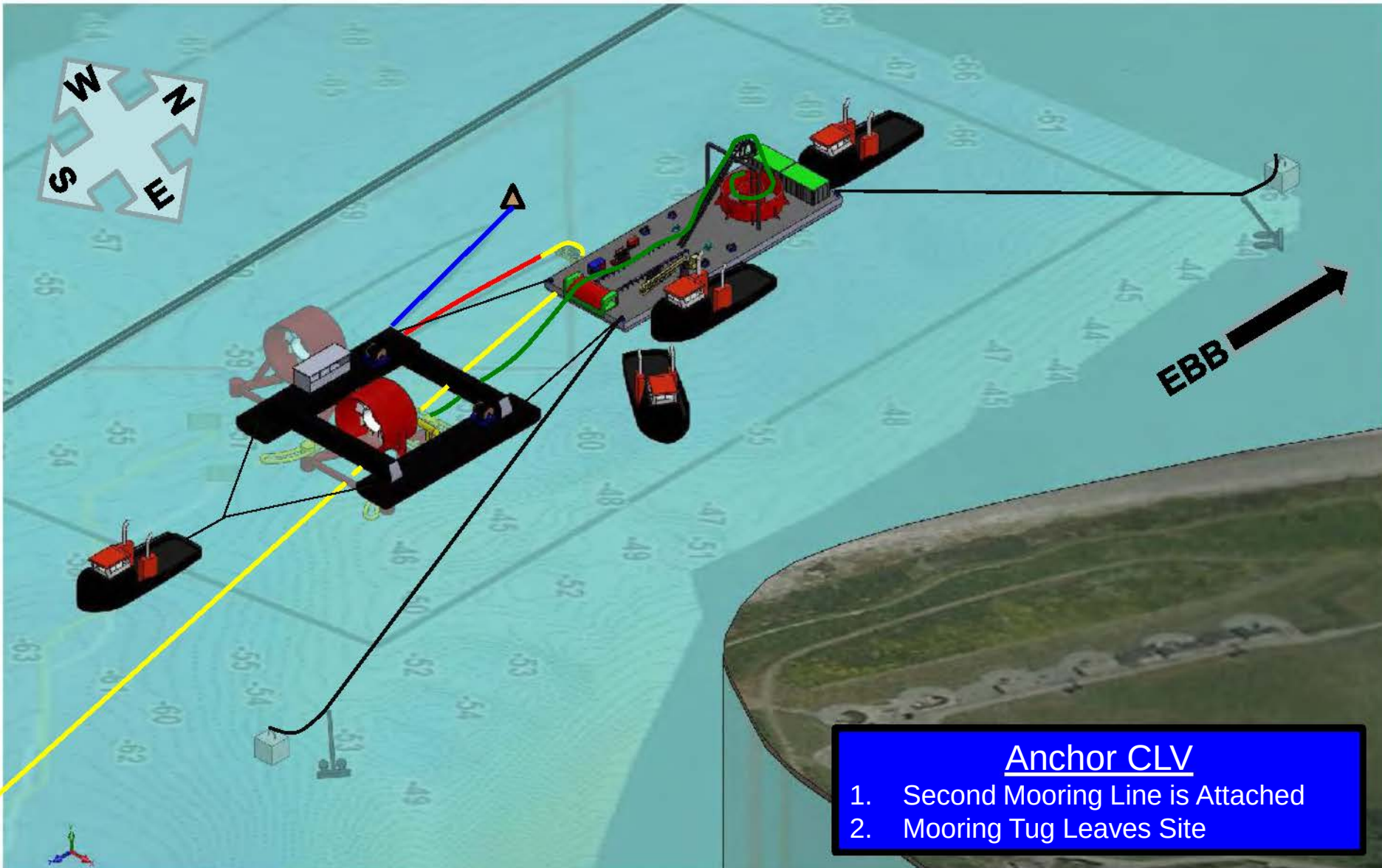
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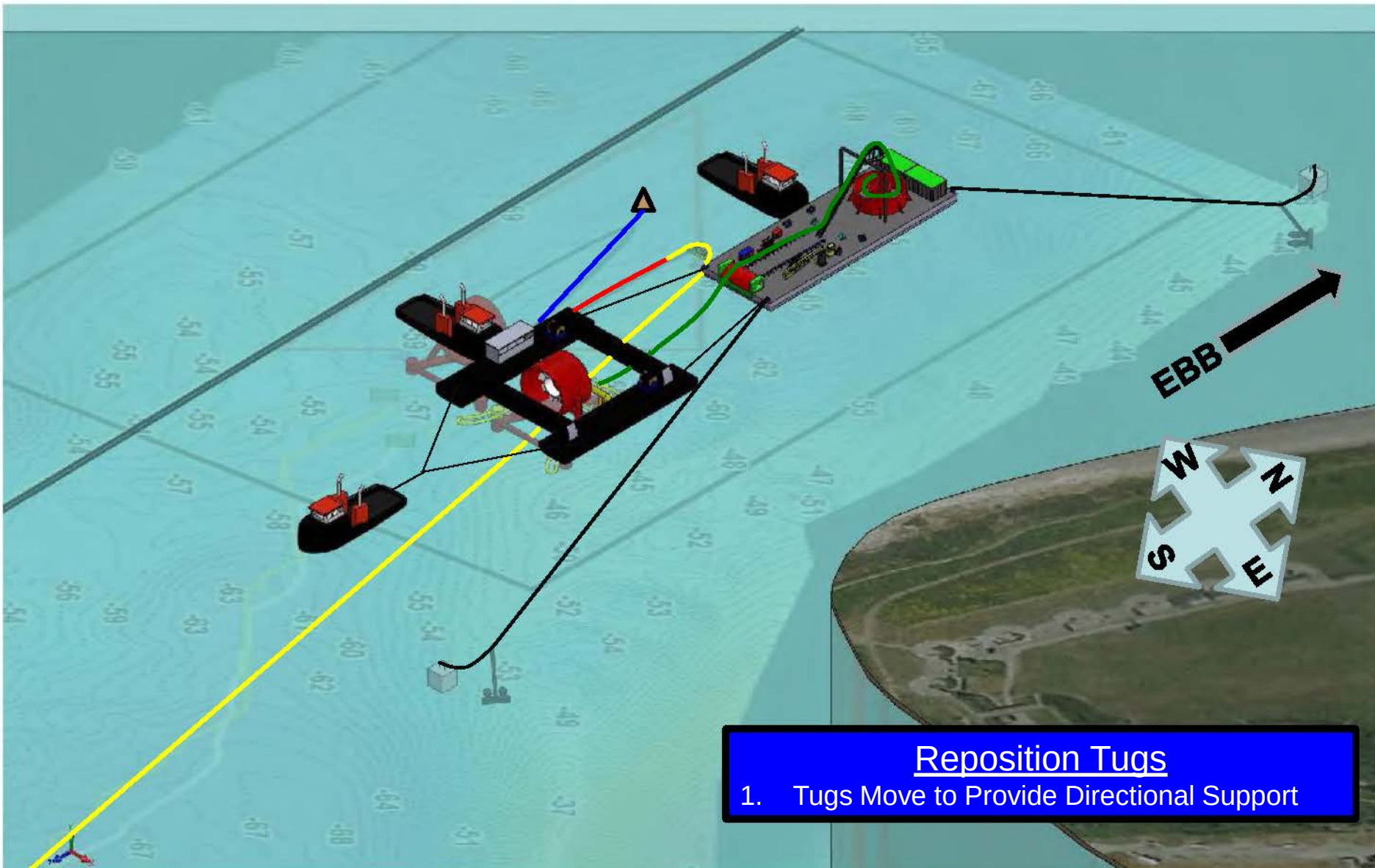
Open Hydro Two-Point Moor Installation Concept



Open Hydro Two-Point Moor Installation Concept



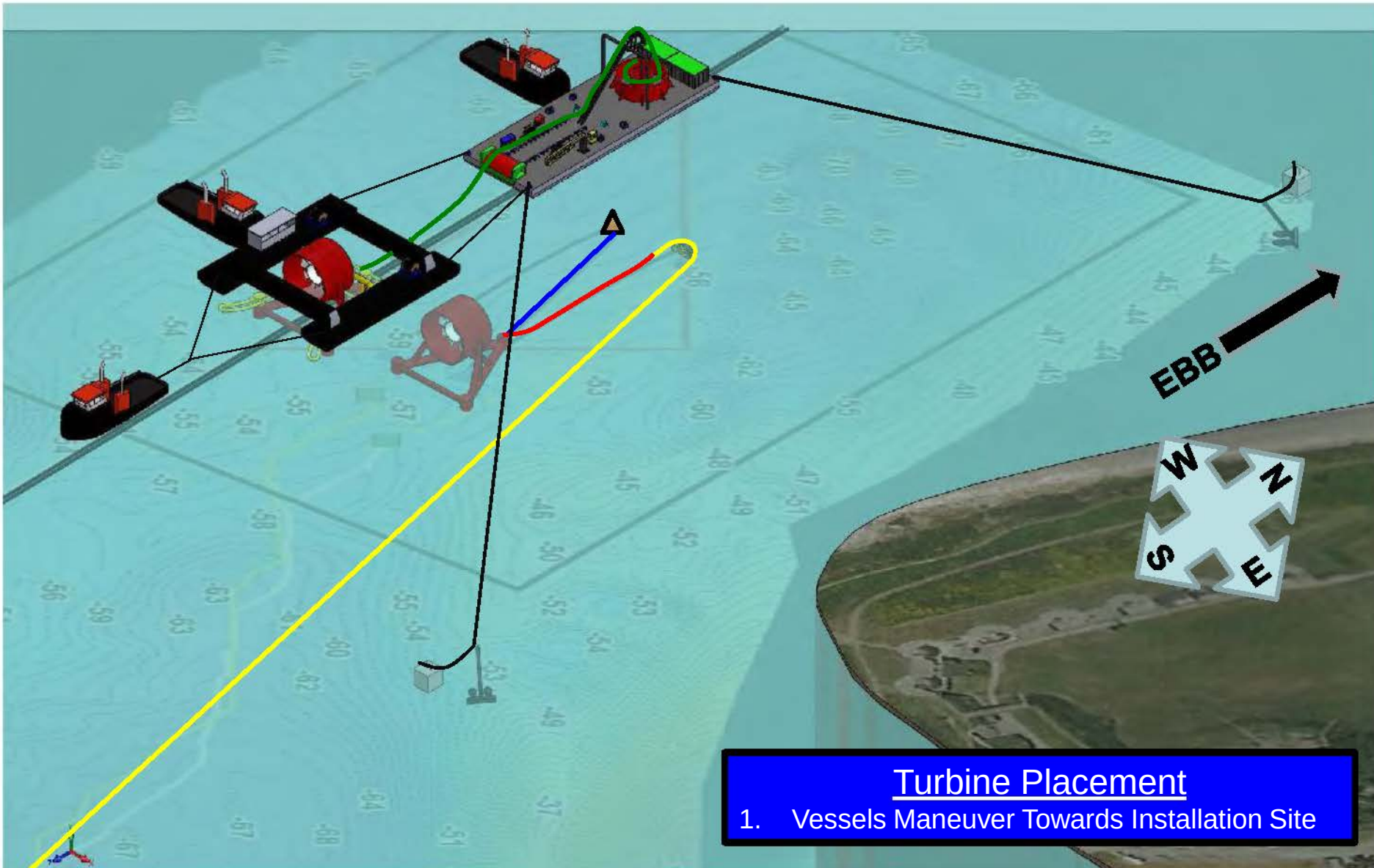
Open Hydro Two-Point Moor Installation Concept



Reposition Tugs

1. Tugs Move to Provide Directional Support

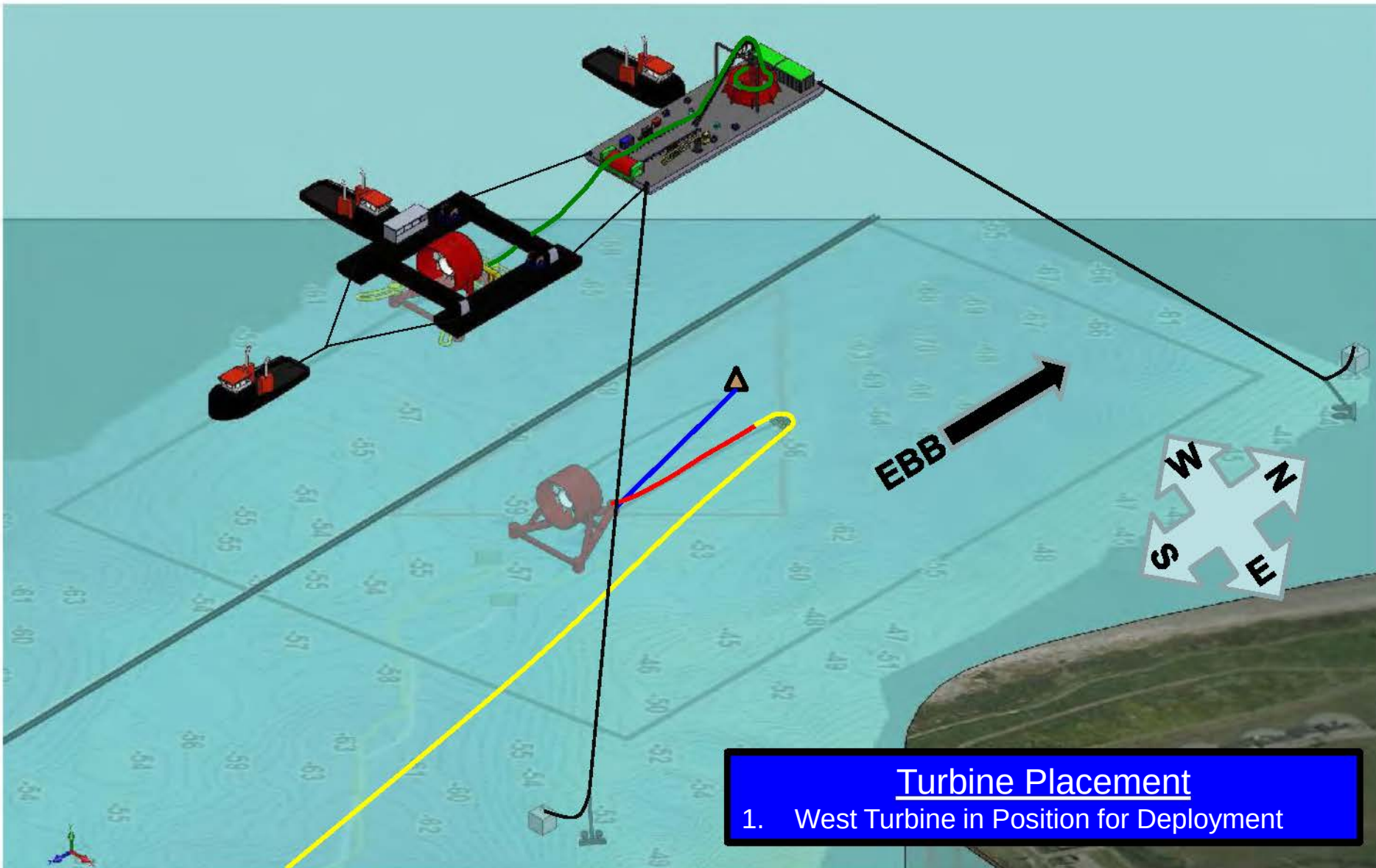
Open Hydro Two-Point Moor Installation Concept



Turbine Placement

1. Vessels Maneuver Towards Installation Site

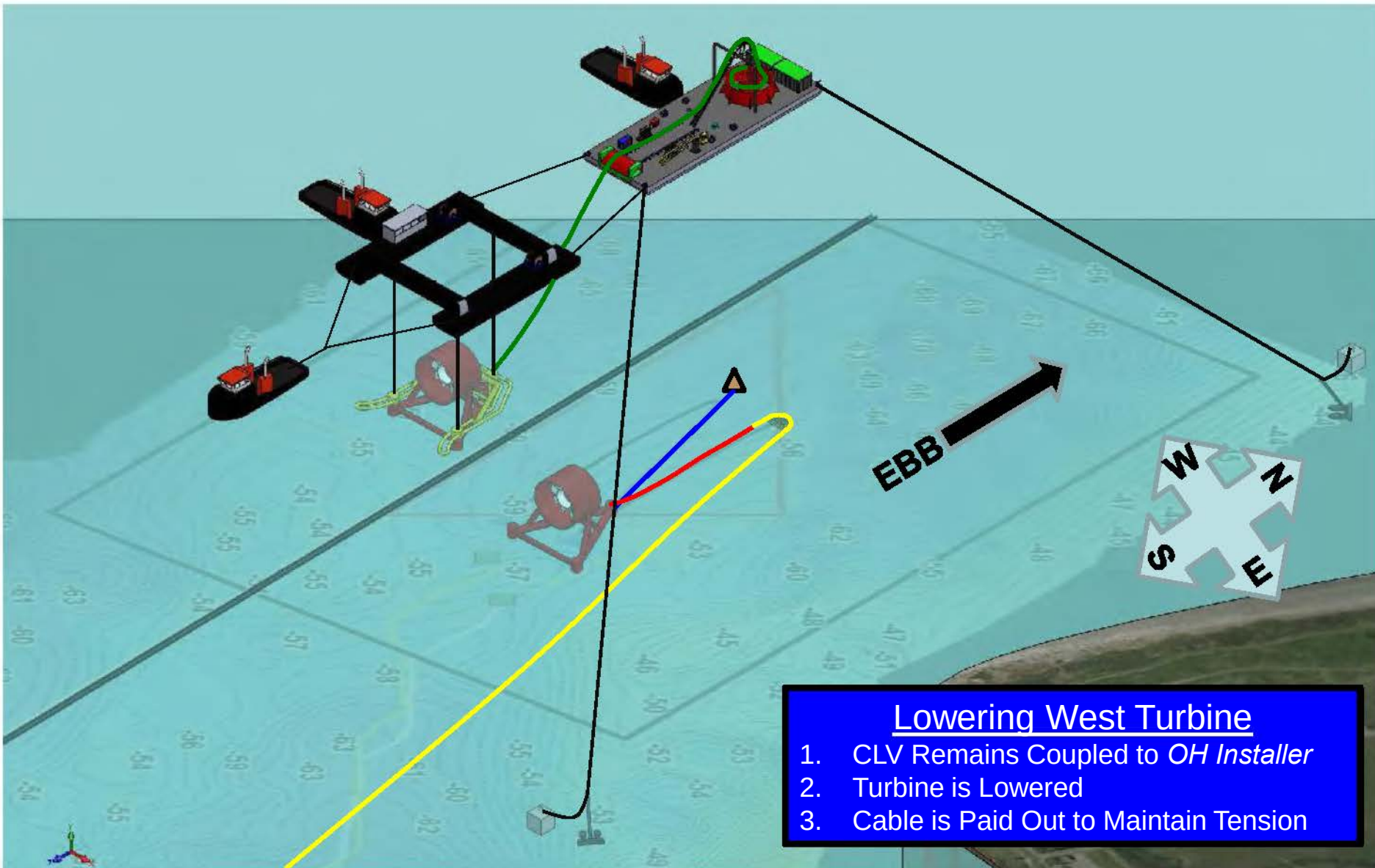
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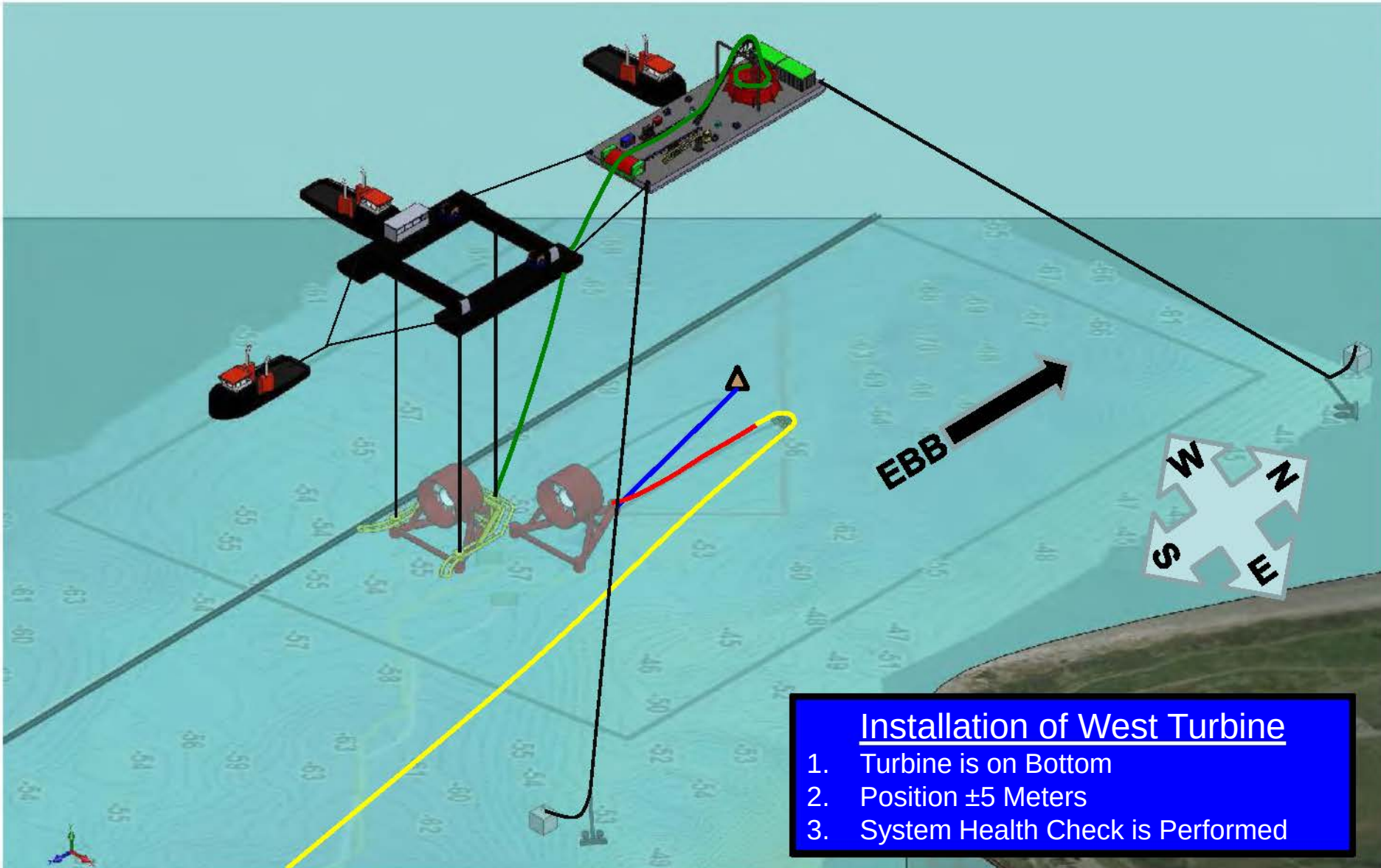
Turbine Placement

1. West Turbine in Position for Deployment

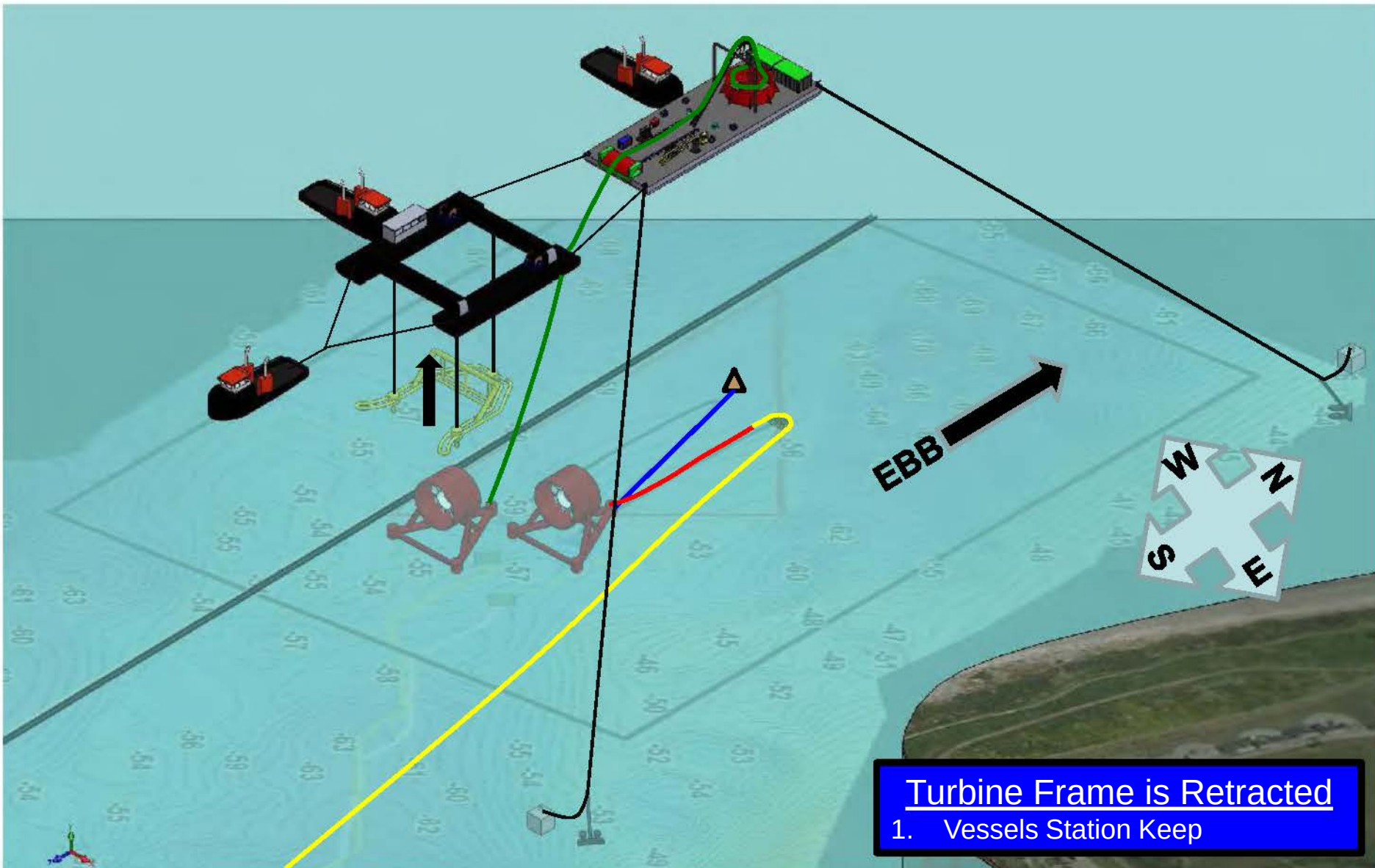
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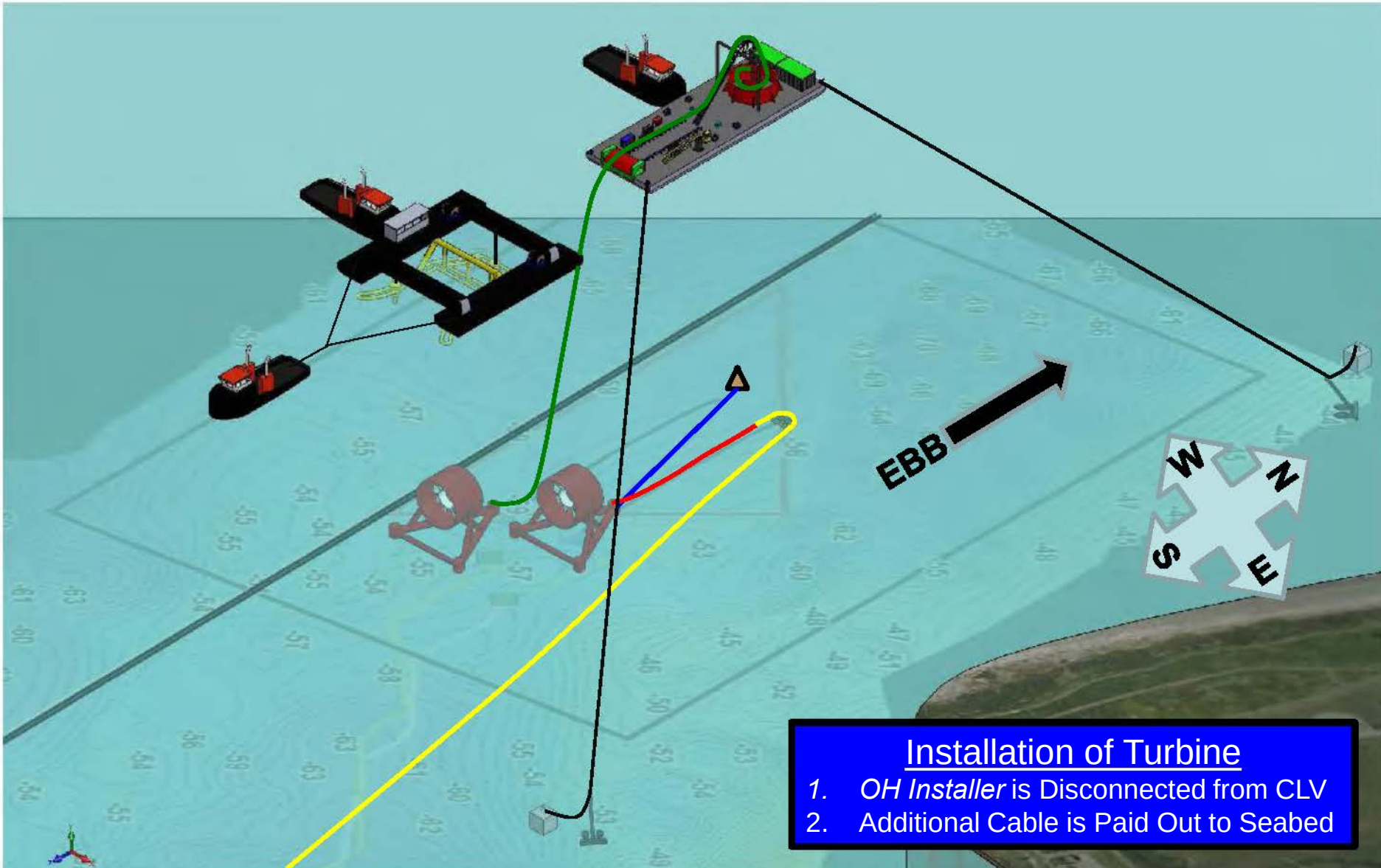
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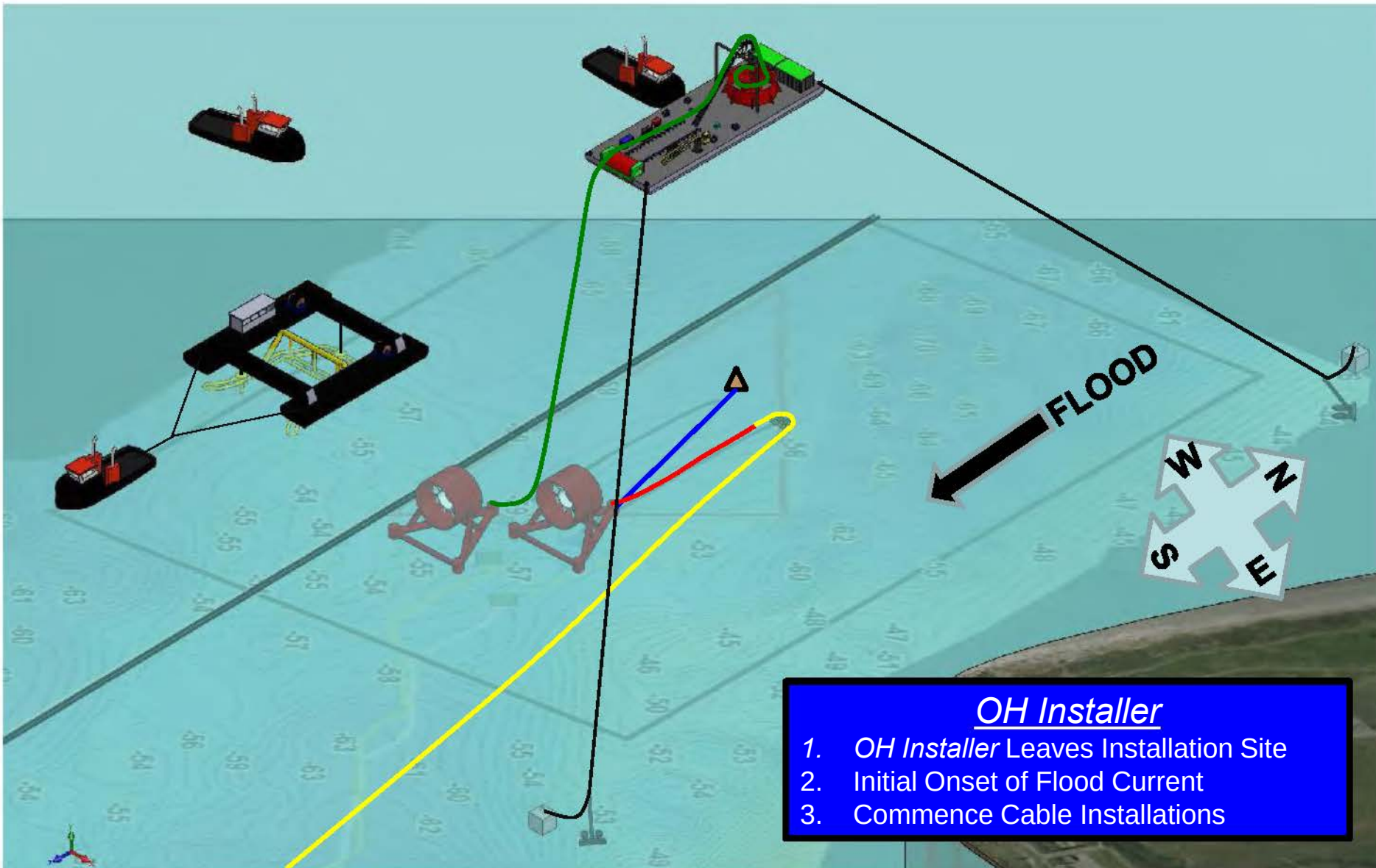
Open Hydro Two-Point Moor Installation Concept



Open Hydro Two-Point Moor Installation Concept



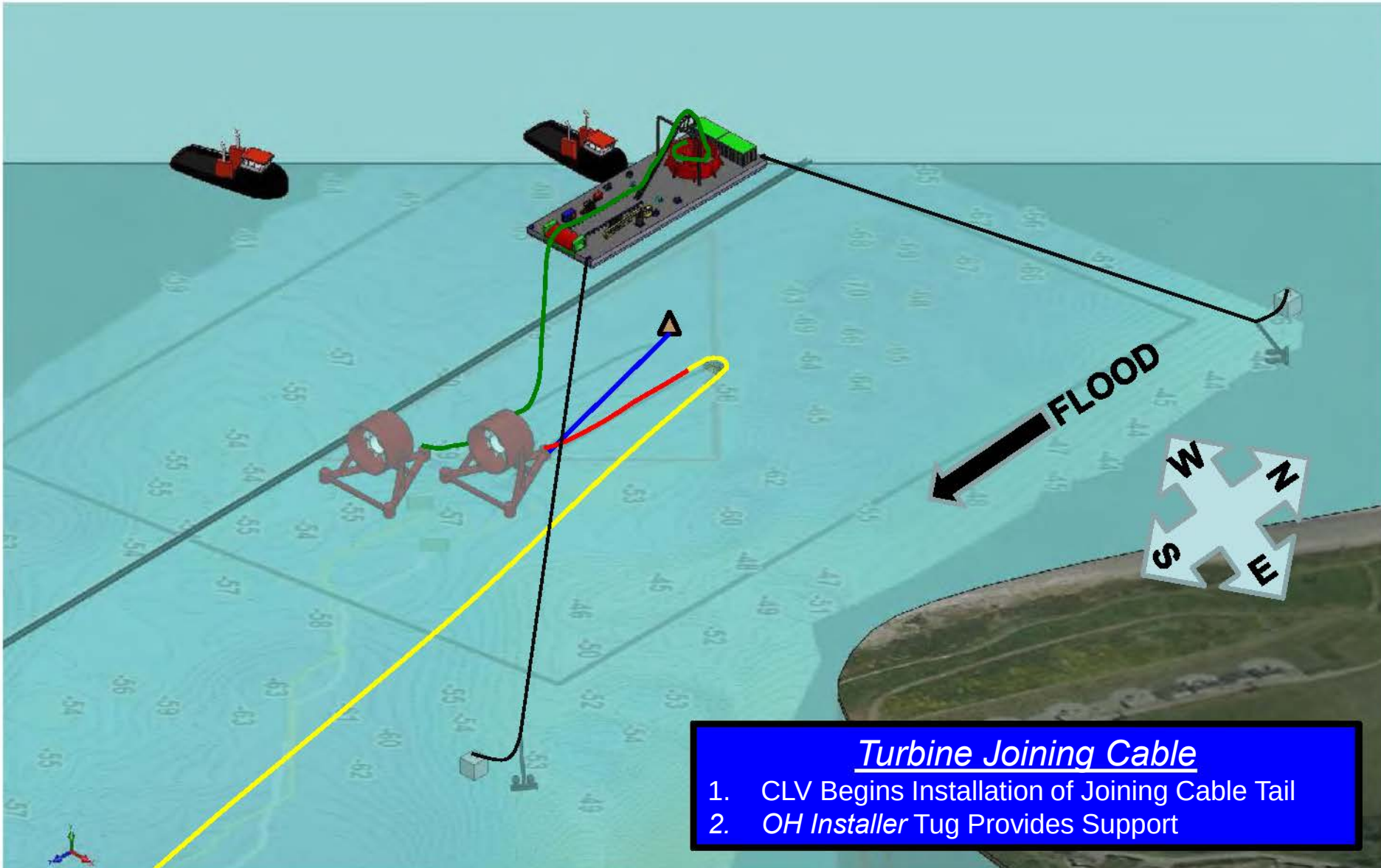
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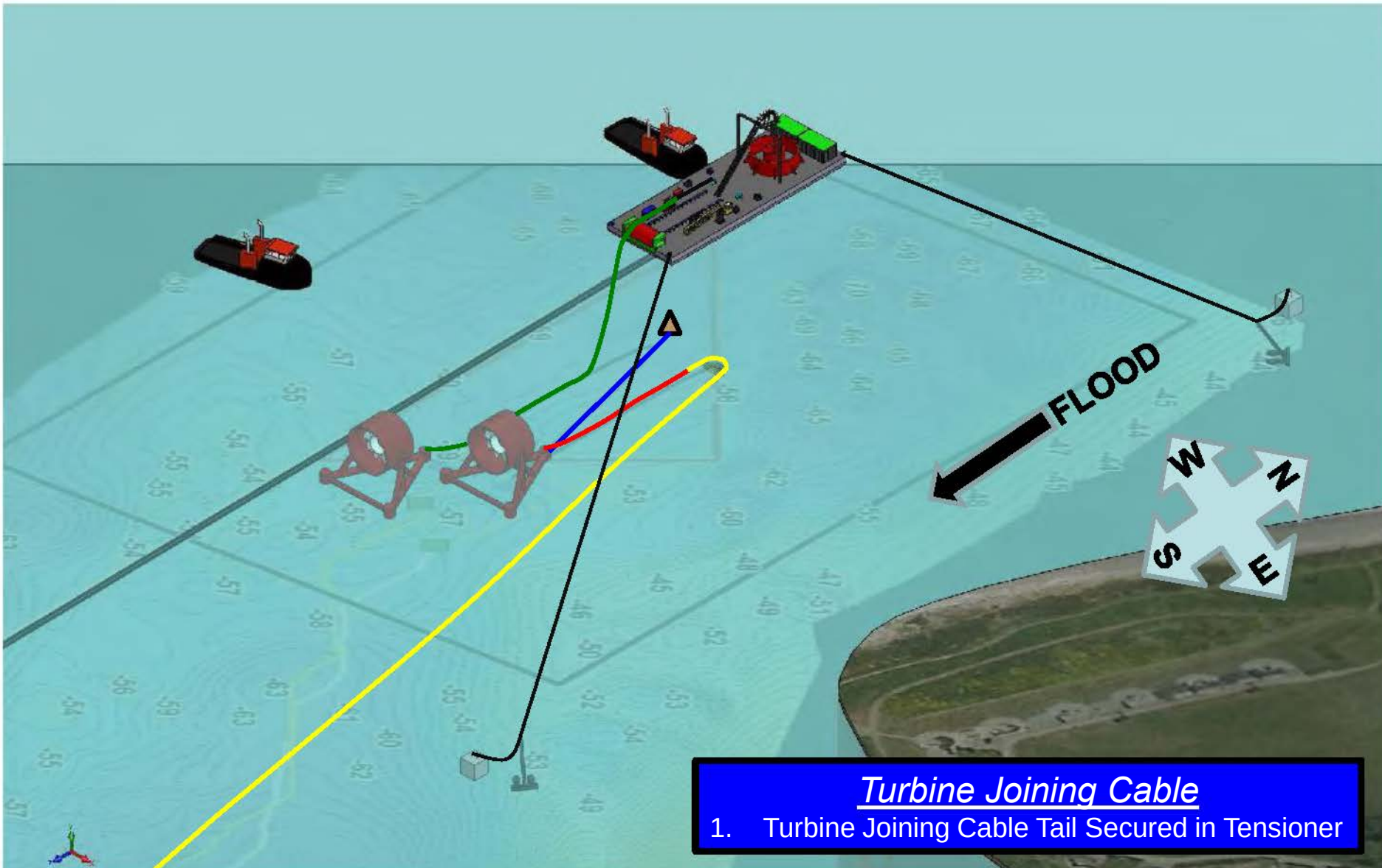
OH Installer

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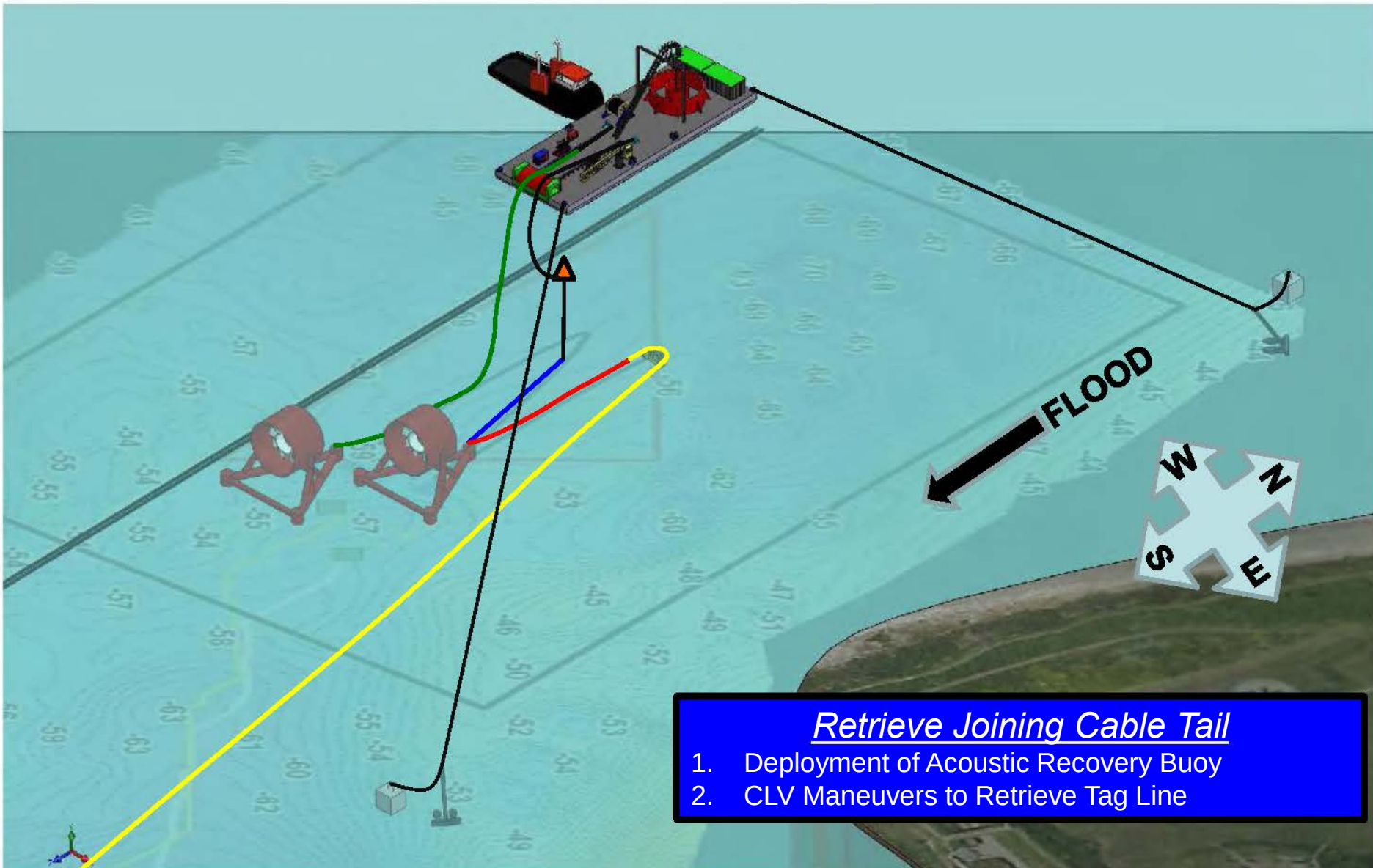
Open Hydro Two-Point Moor Installation Concept



Open Hydro Two-Point Moor Installation Concept

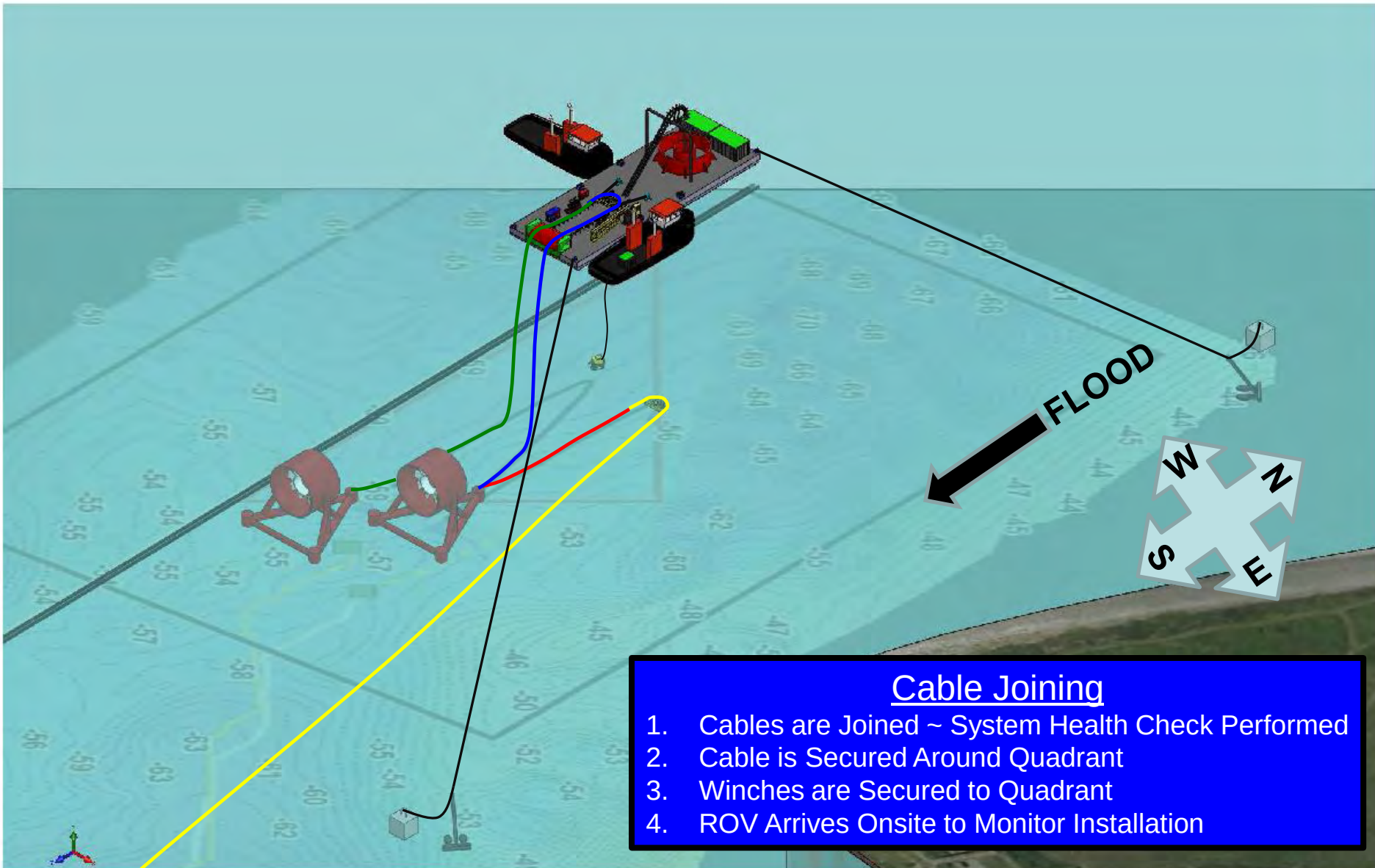


Open Hydro Two-Point Moor Installation Concept

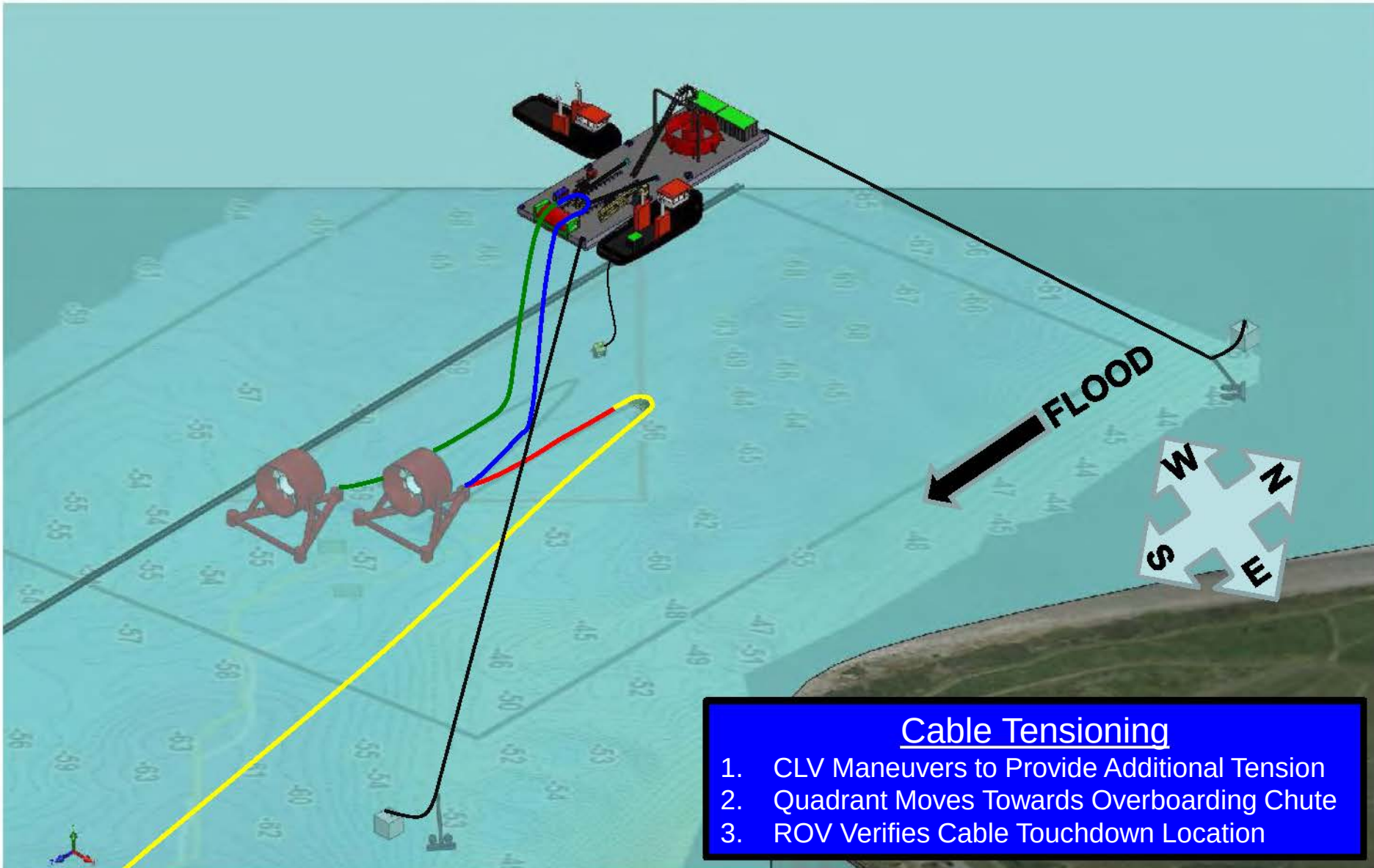




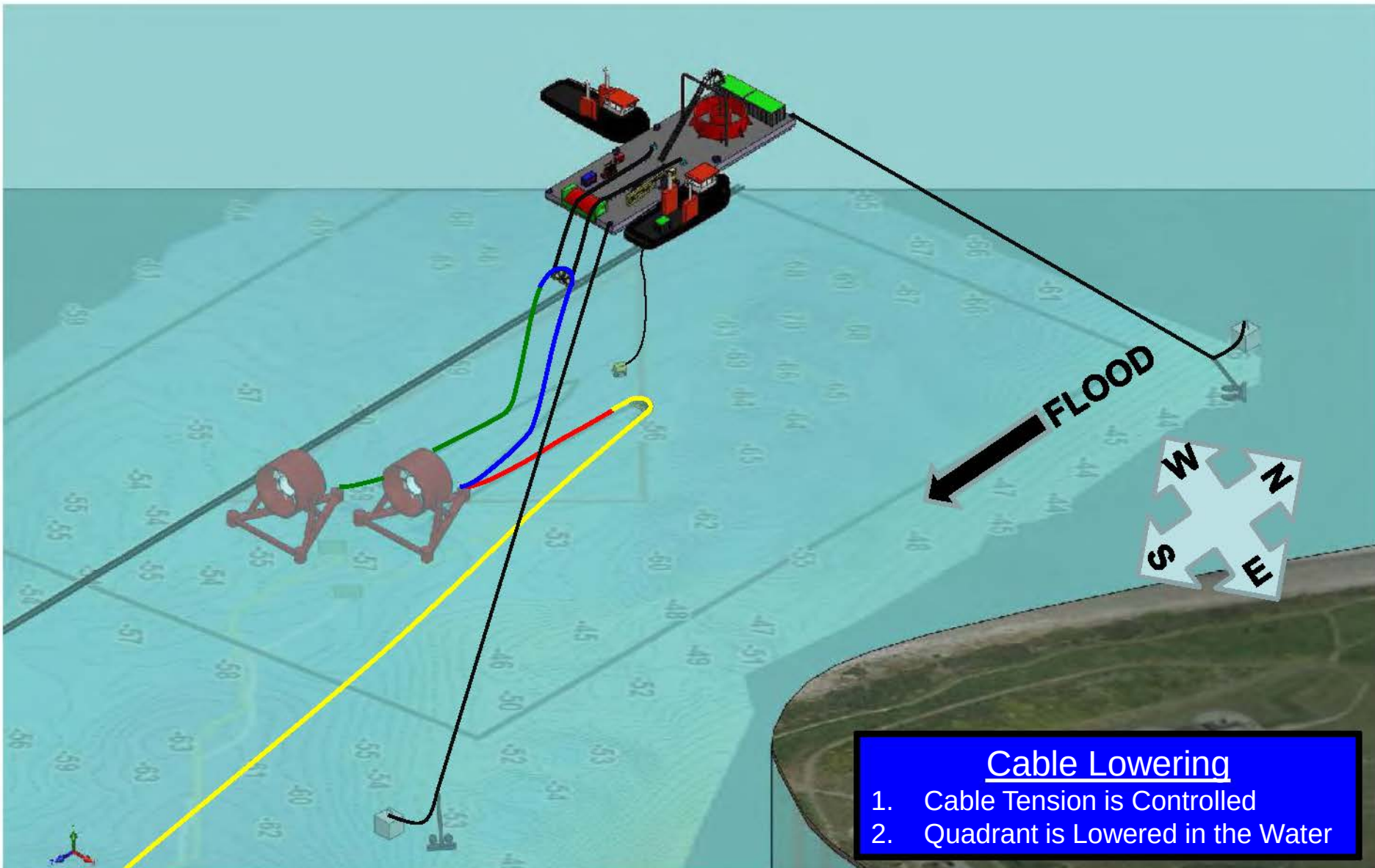
Open Hydro Two-Point Moor Installation Concept



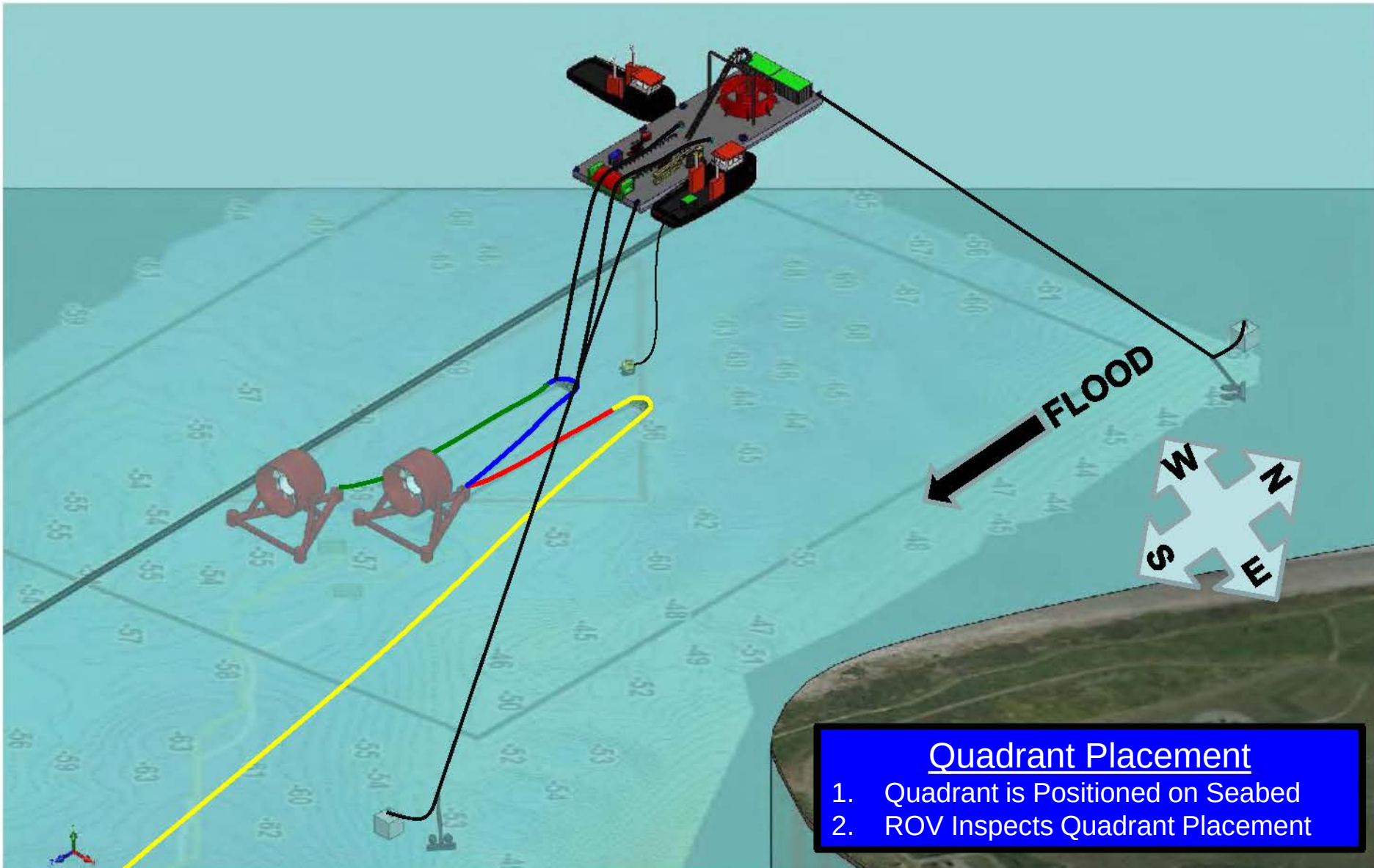
Open Hydro Two-Point Moor Installation Concept



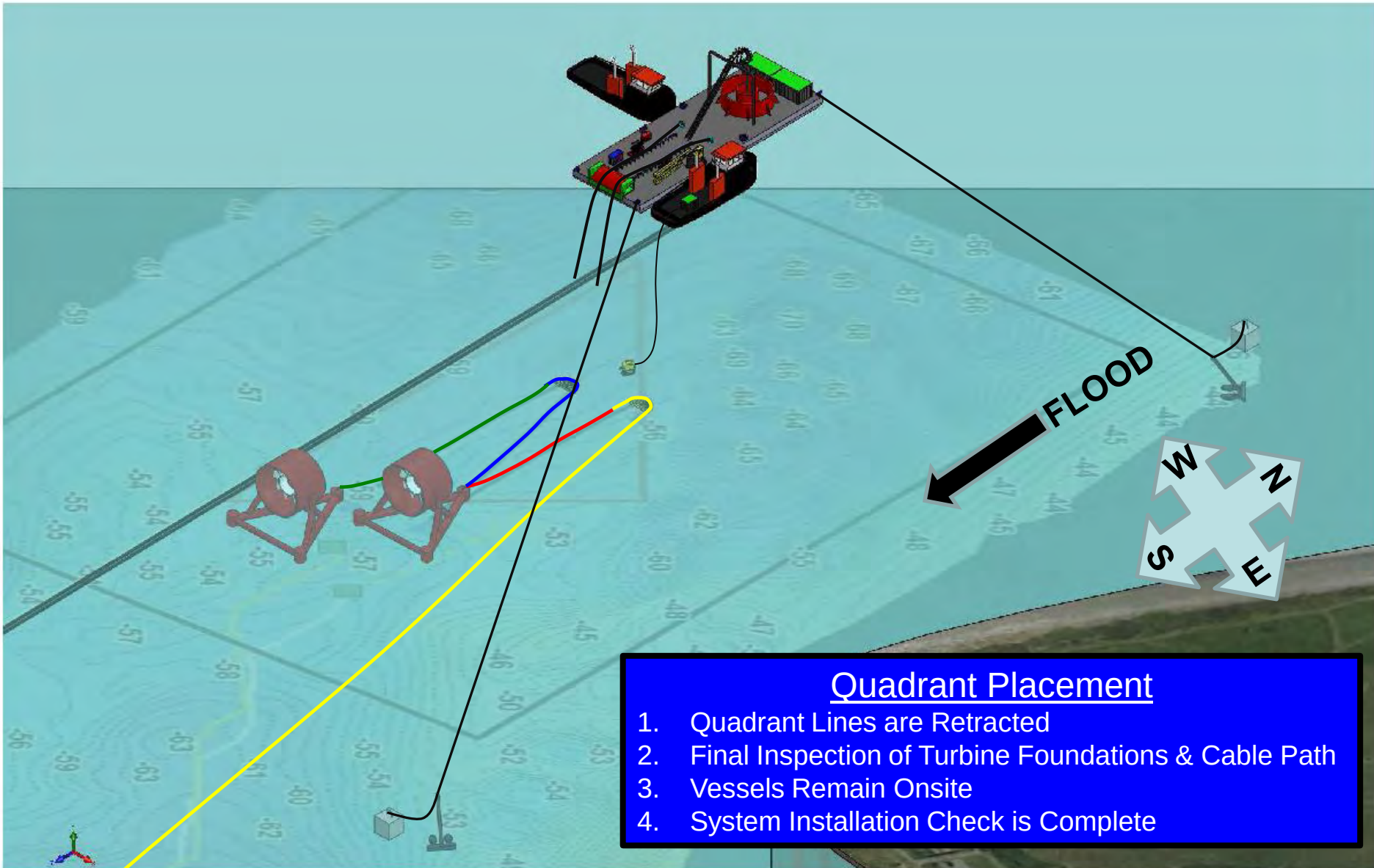
Open Hydro Two-Point Moor Installation Concept



Open Hydro Two-Point Moor Installation Concept



Open Hydro Two-Point Moor Installation Concept



ATTACHMENT 5



OpenHydro SnoPud Project

Turbine Deployment & Cable Planning

Individual Cable Installation Concept

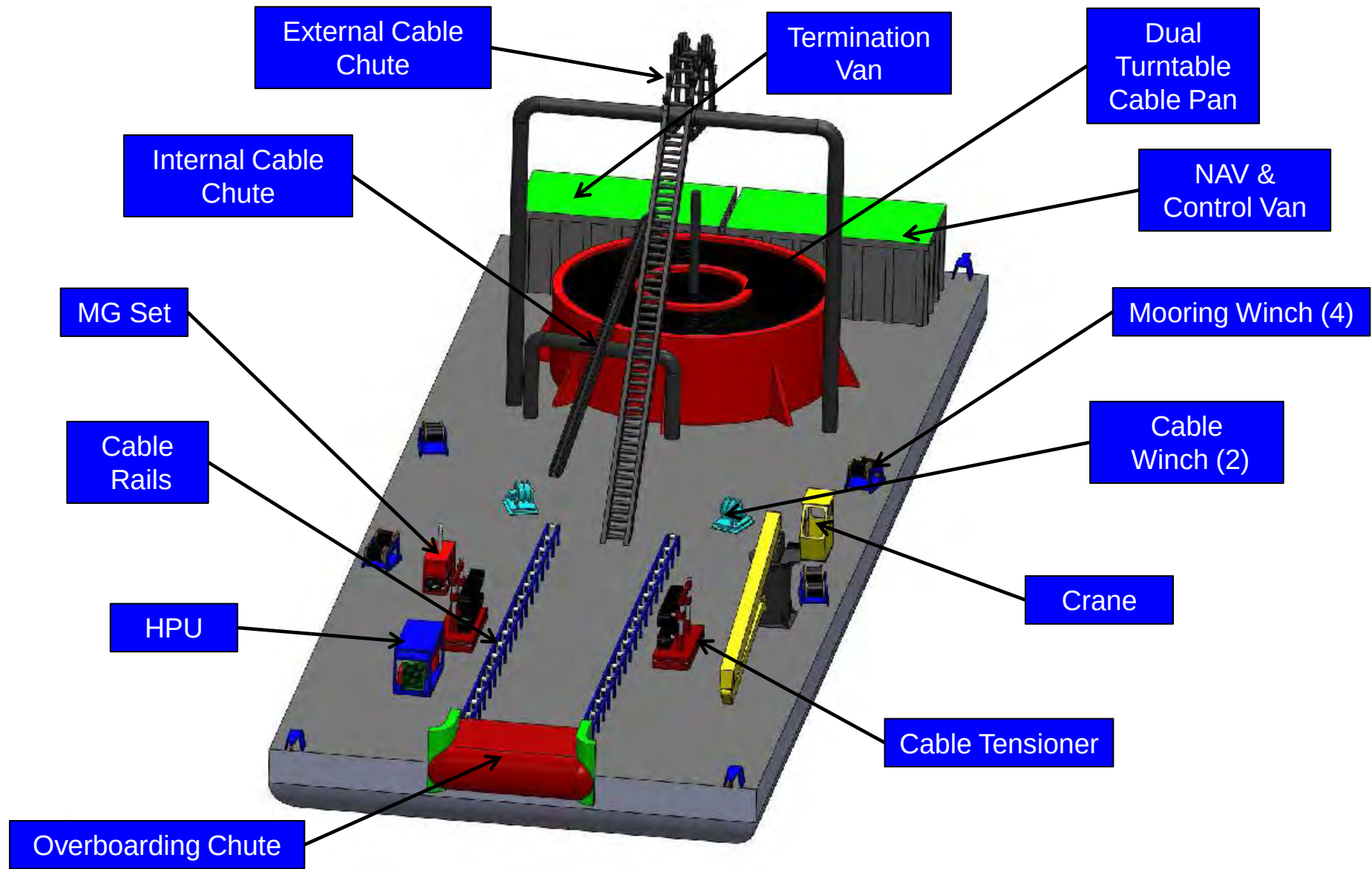
August 5, 2011



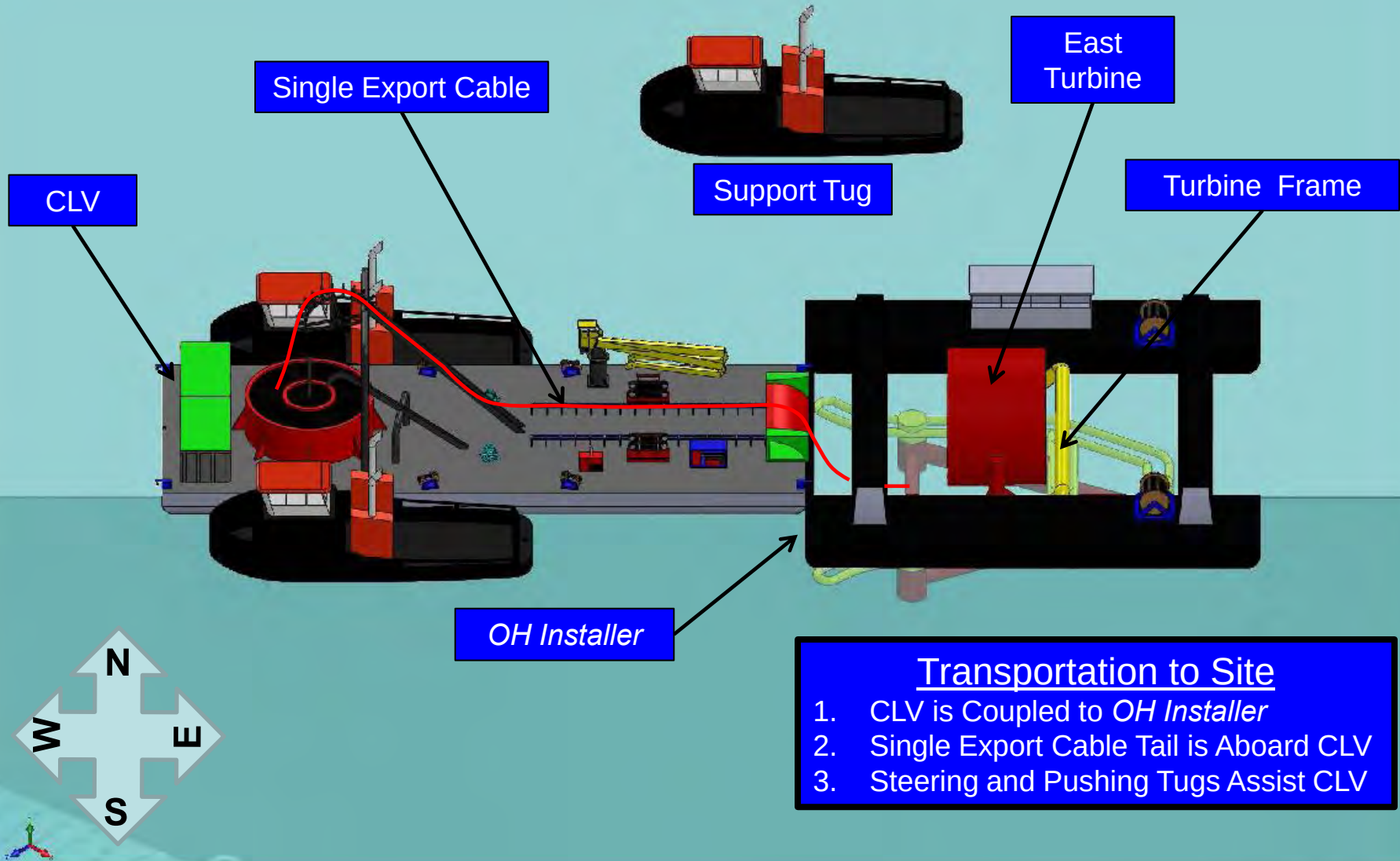
Appendix of Acronyms

<u>Description</u>	<u>Acronym</u>
Cable Laying Vessel	CLV
Openhydro	OH
Hydraulic Power Unit	HPU
Pacific Crossing Cables	PC-1
Horizontal Directional Drill	HDD

CLV Layout

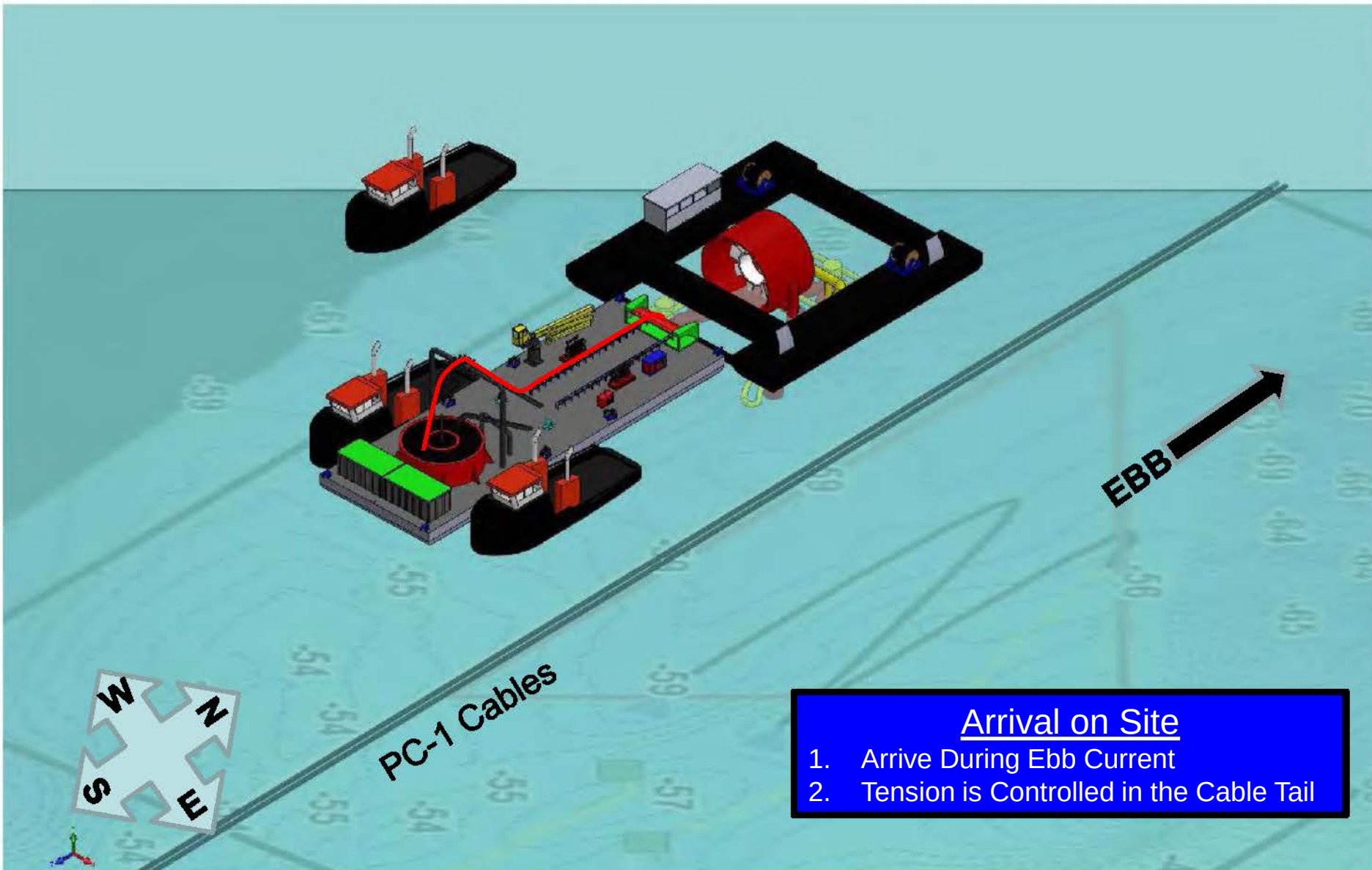


Open Hydro Individual Cable Installation Concept



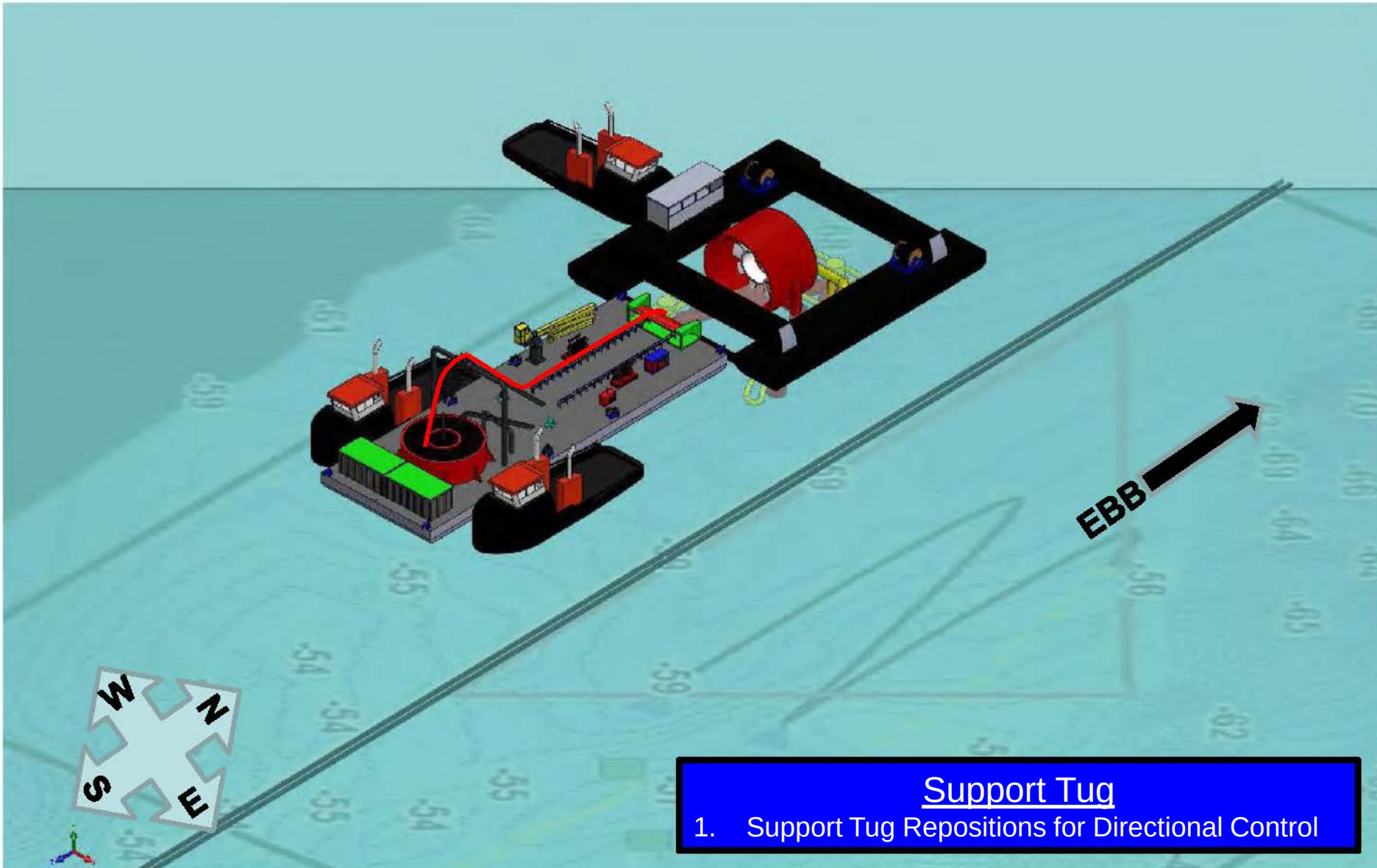


Open Hydro Individual Cable Installation Concept

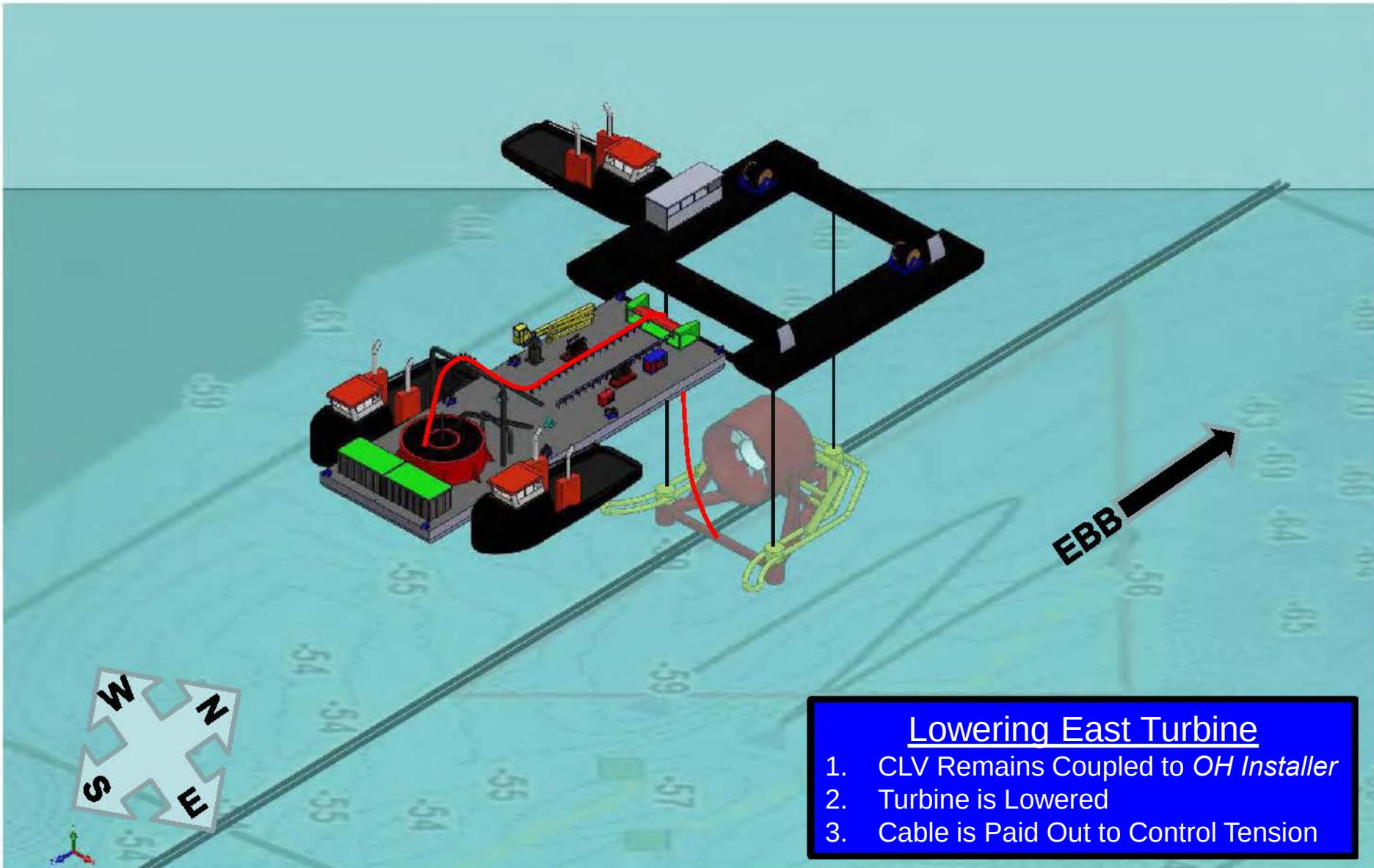




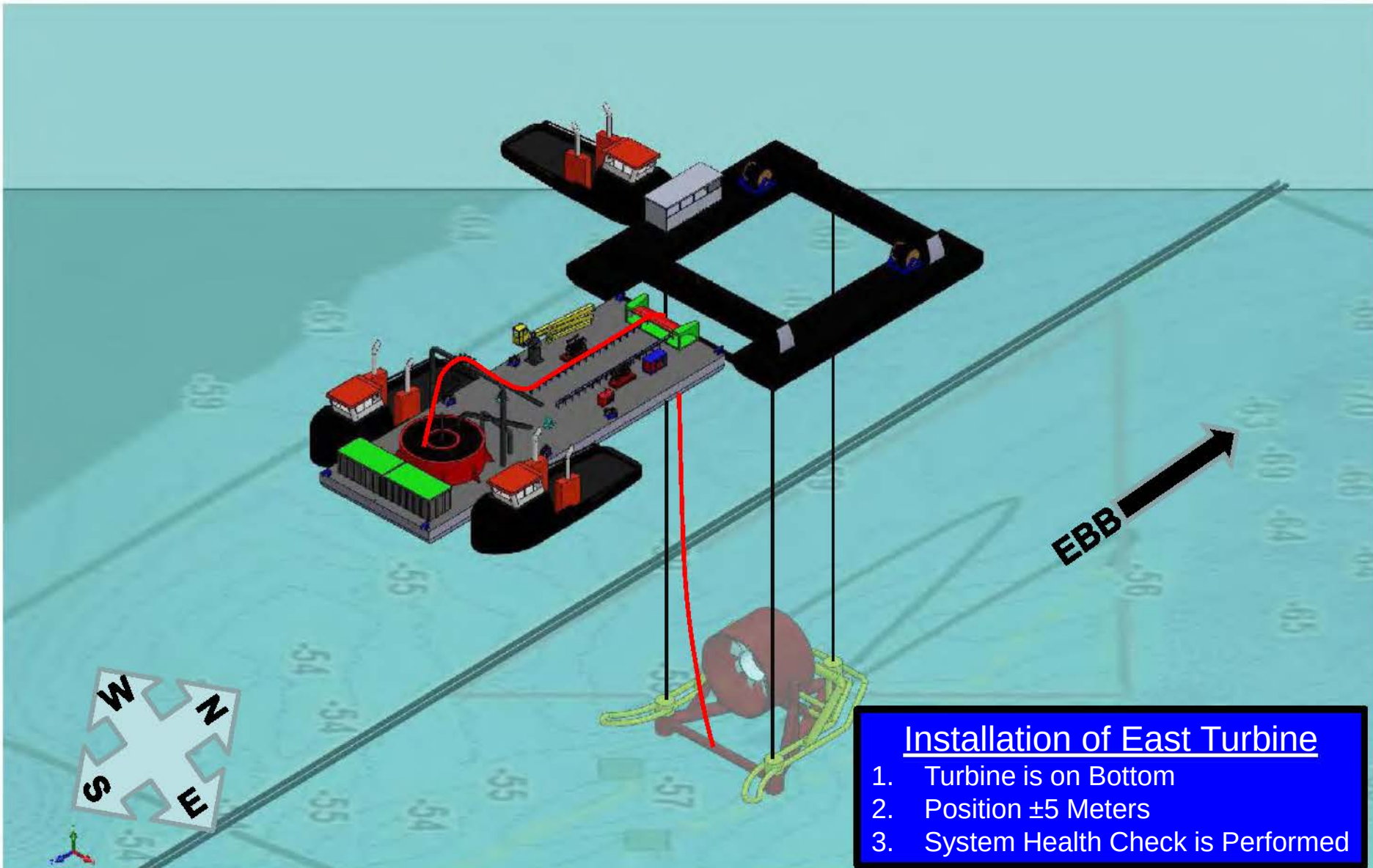
Open Hydro Individual Cable Installation Concept



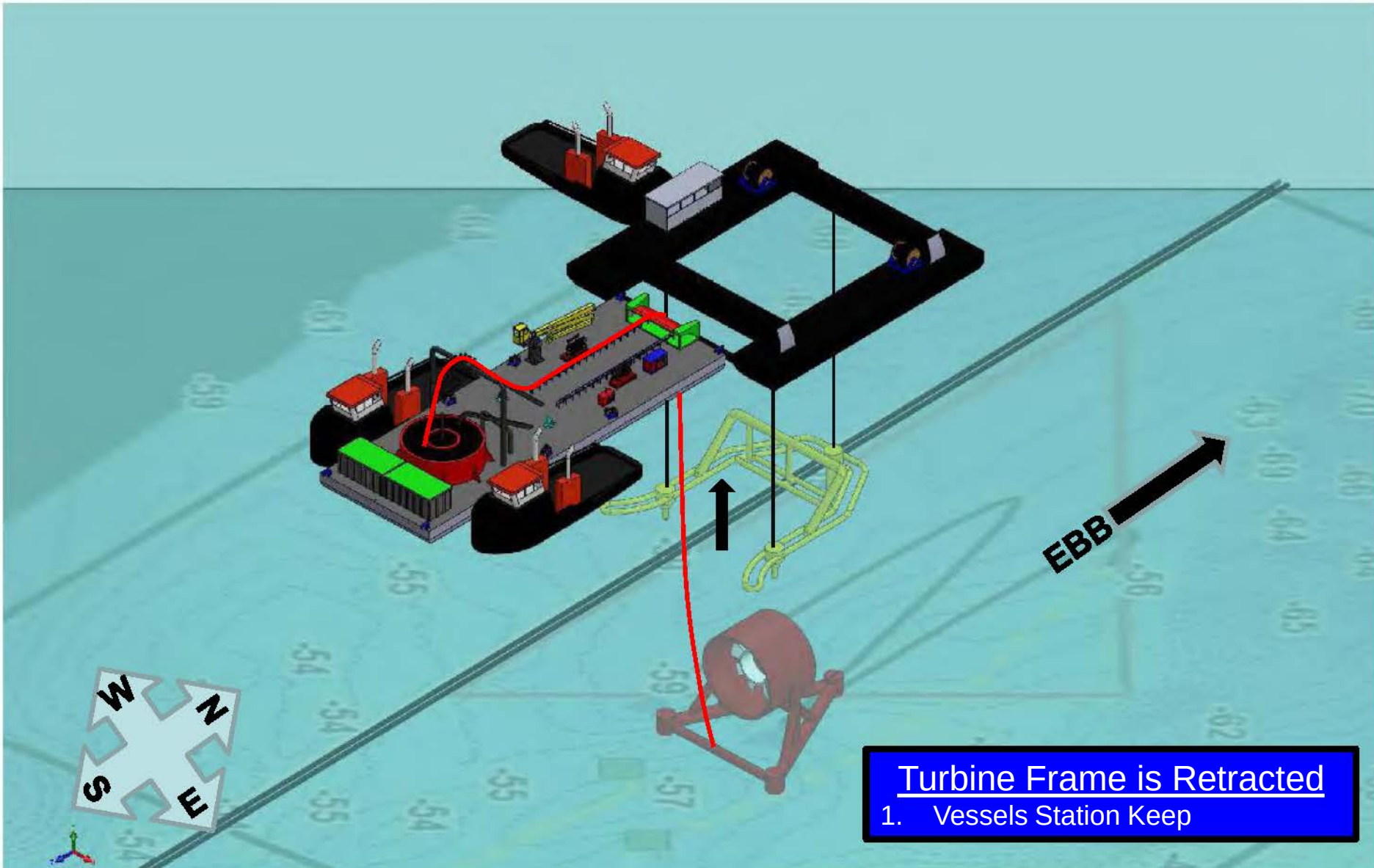
Open Hydro Individual Cable Installation Concept



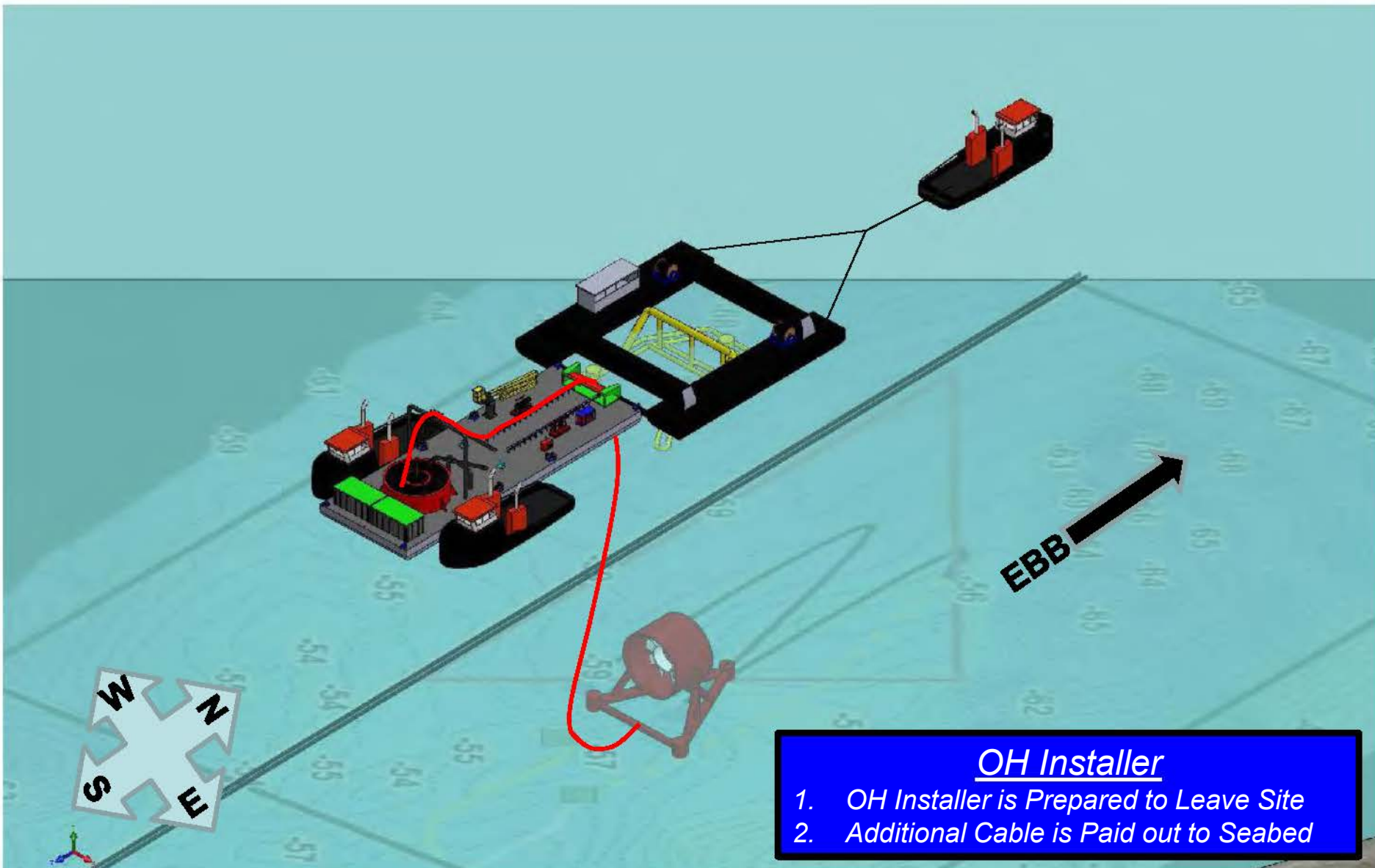
Open Hydro Individual Cable Installation Concept



Open Hydro Individual Cable Installation Concept

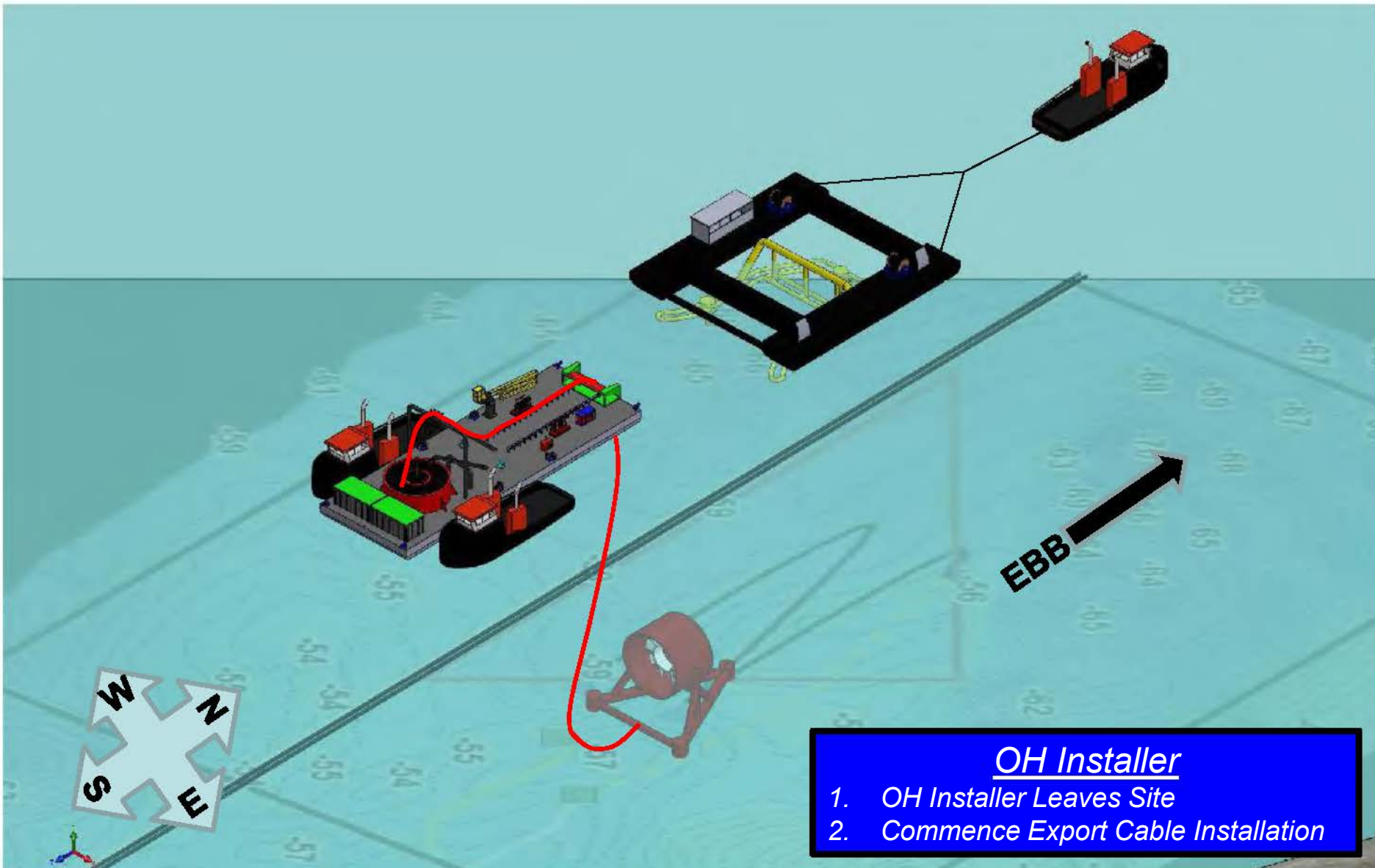


Open Hydro Individual Cable Installation Concept





Open Hydro Individual Cable Installation Concept

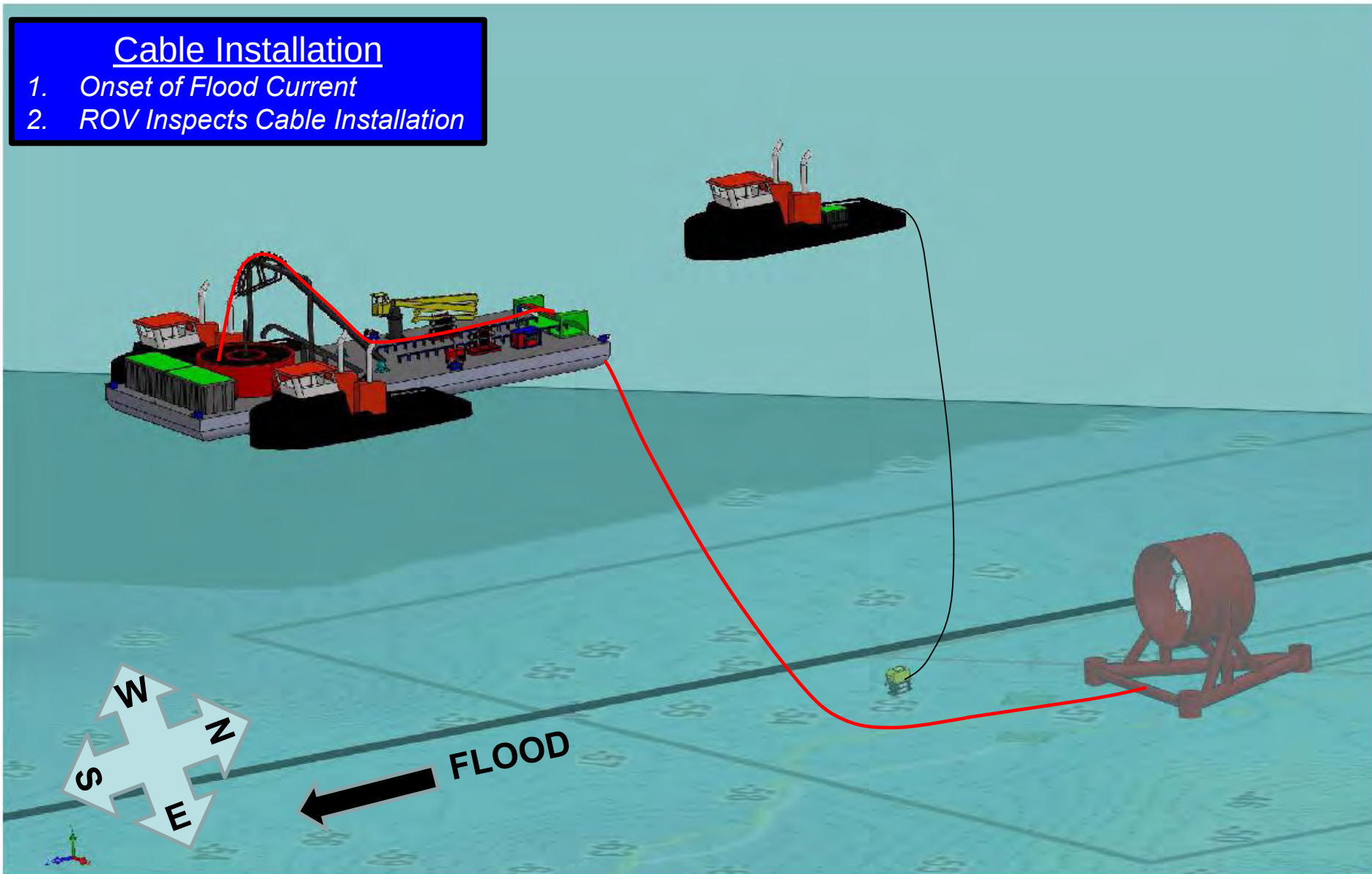




Open Hydro Individual Cable Installation Concept

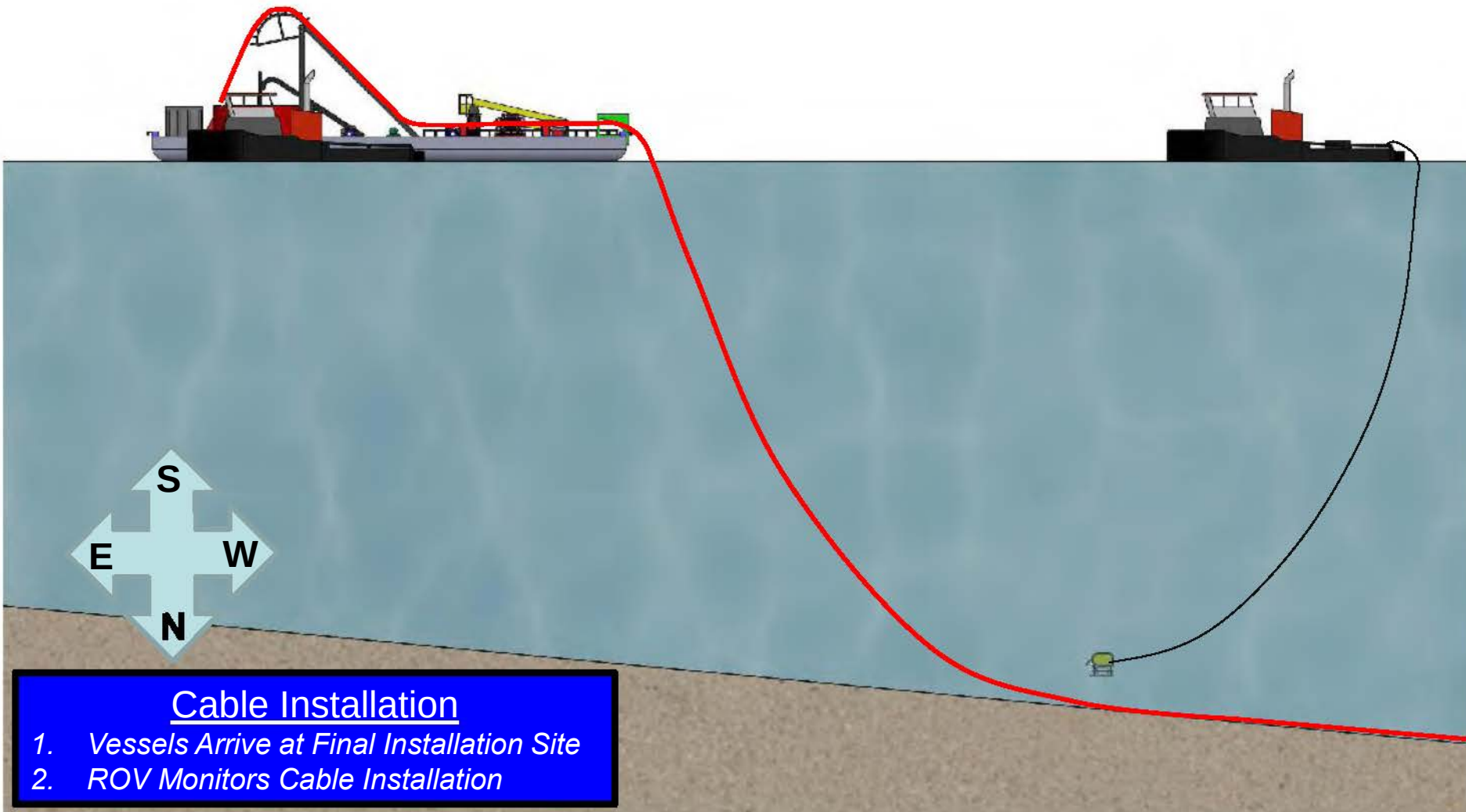
Cable Installation

1. Onset of Flood Current
2. ROV Inspects Cable Installation





Open Hydro Individual Cable Installation Concept



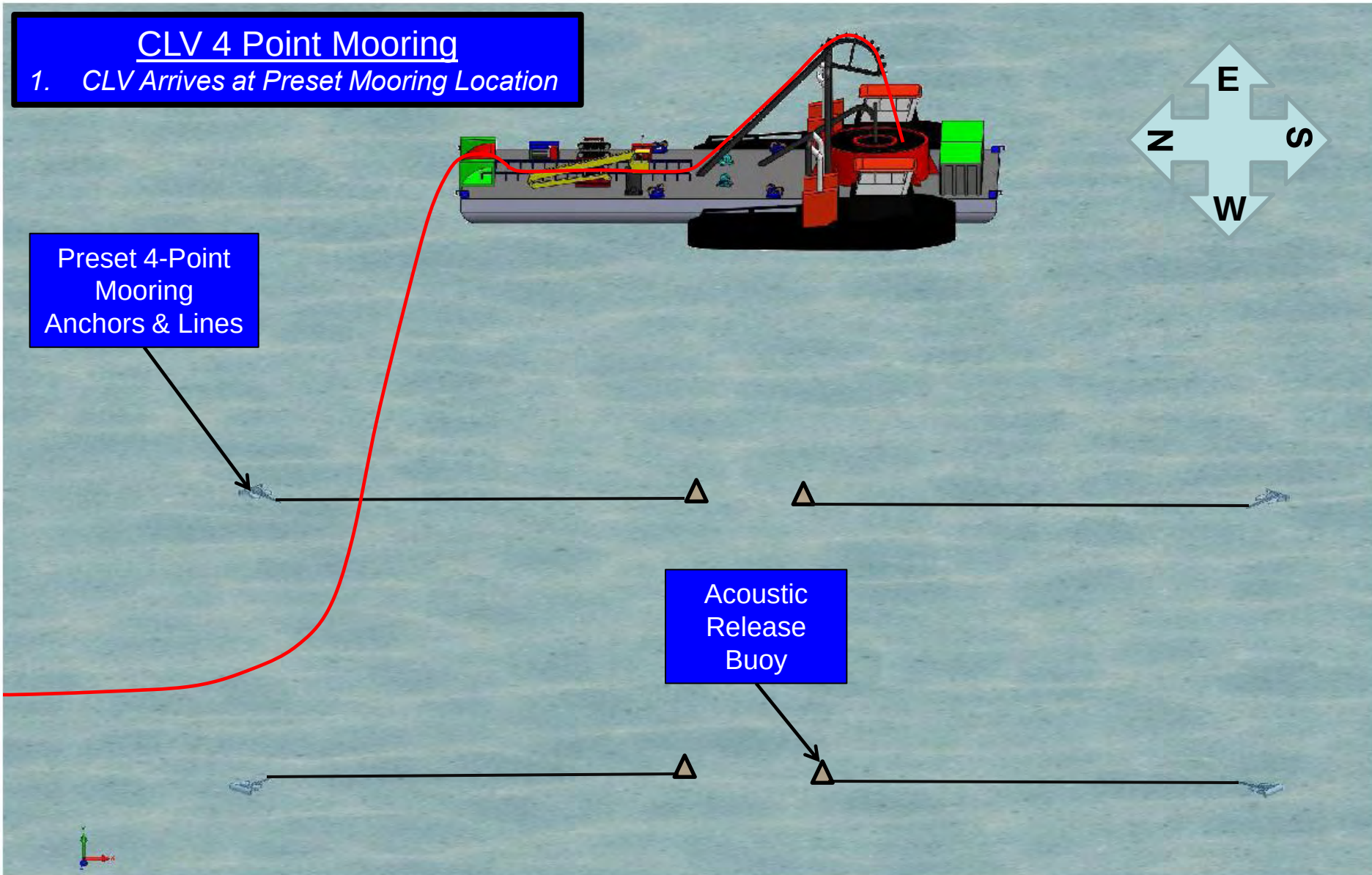
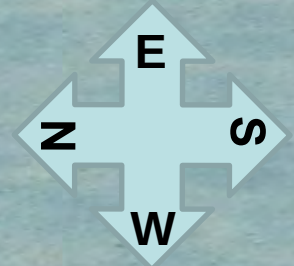
Open Hydro Individual Cable Installation Concept

CLV 4 Point Mooring

1. CLV Arrives at Preset Mooring Location

Preset 4-Point
Mooring
Anchors & Lines

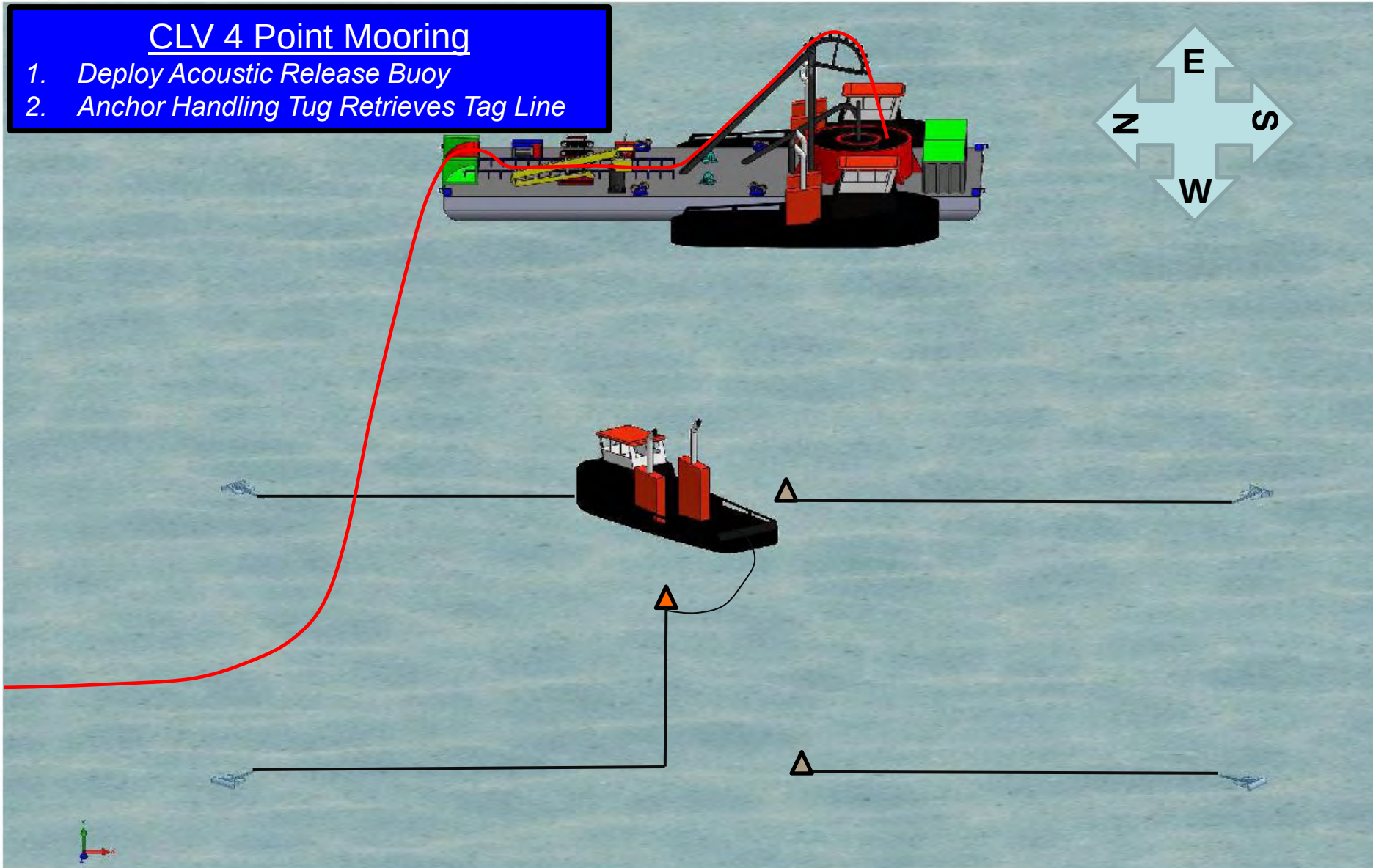
Acoustic
Release
Buoy



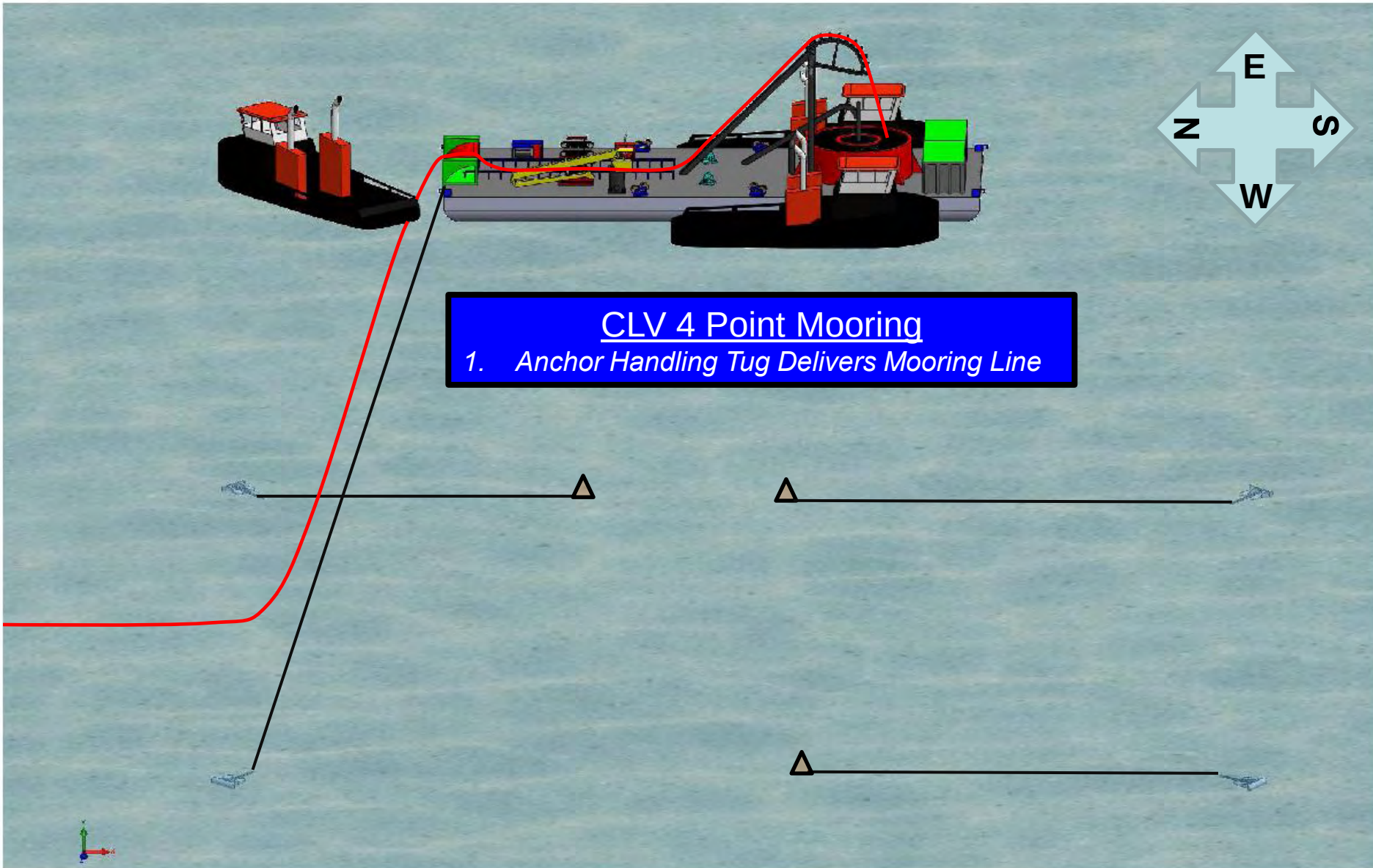
Open Hydro Individual Cable Installation Concept

CLV 4 Point Mooring

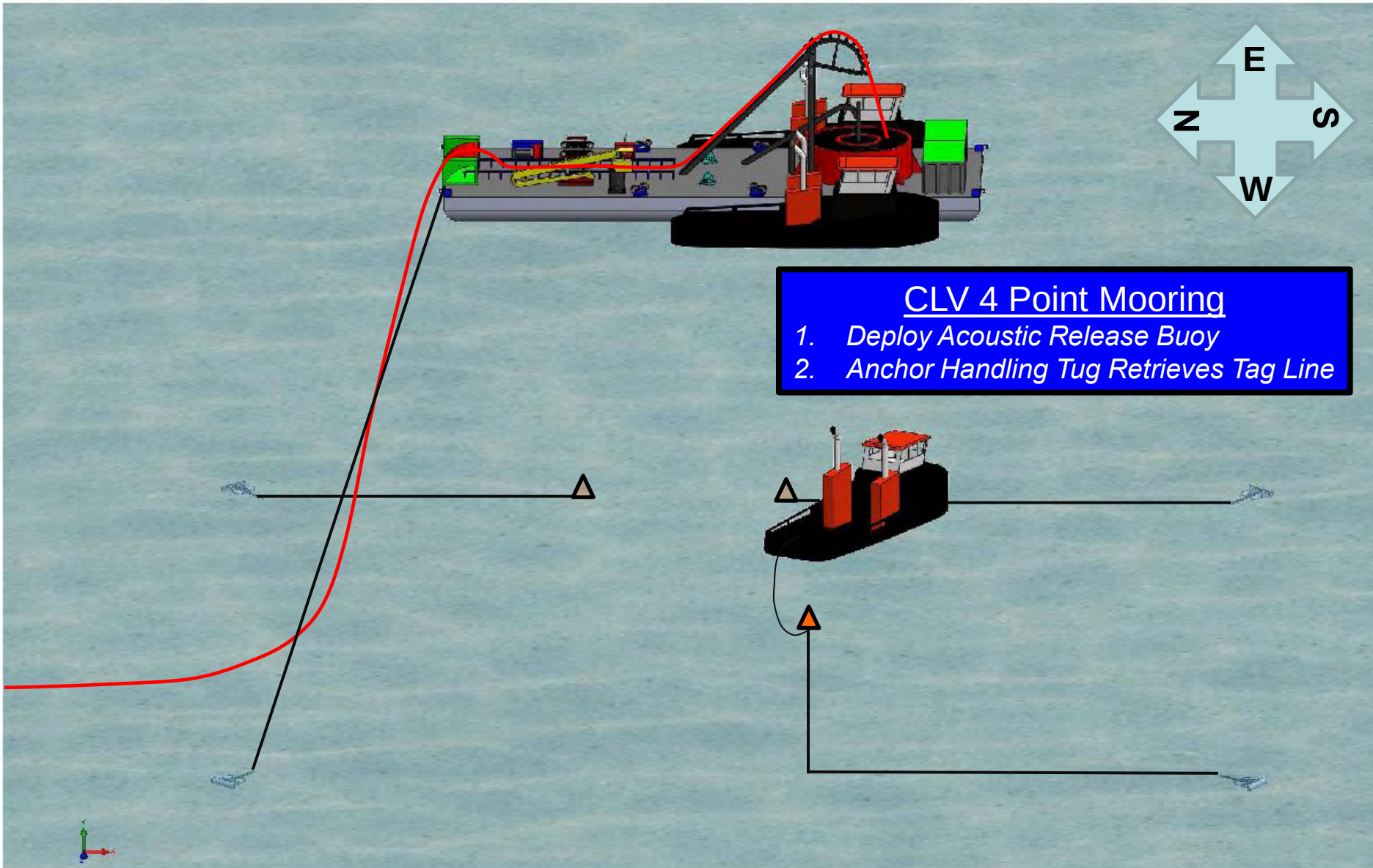
1. *Deploy Acoustic Release Buoy*
2. *Anchor Handling Tug Retrieves Tag Line*



Open Hydro Individual Cable Installation Concept



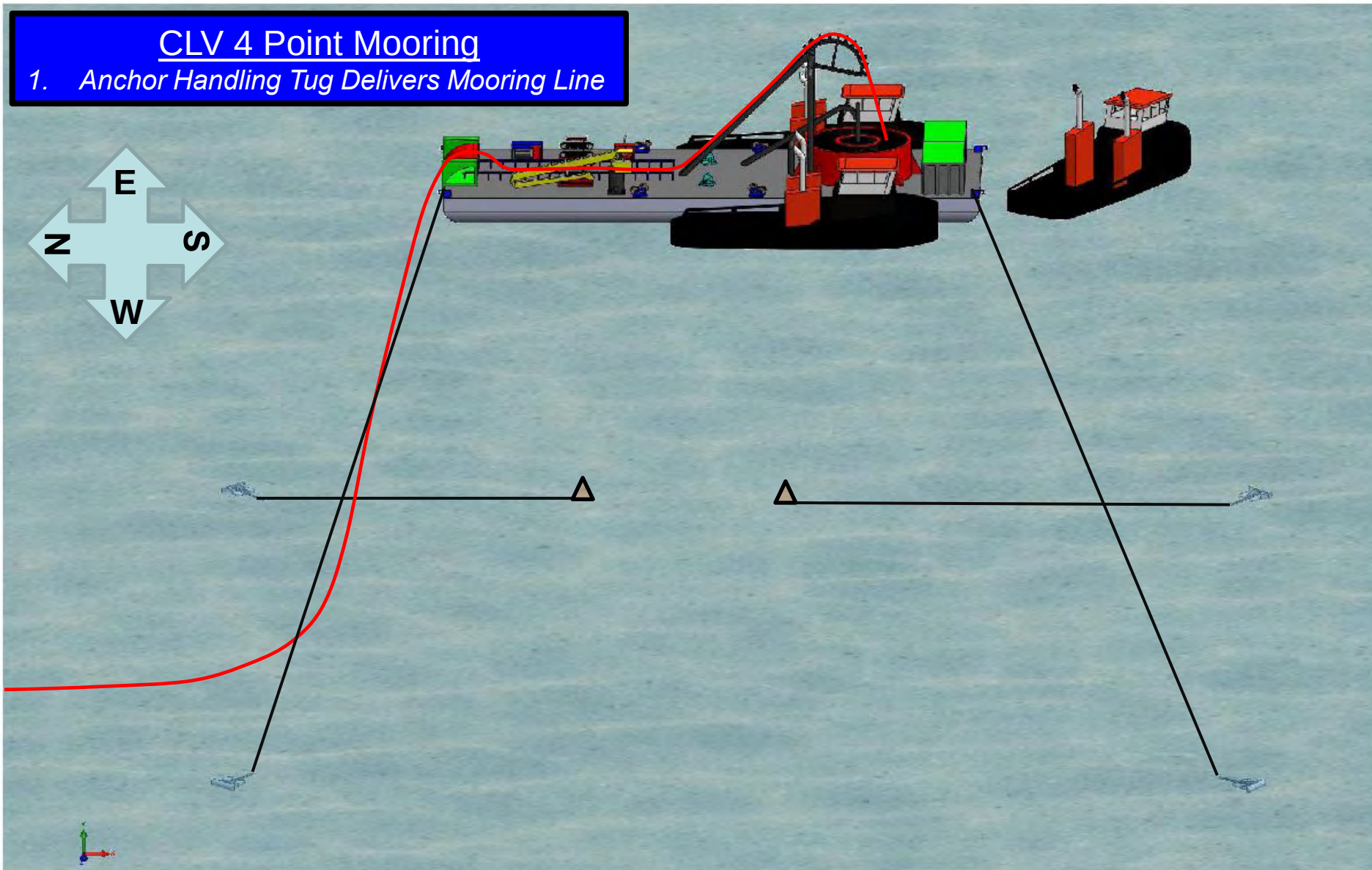
Open Hydro Individual Cable Installation Concept



Open Hydro Individual Cable Installation Concept

CLV 4 Point Mooring

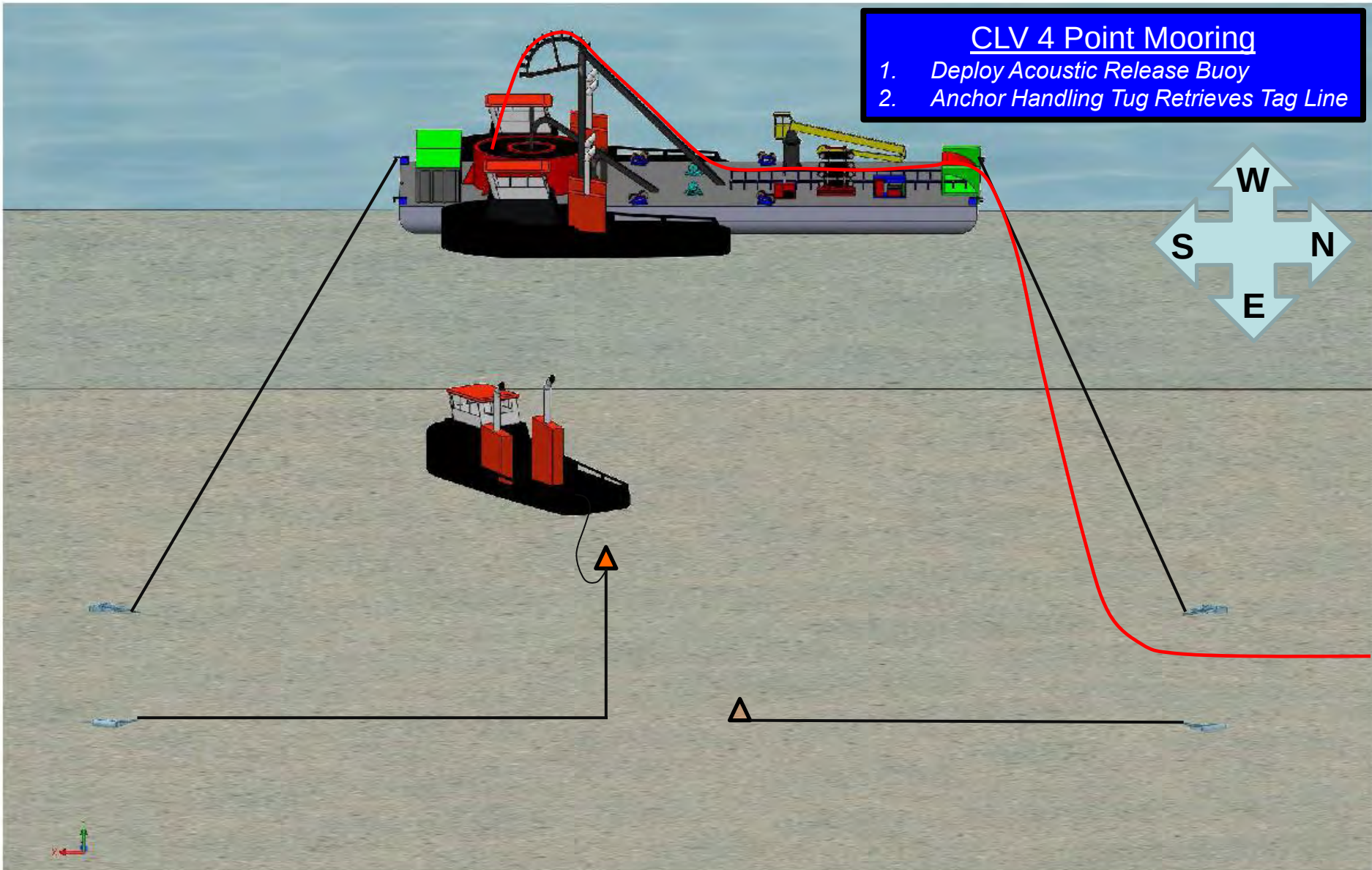
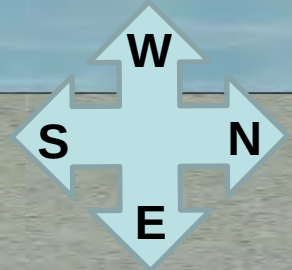
1. *Anchor Handling Tug Delivers Mooring Line*



Open Hydro Individual Cable Installation Concept

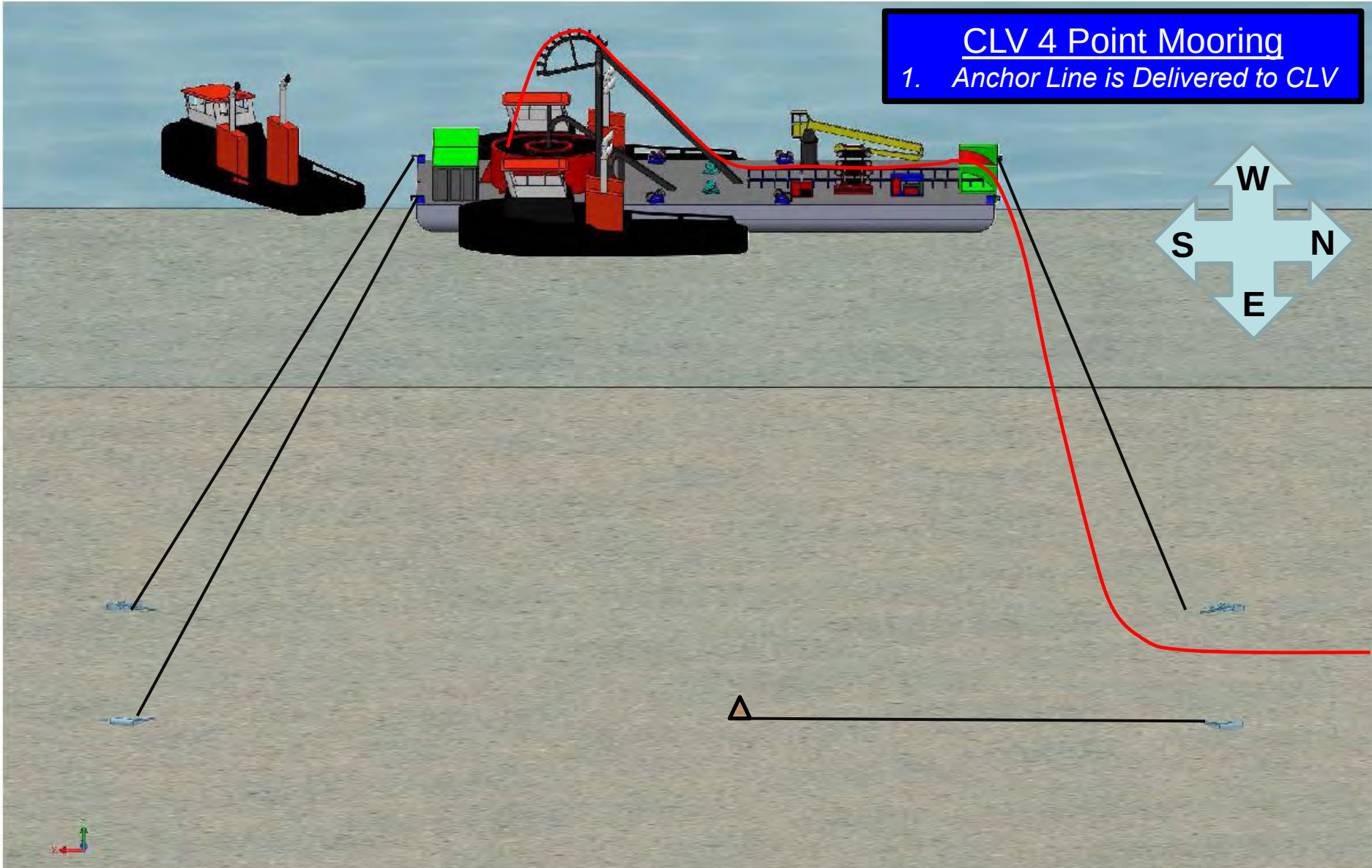
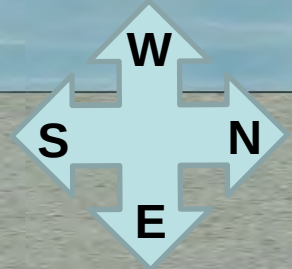
CLV 4 Point Mooring

1. Deploy Acoustic Release Buoy
2. Anchor Handling Tug Retrieves Tag Line

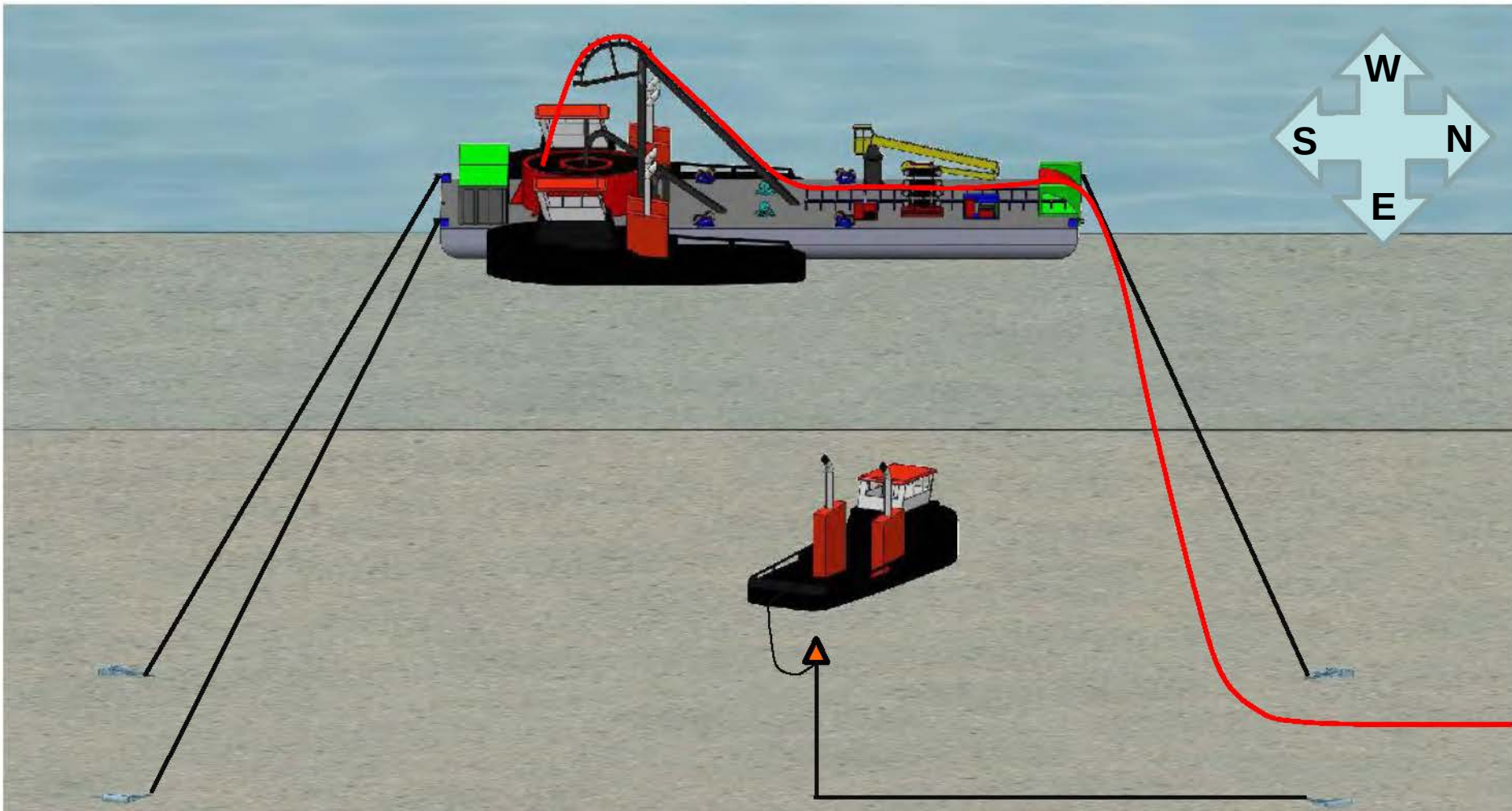


Open Hydro Individual Cable Installation Concept

CLV 4 Point Mooring
1. *Anchor Line is Delivered to CLV*



Open Hydro Individual Cable Installation Concept



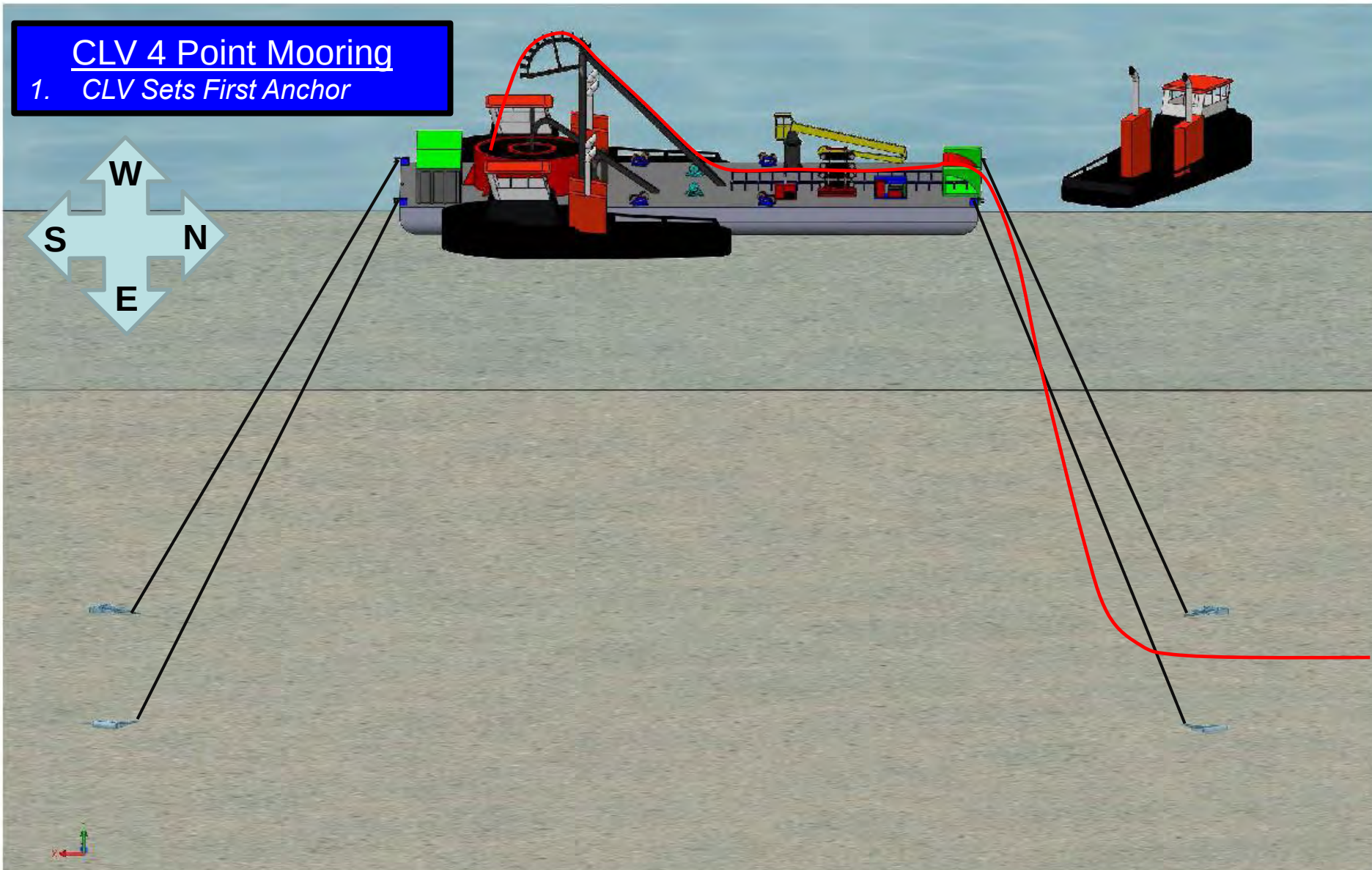
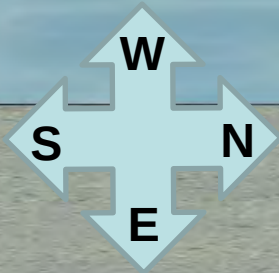
CLV 4 Point Mooring

1. *Deploy Acoustic Release Buoy*
2. *Anchor Handling Tug Retrieves Tag Line*

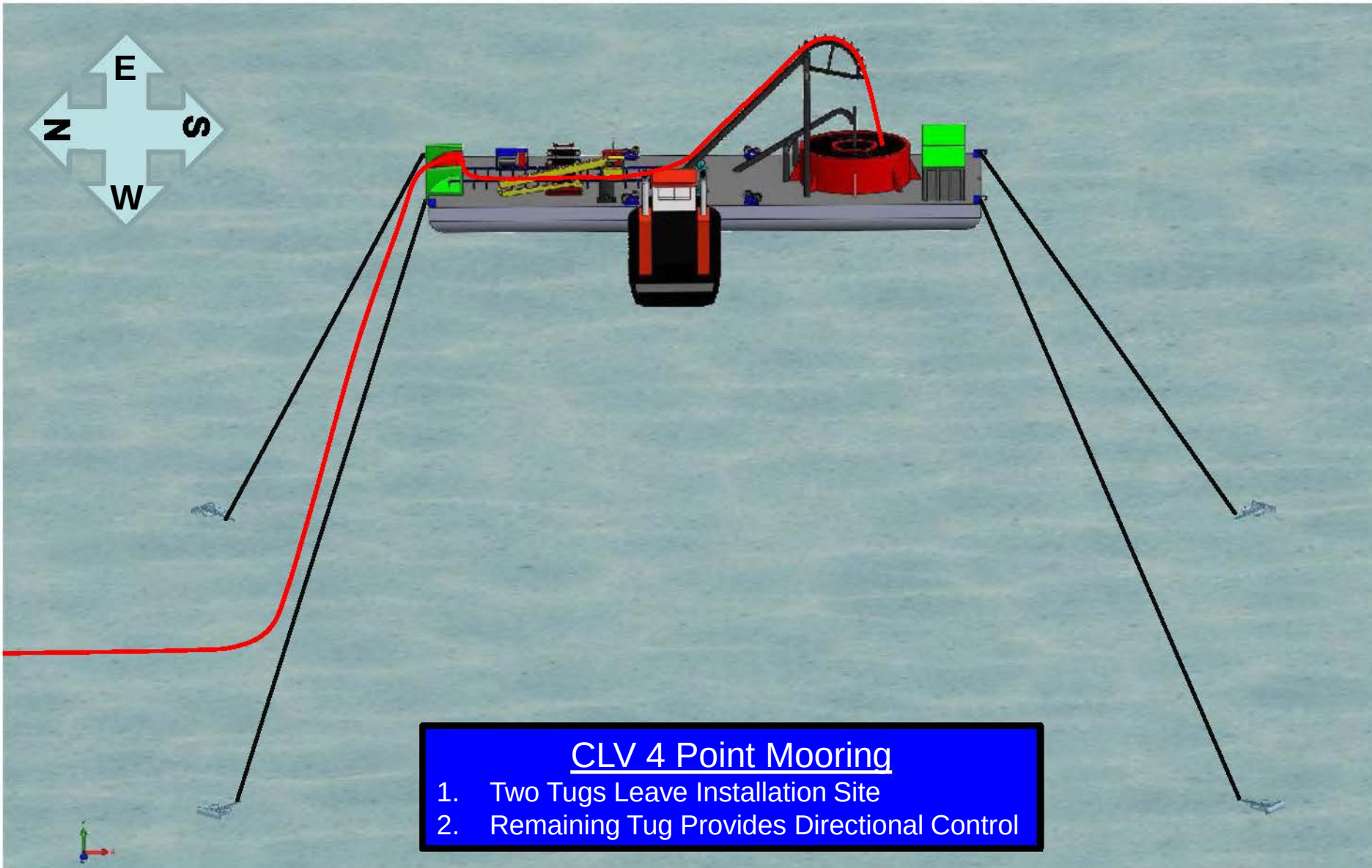
Open Hydro Individual Cable Installation Concept

CLV 4 Point Mooring

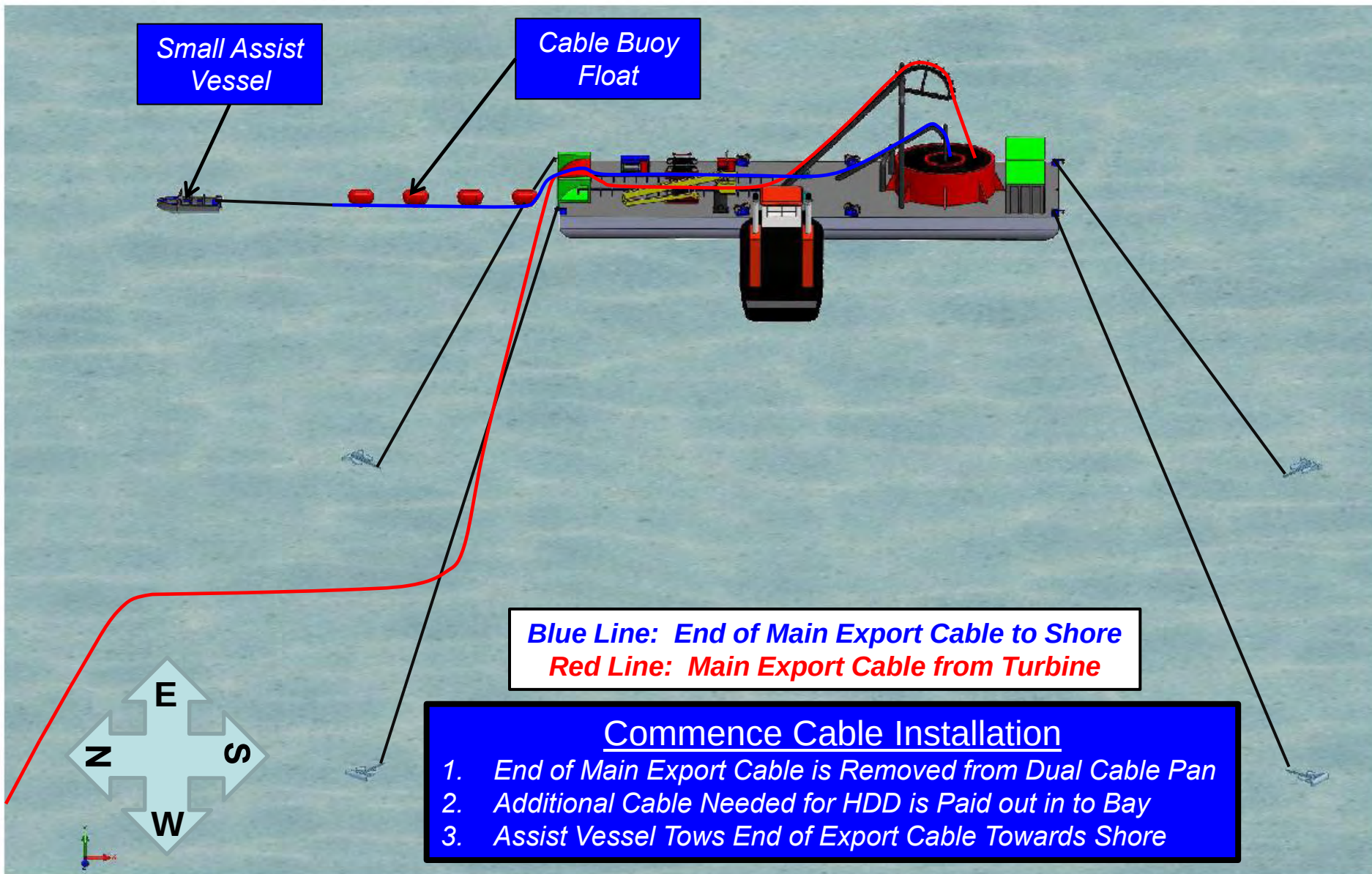
1. CLV Sets First Anchor



Open Hydro Individual Cable Installation Concept



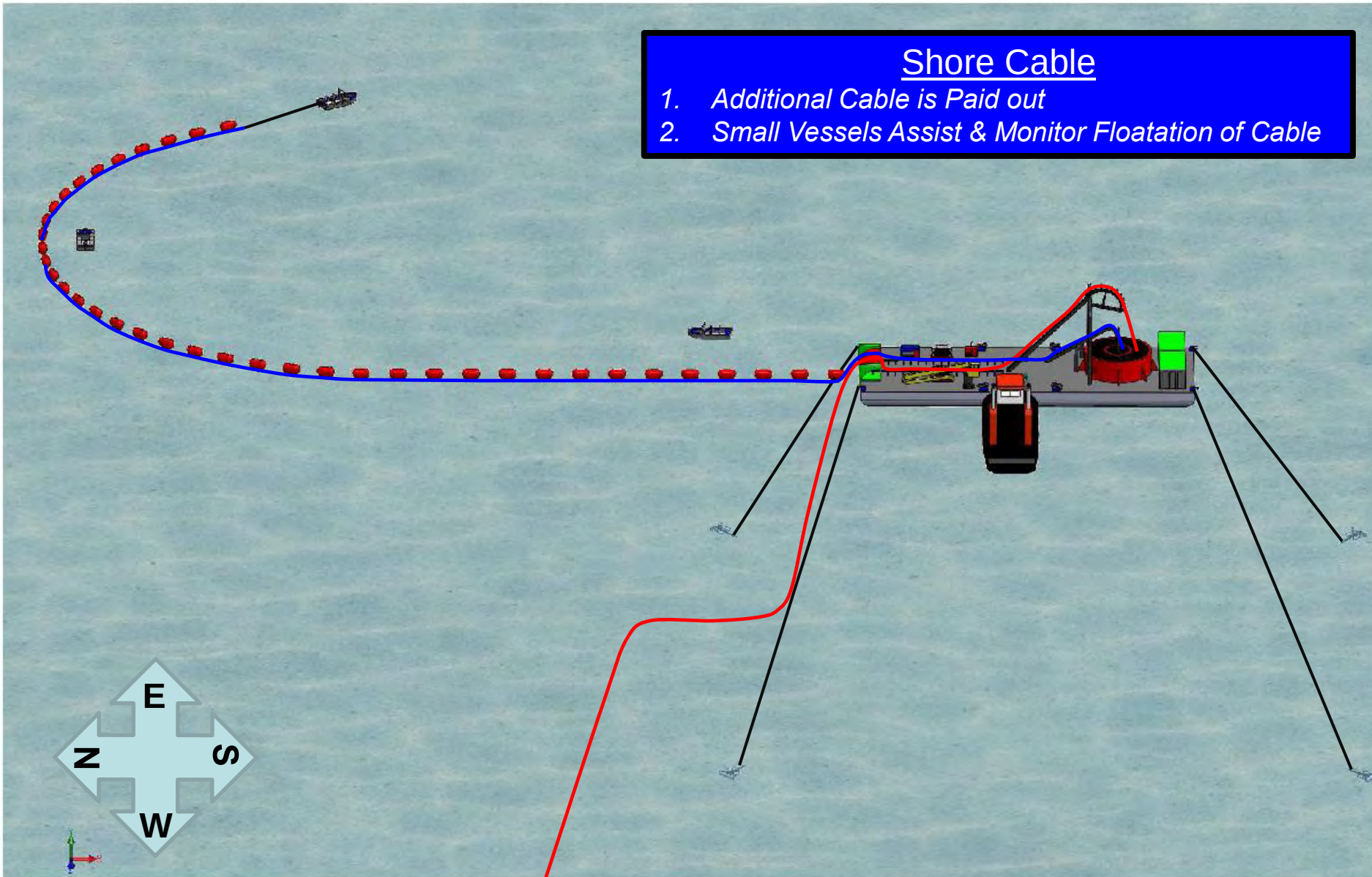
Open Hydro Individual Cable Installation Concept



Open Hydro Individual Cable Installation Concept

Shore Cable

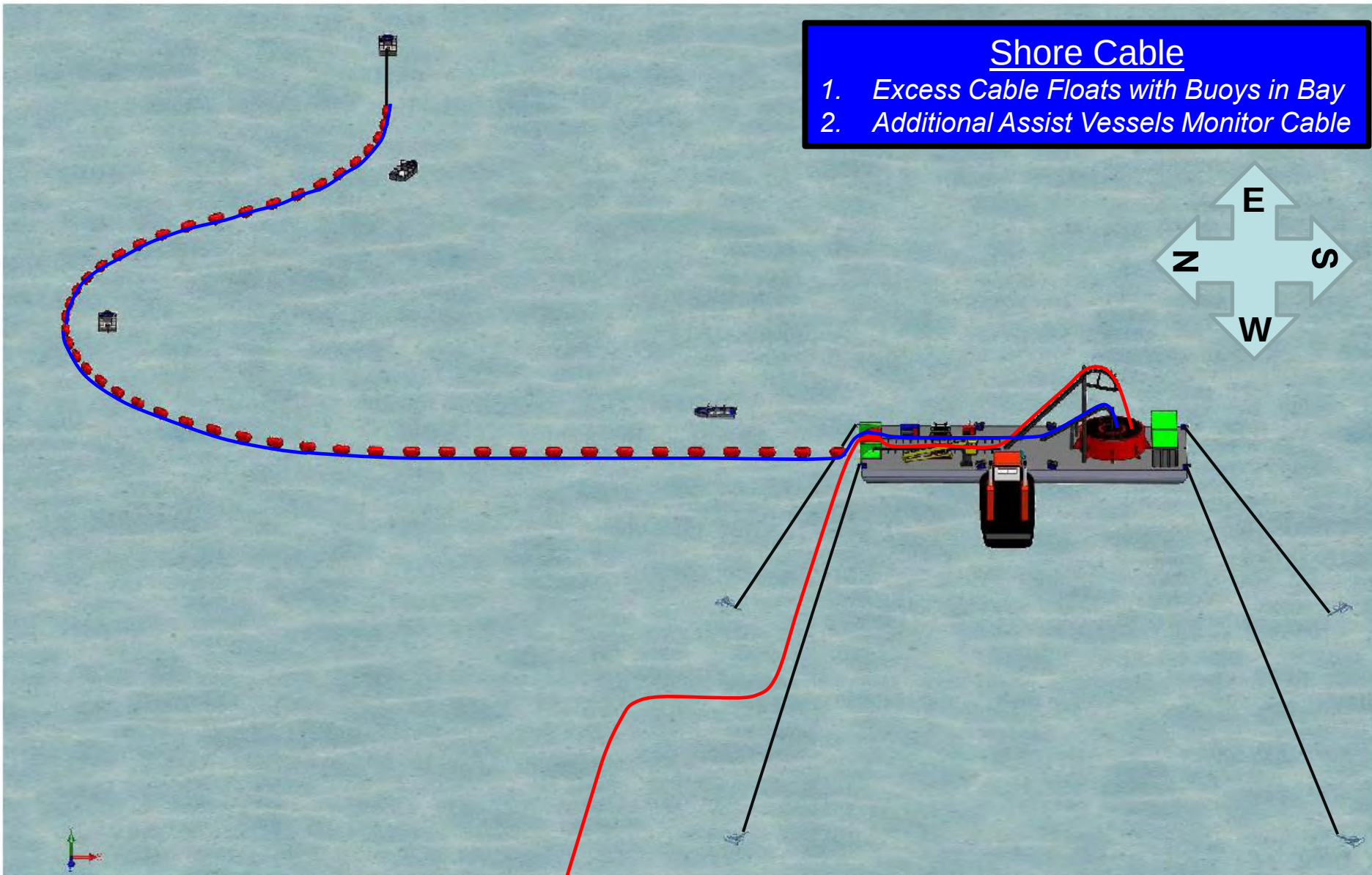
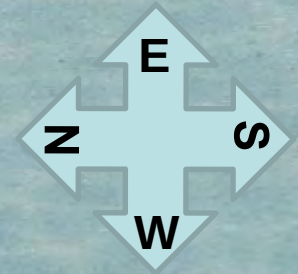
1. Additional Cable is Paid out
2. Small Vessels Assist & Monitor Floatation of Cable



Open Hydro Individual Cable Installation Concept

Shore Cable

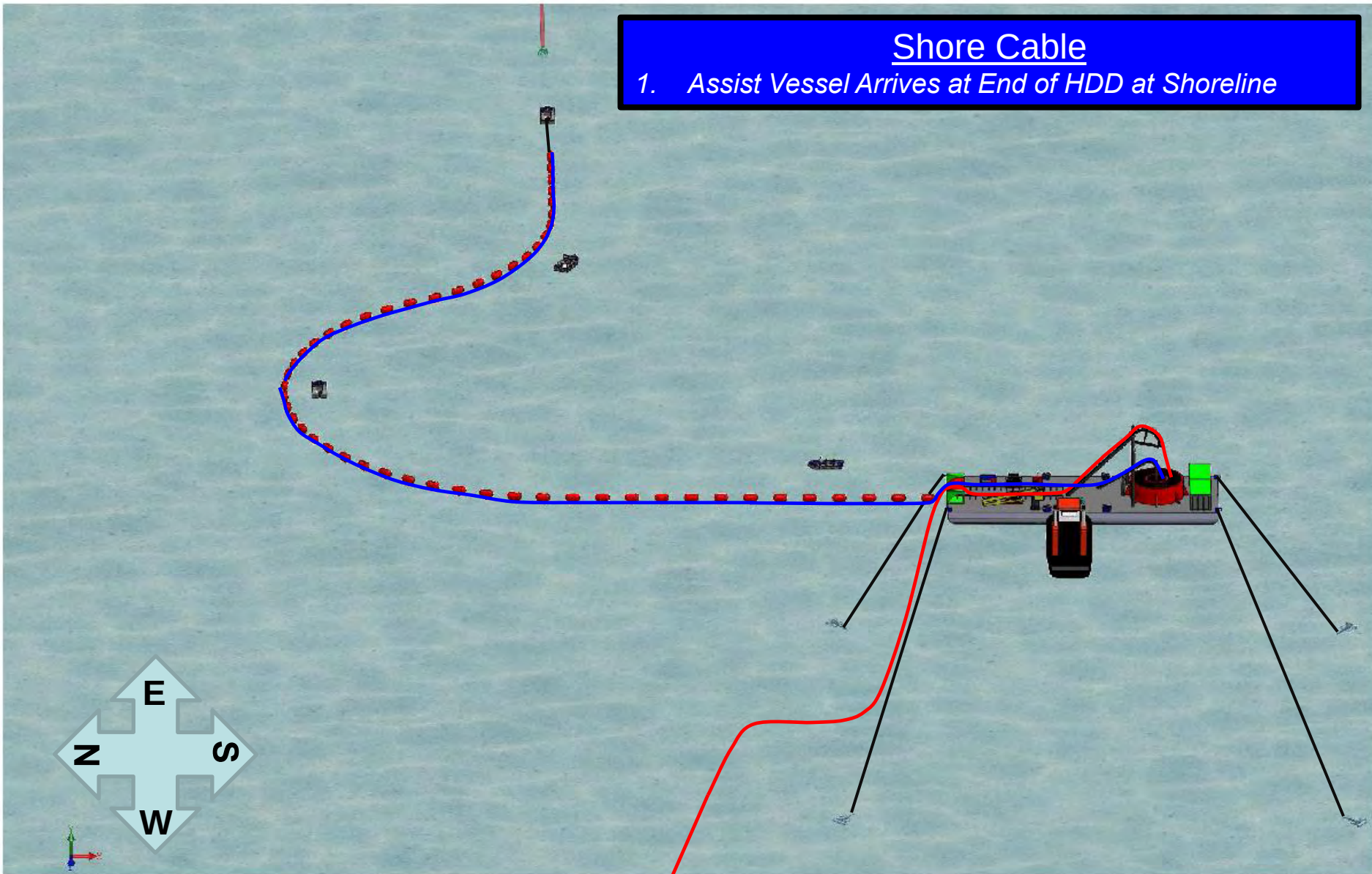
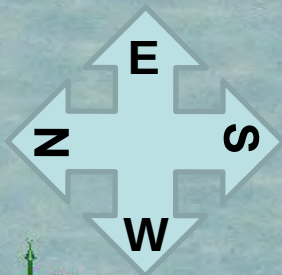
1. *Excess Cable Floats with Buoys in Bay*
2. *Additional Assist Vessels Monitor Cable*



Open Hydro Individual Cable Installation Concept

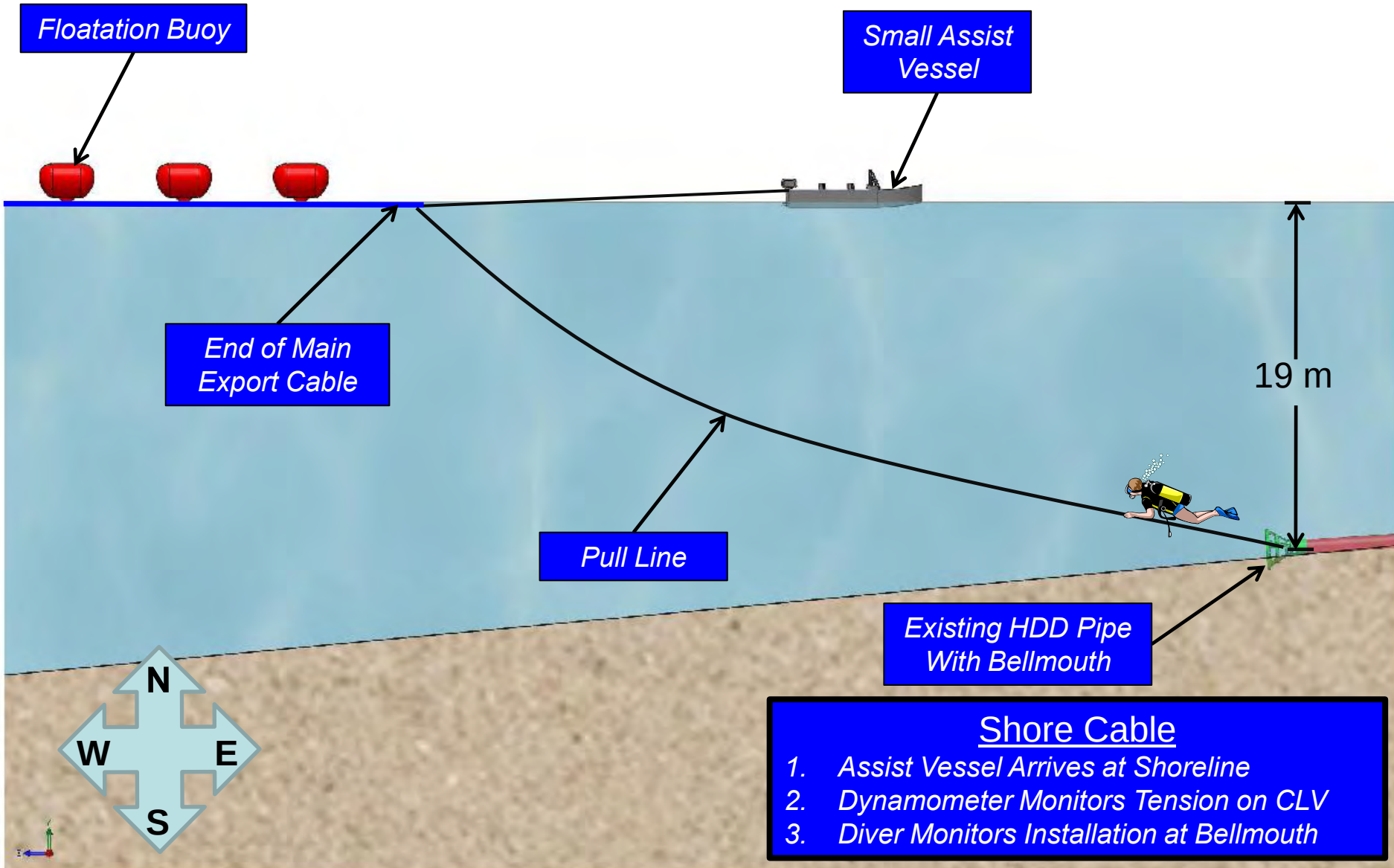
Shore Cable

1. Assist Vessel Arrives at End of HDD at Shoreline



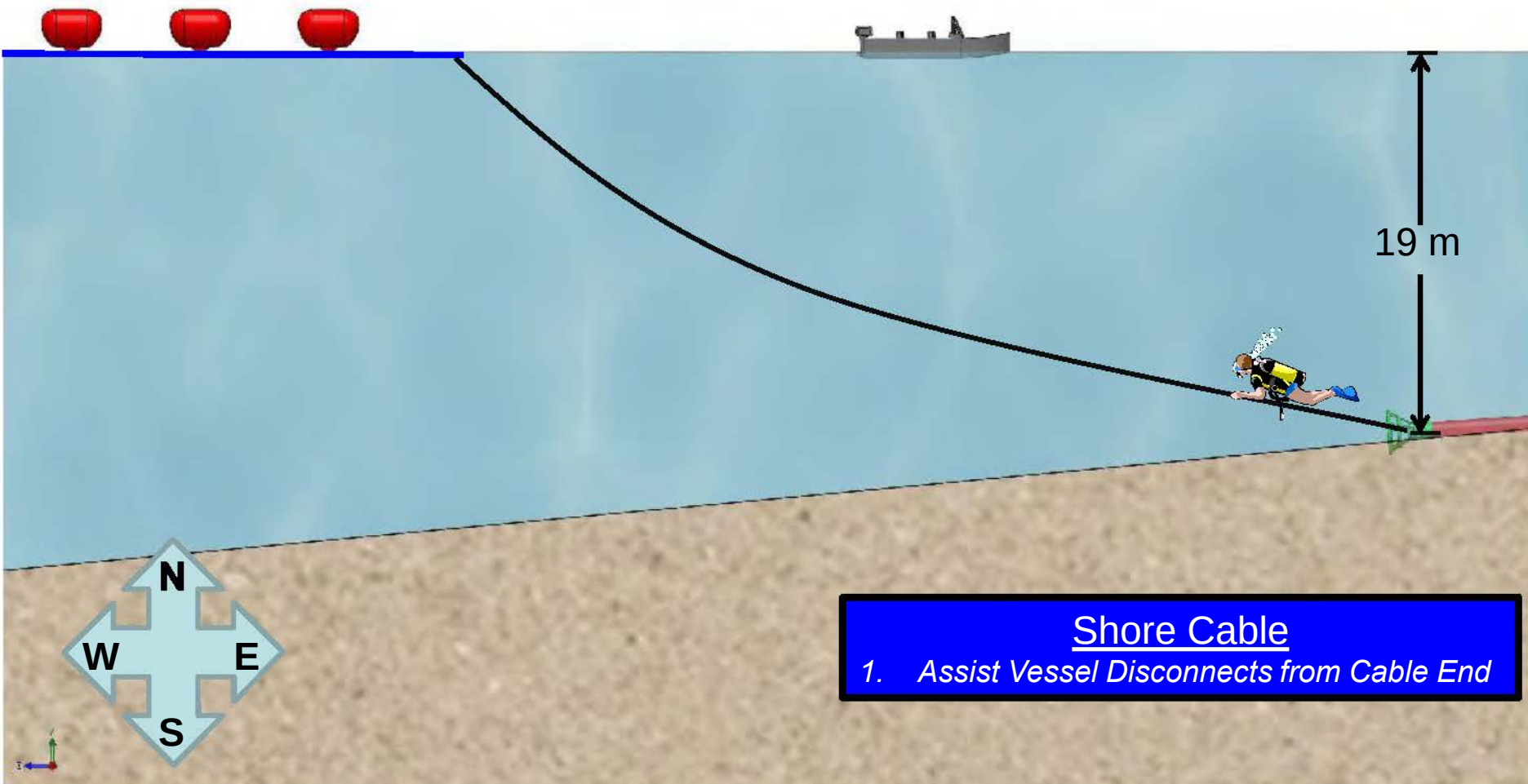


Open Hydro Individual Cable Installation Concept



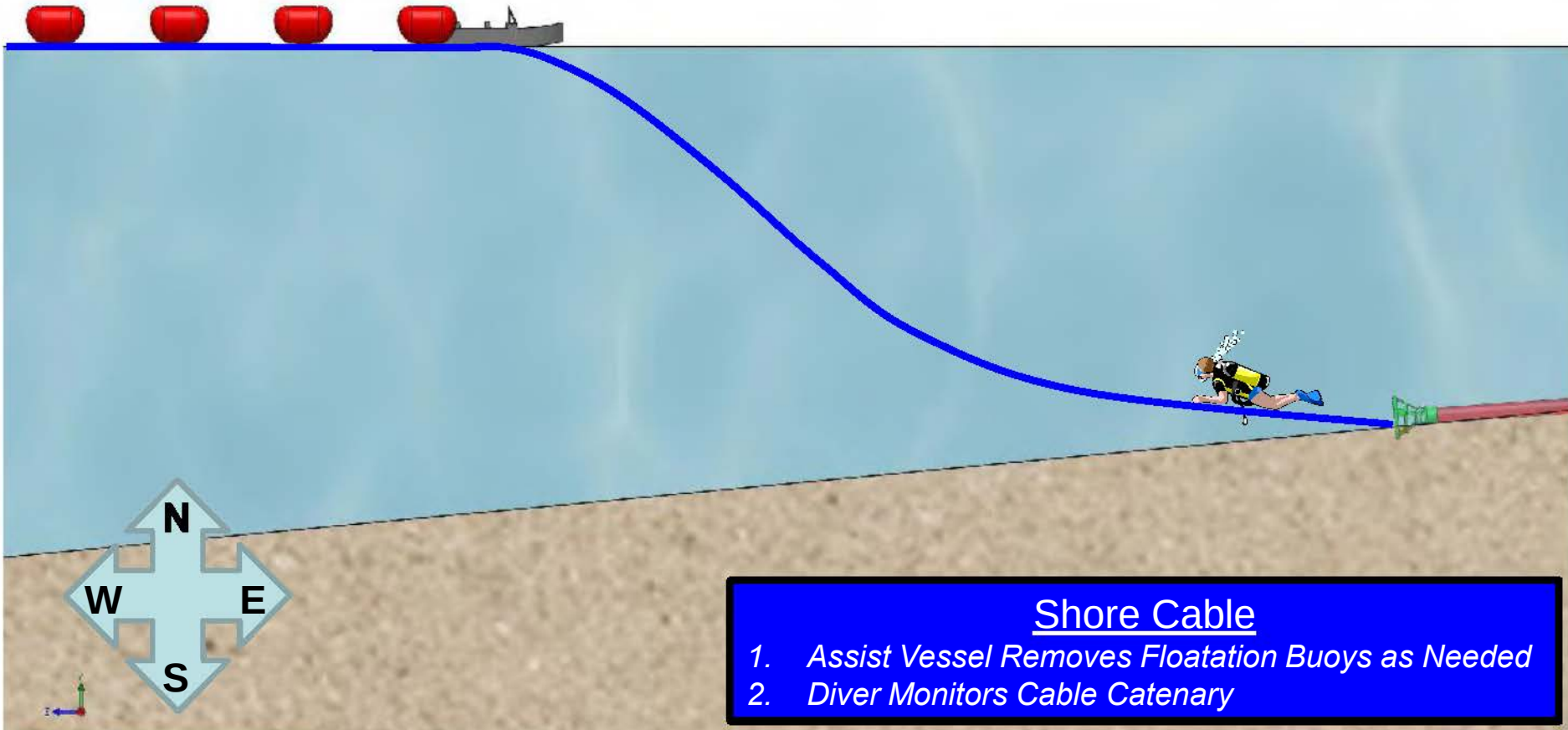


Open Hydro Individual Cable Installation Concept

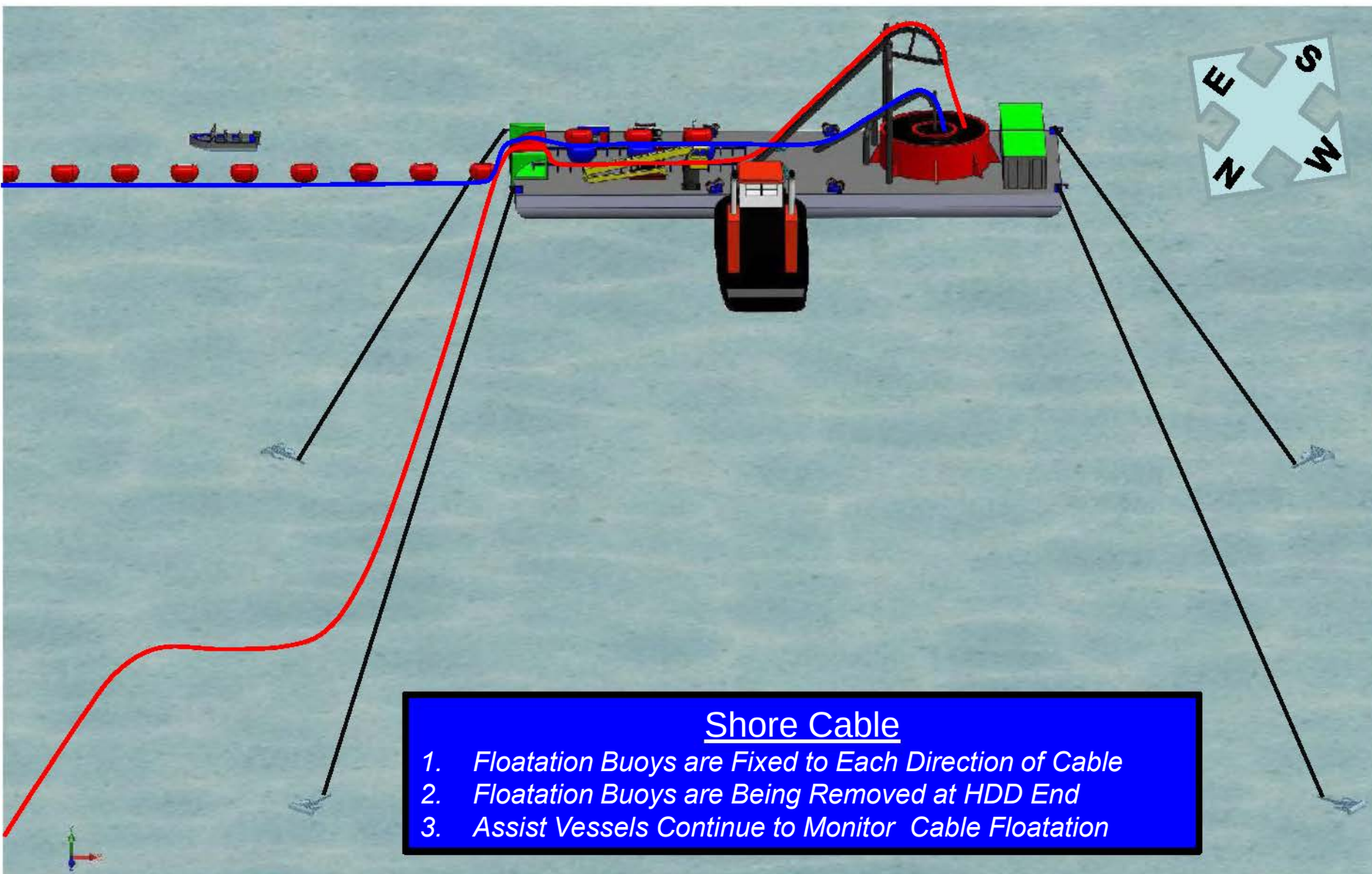




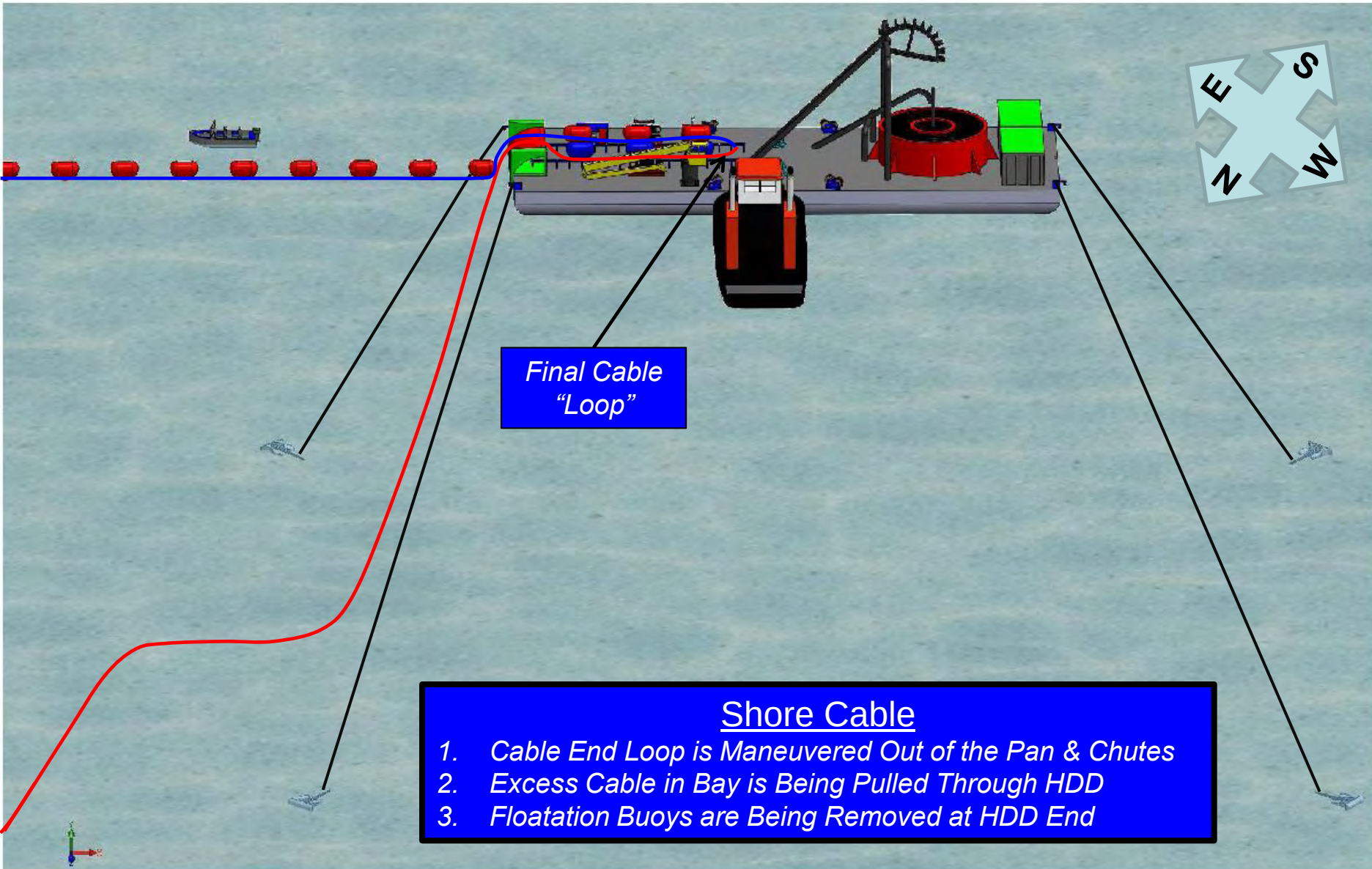
Open Hydro Individual Cable Installation Concept



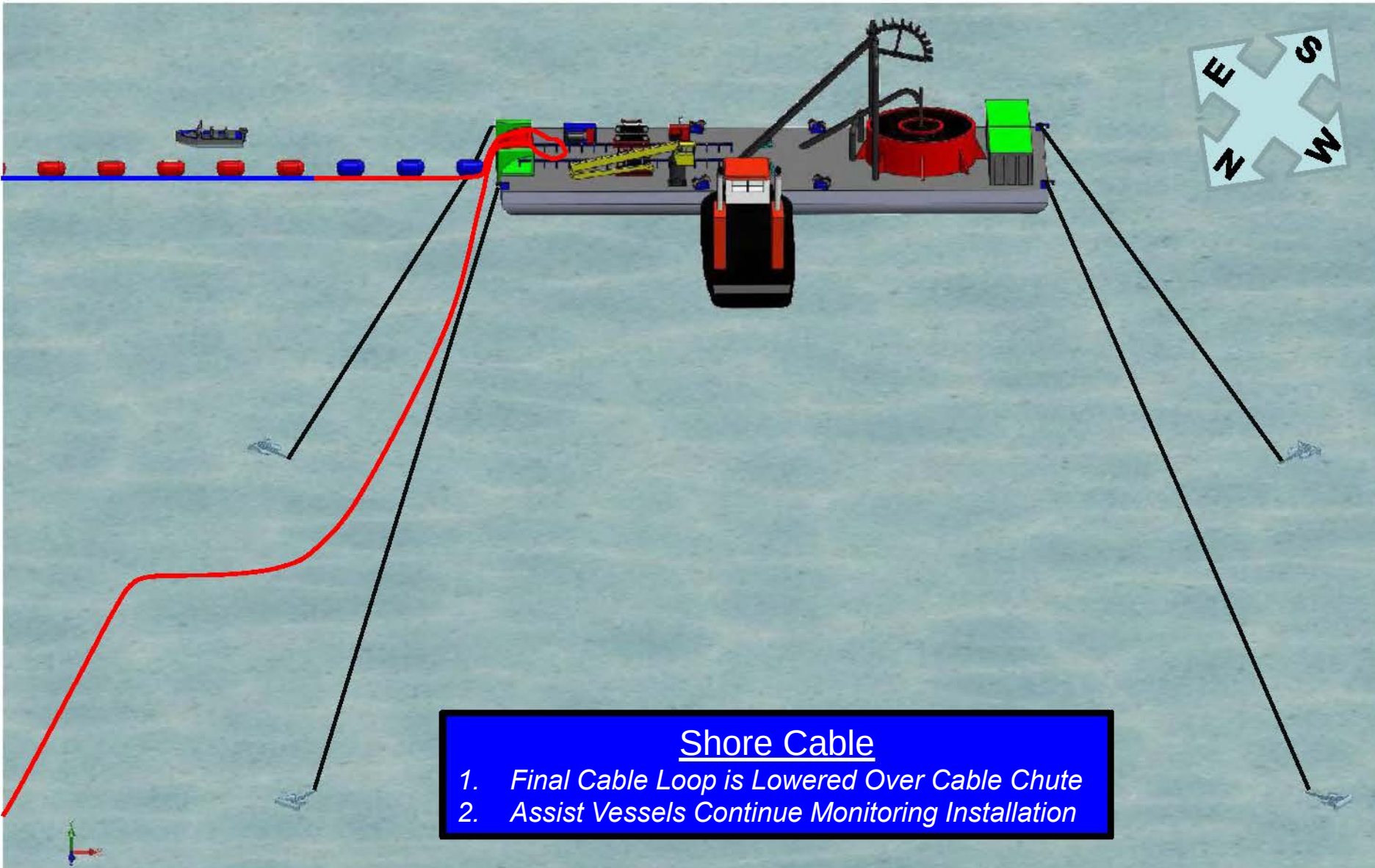
Open Hydro Individual Cable Installation Concept



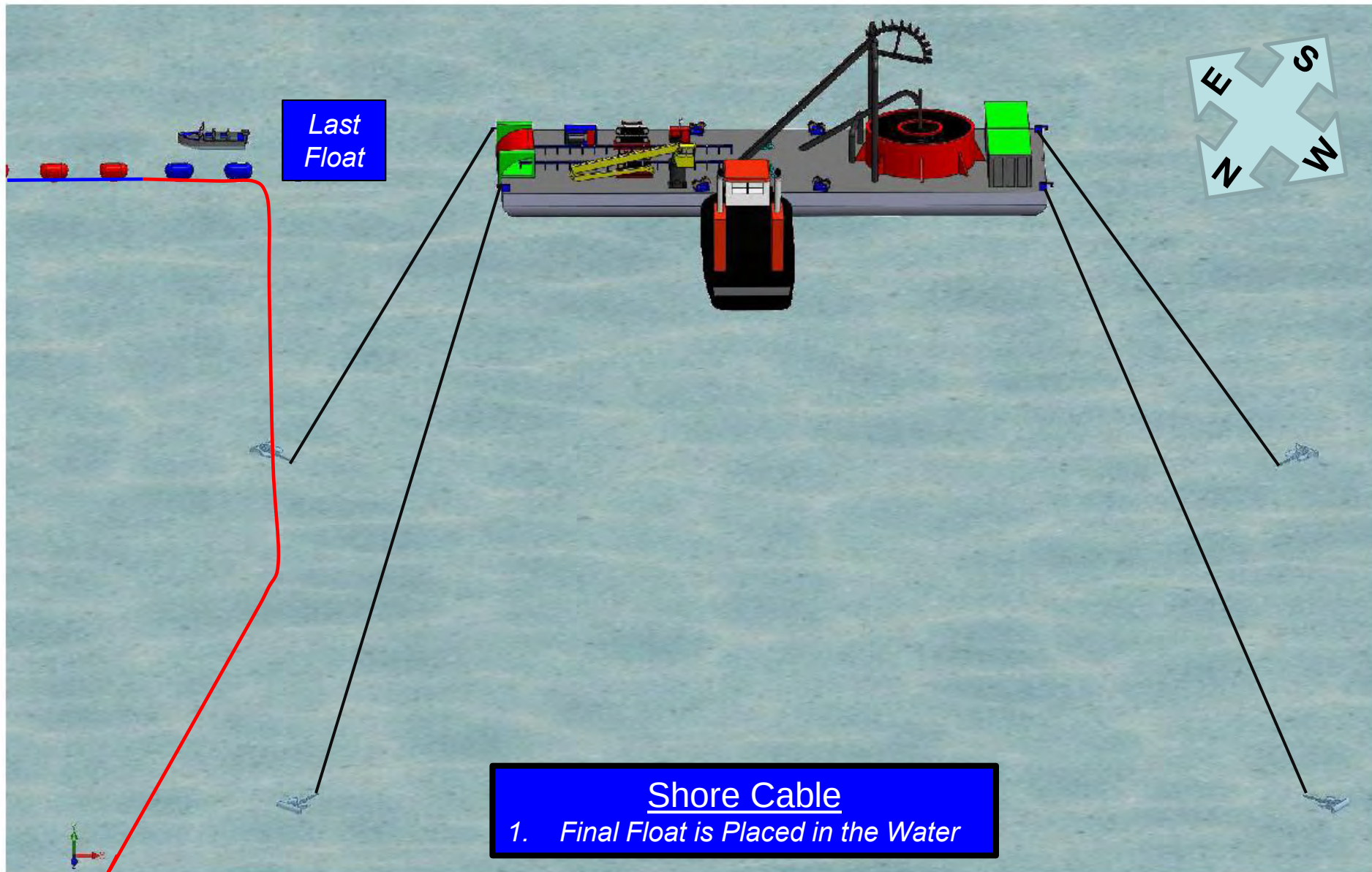
Open Hydro Individual Cable Installation Concept



Open Hydro Individual Cable Installation Concept

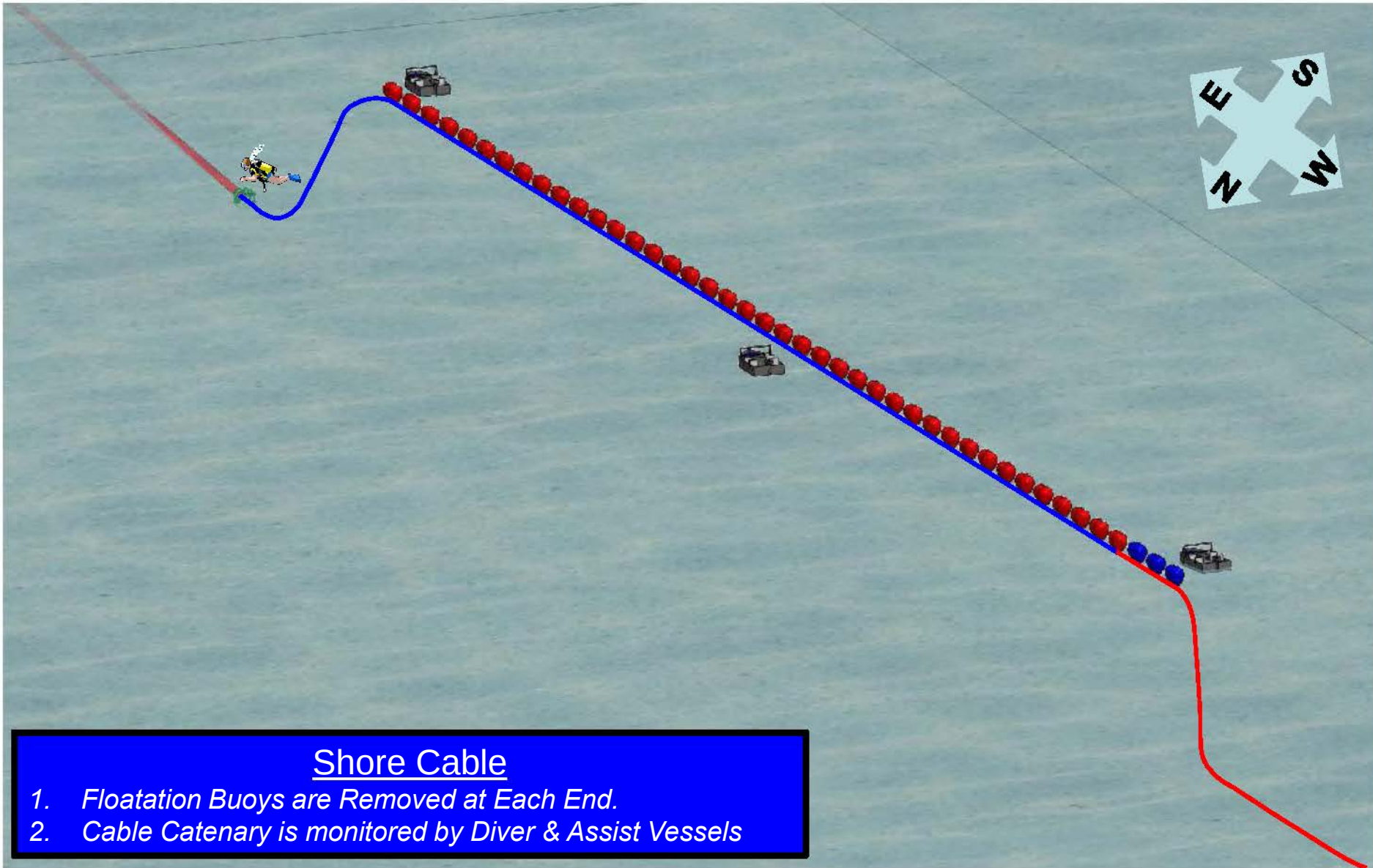


Open Hydro Individual Cable Installation Concept





Open Hydro Individual Cable Installation Concept



Shore Cable

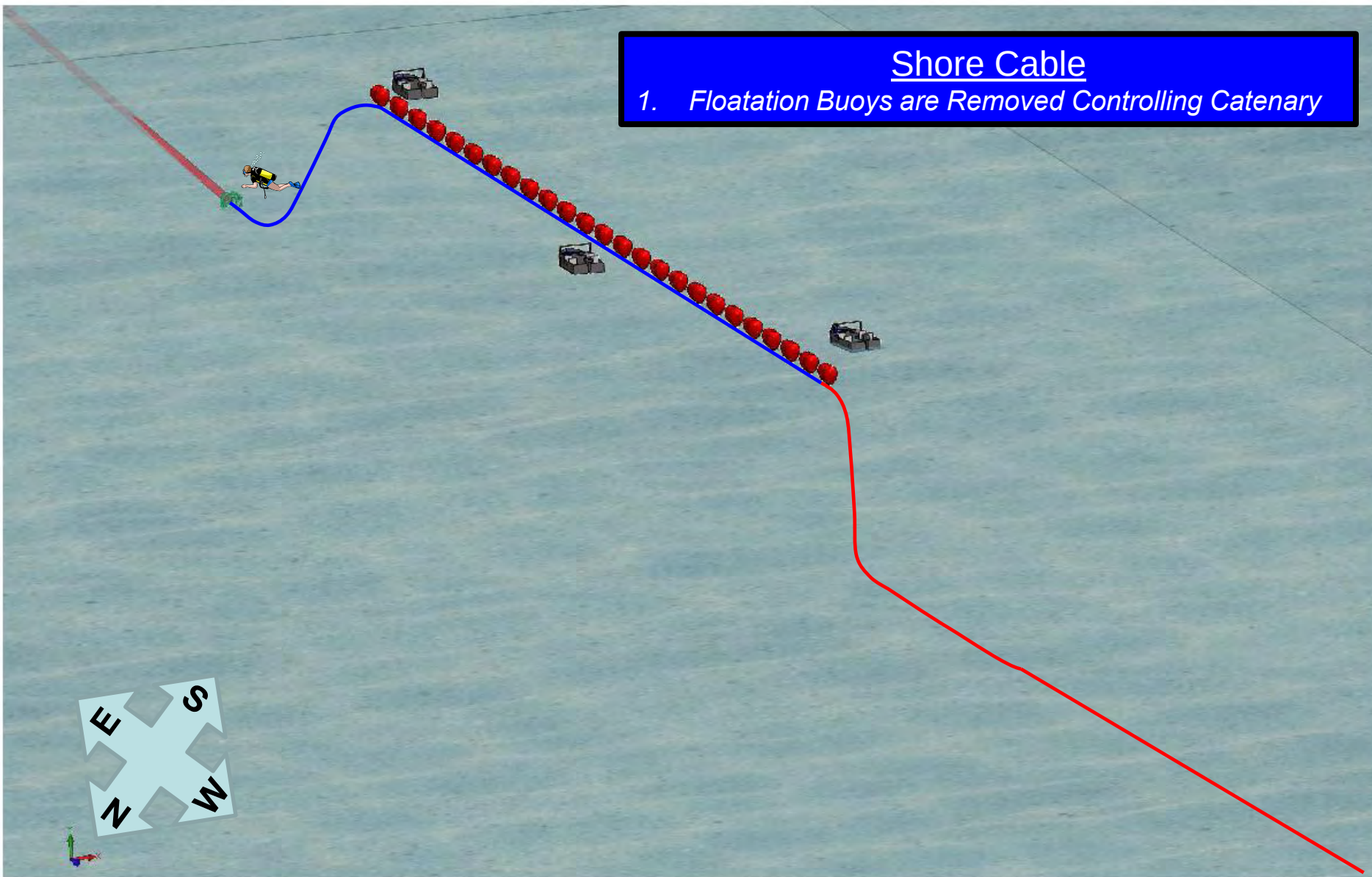
1. *Floatation Buoys are Removed at Each End.*
2. *Cable Catenary is monitored by Diver & Assist Vessels*



Open Hydro Individual Cable Installation Concept

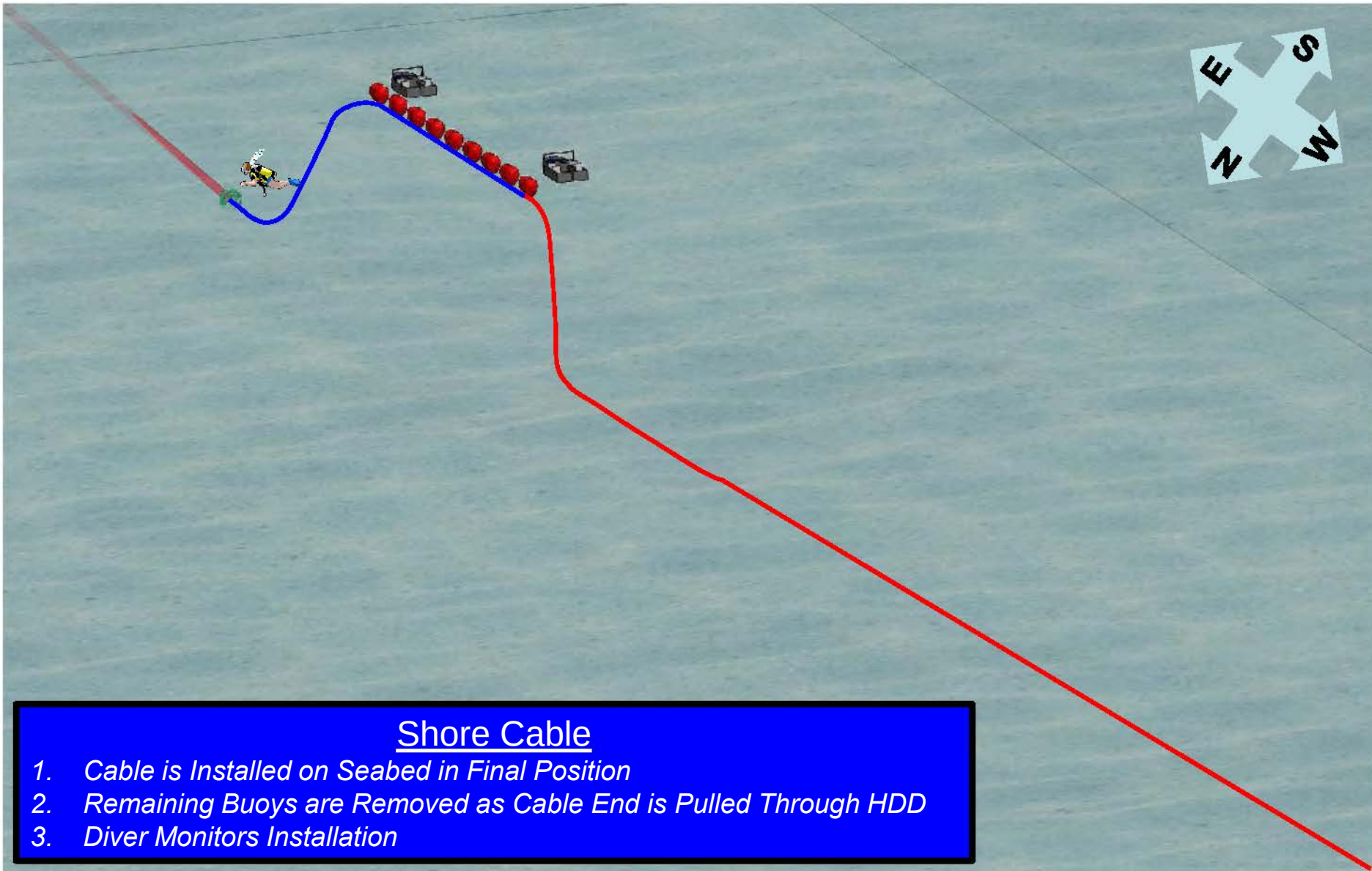
Shore Cable

1. *Floatation Buoys are Removed Controlling Catenary*





Open Hydro Individual Cable Installation Concept

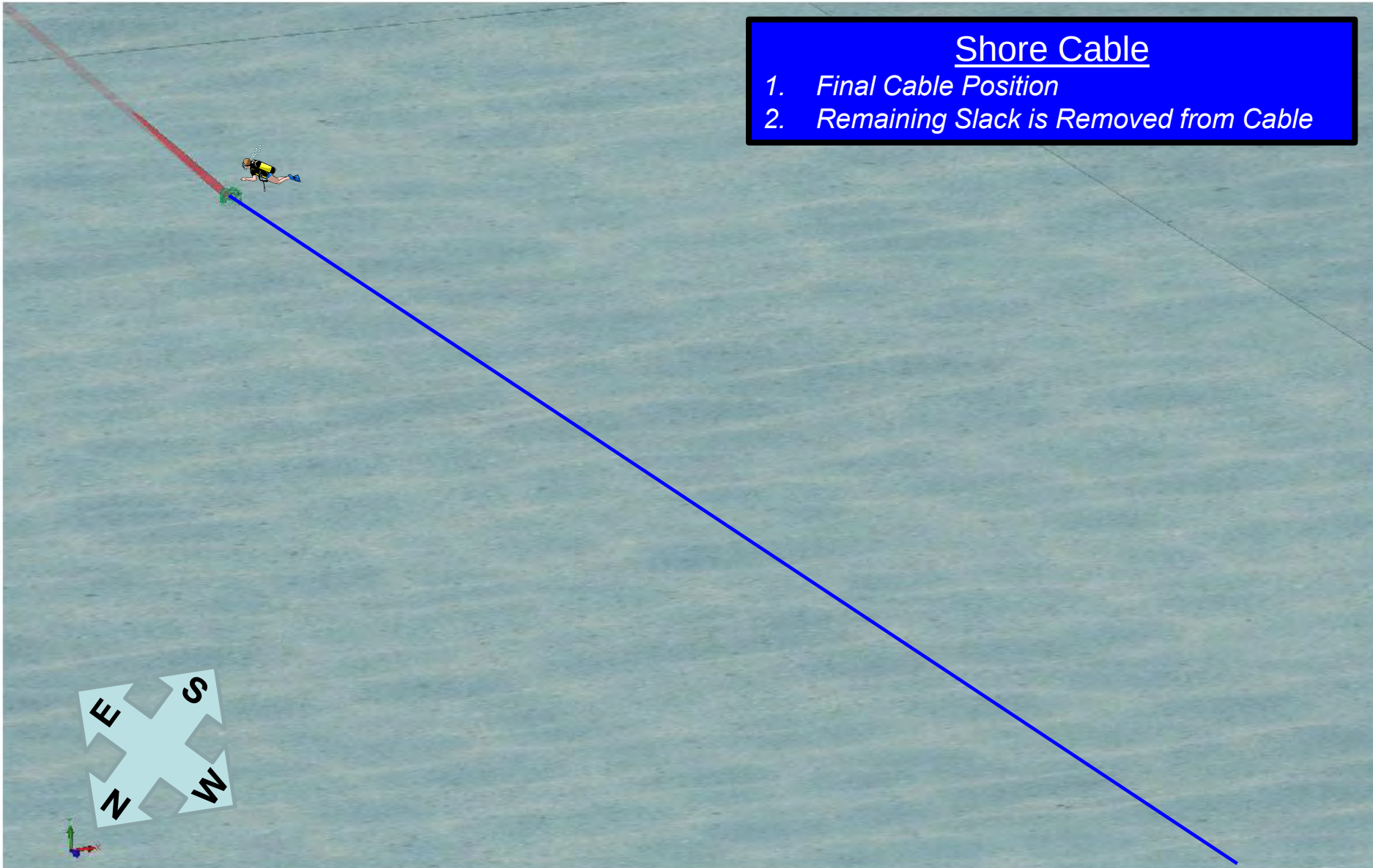




Open Hydro Individual Cable Installation Concept

Shore Cable

1. *Final Cable Position*
2. *Remaining Slack is Removed from Cable*





Open Hydro Original Installation Concept

Installation of West Turbine Duplicates
Process of East Turbine

ATTACHMENT 6



Tidal Energy Project

Project Installation and Operations Scenarios

Considerations for PC-1 Protection

June 30, 2011



Tidal Energy Project

Briefing Objectives

- **Provide overview of the Tidal Energy Project**
 - Site selection rationale
 - Survey operations
 - Licensing and Public Outreach (?)
 - Project Schedule
 - Installation operations
 - Turbine
 - Cables
 - Post installation operations
- **PC-1 protection and mitigation considerations**
 - Damage mitigation
 - Repair
- **Next Steps**

Tidal Energy Project Overview

- Prepared by SnoPUD or SST
- Mandate for PUD to focus on renewables
- PUD focus on tidal, geothermal and small hydro
- PUD focus on tidal
 - Brief chronology of events
 - Site alternatives showing resource availability
 - Site down select and criteria

Tidal Energy Project

Survey Operations

- Preliminary resource assessments
 - Acoustic Doppler Current Profiler (ADCP) from vessel (not anchored)
 - Fixed ADCP by bottom mounted tripod in multiple locations
 - Bathymetric, sidescan and subbottom surveys by towed devices
 - ROV survey from vessel

Tidal Energy Project

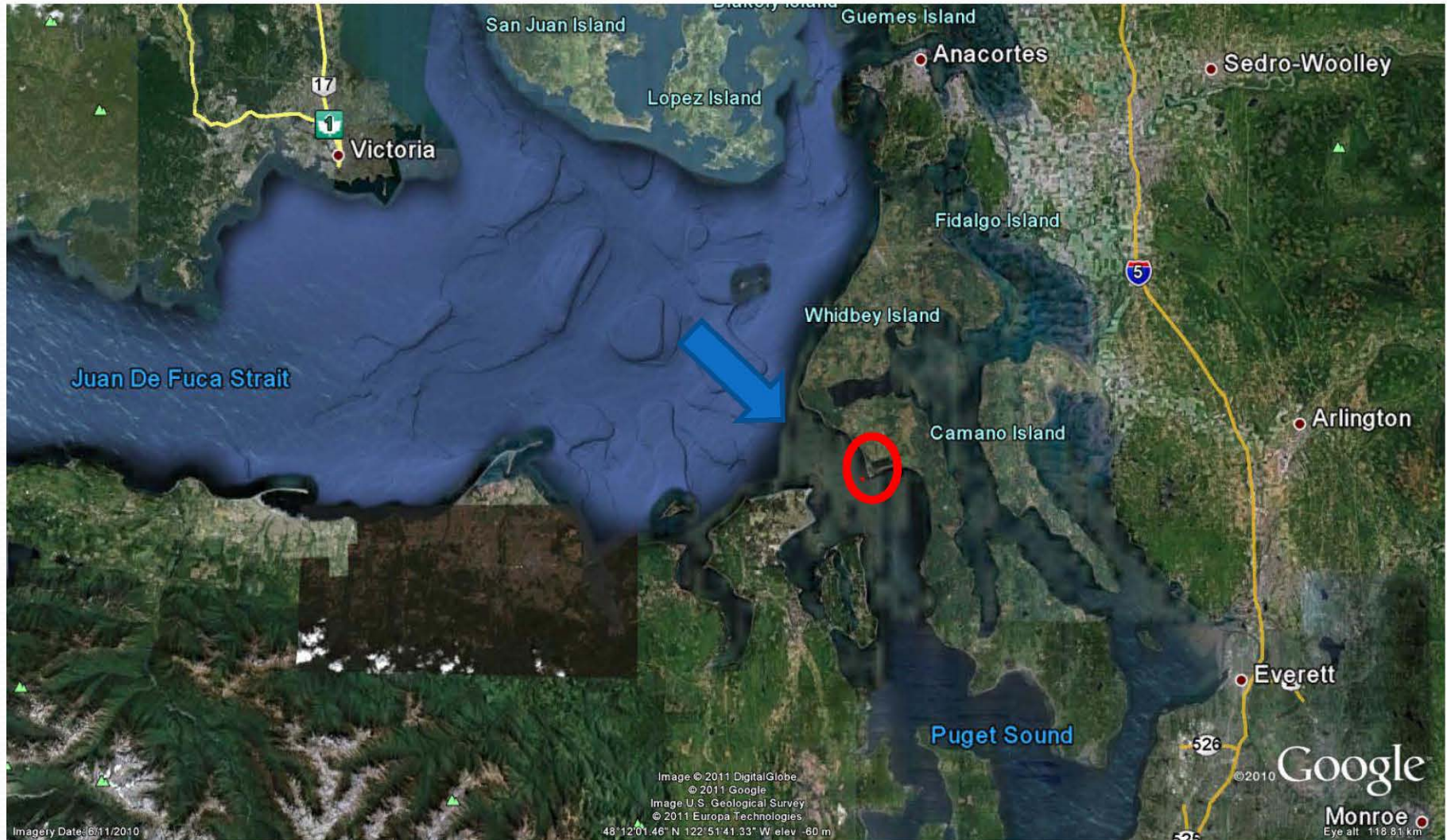
Site Selection Rationale

Prepared by SnoPUD or UW?

- Primary site selection criteria are:
 - Tidal current flow
 - Bathymetry,
 - Cable crossings
 - Vessel traffic and navigation impacts
 - Environmental constraints
- Site selection focus:
 - Admiralty Inlet due to tidal current resource
 - Admiralty Head for tidal resource and compatible bathymetry
 - No cable crossings
 - Balanced navigation impacts
 - Balanced environmental considerations

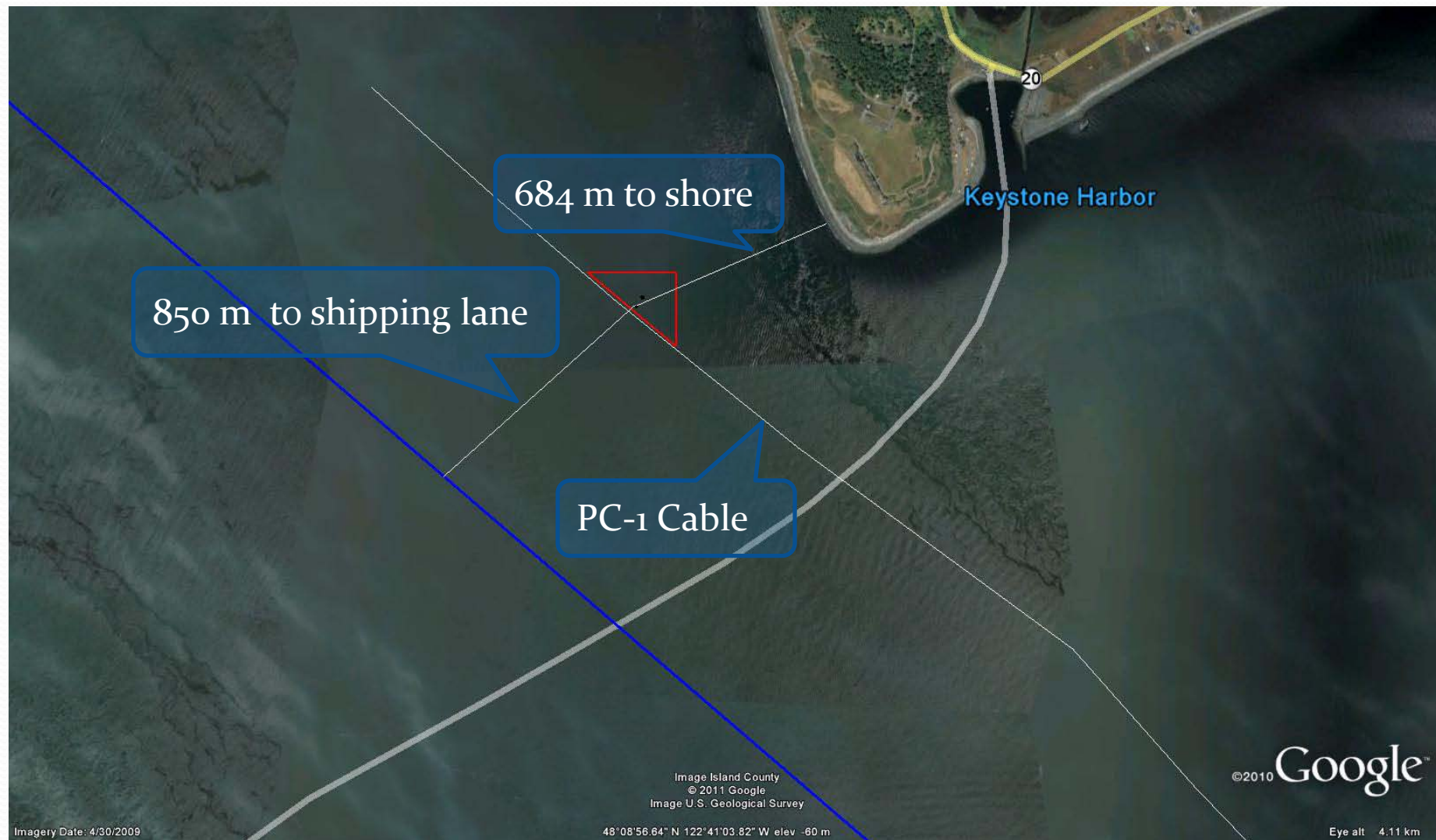
Tidal Energy Project

Sites with Tidal Resource



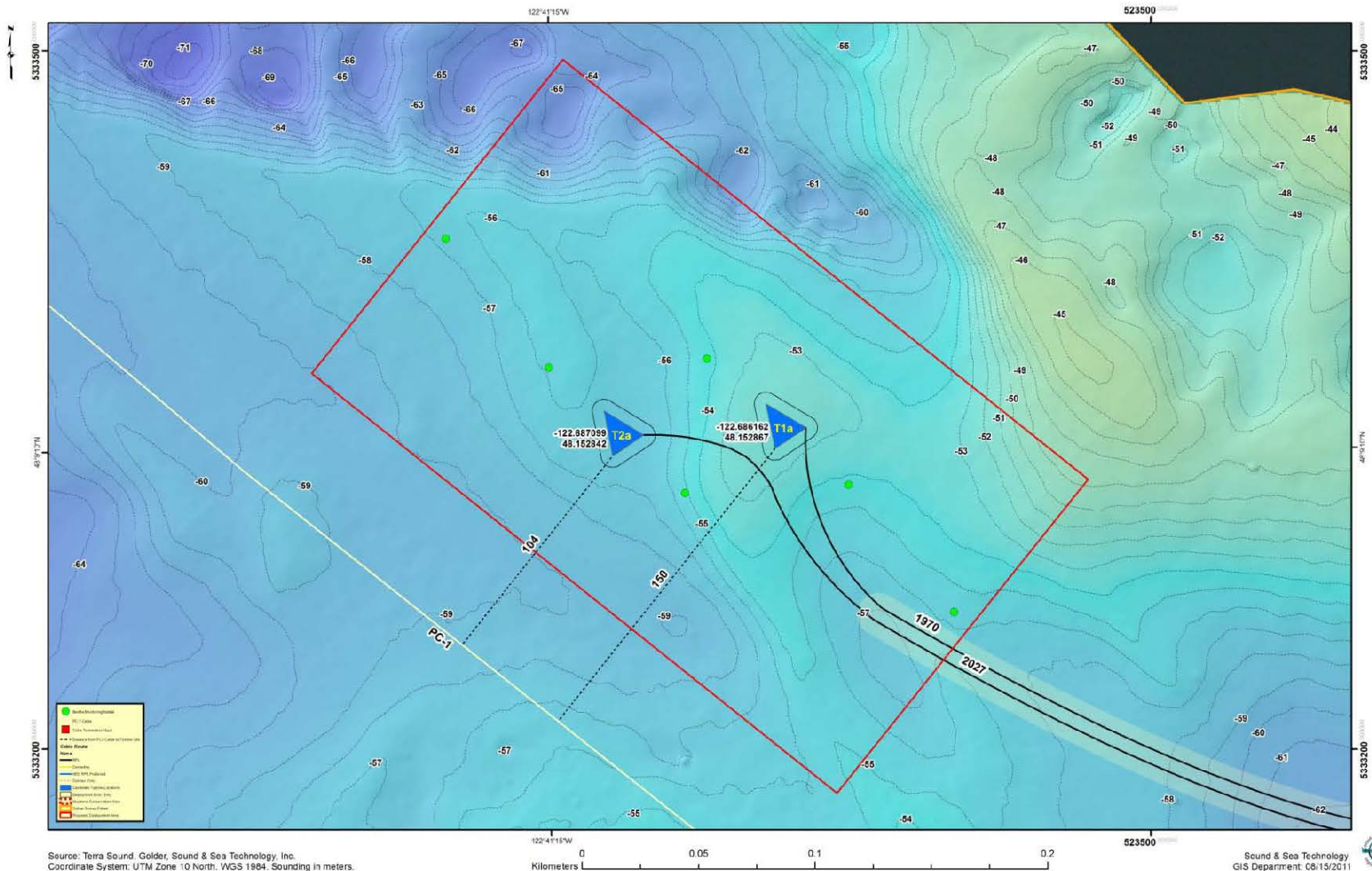
Tidal Energy Project

Turbine Site Selection



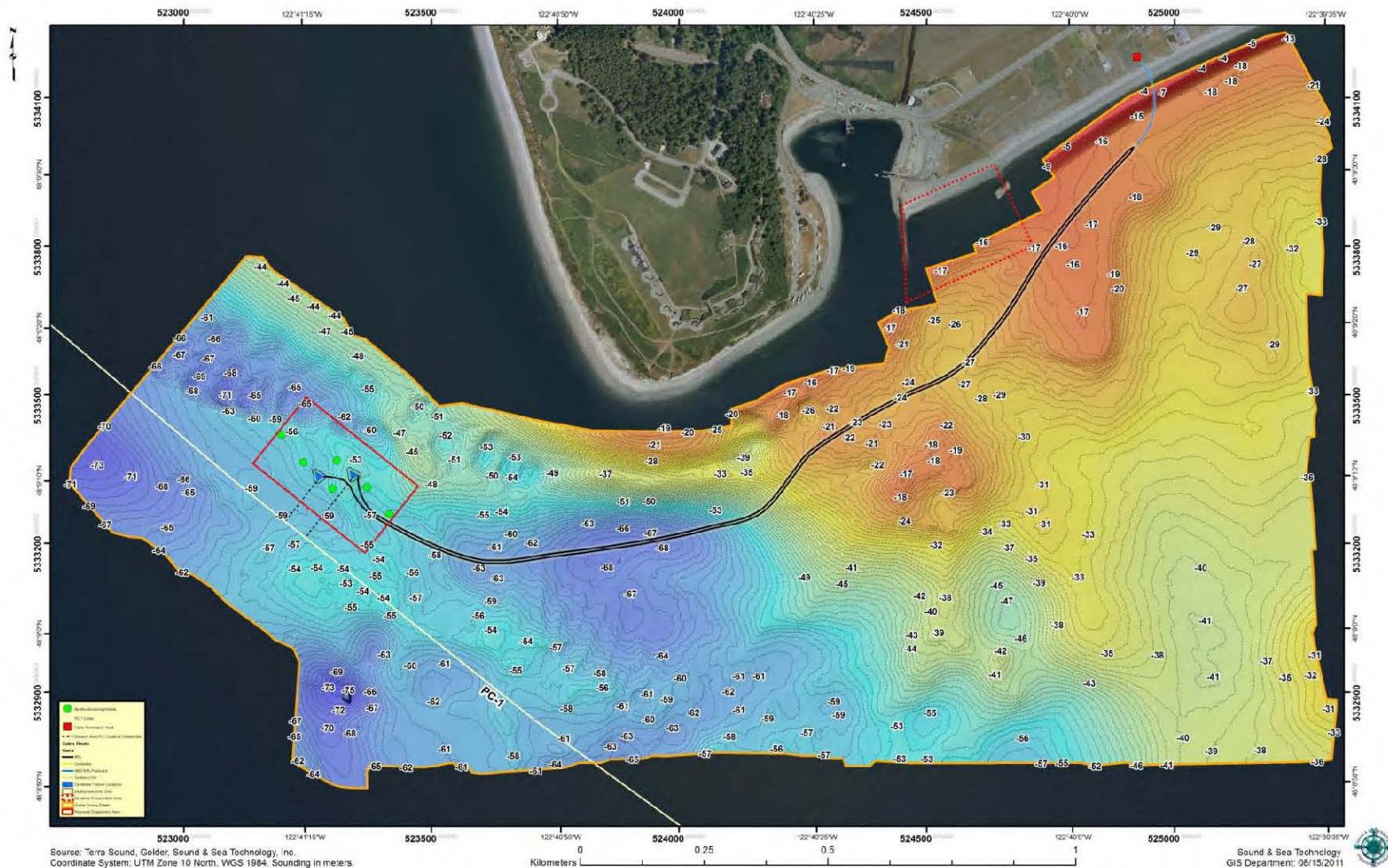
Tidal Energy Project

Details of Site



Tidal Energy Project

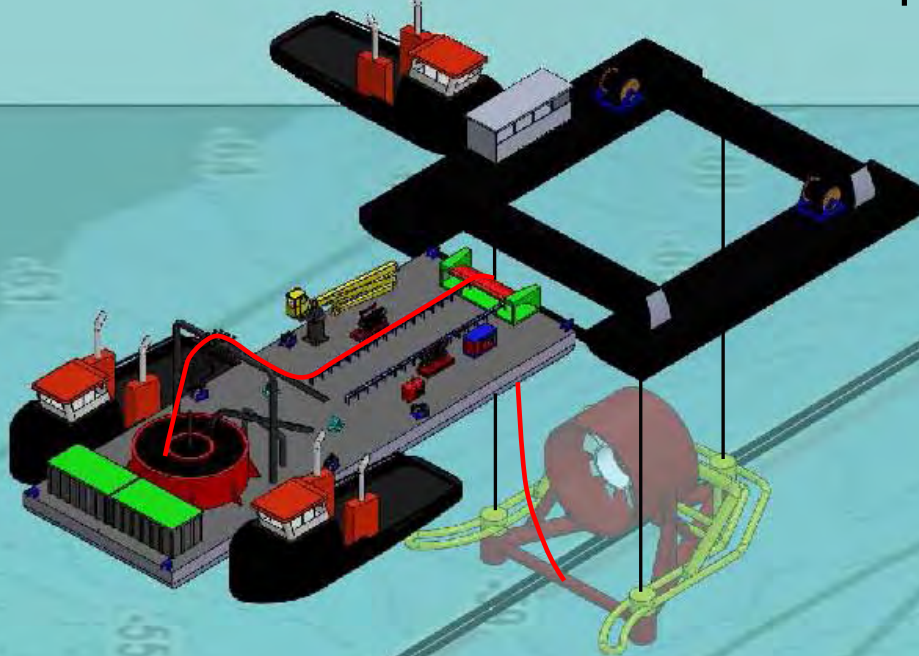
Details of Site



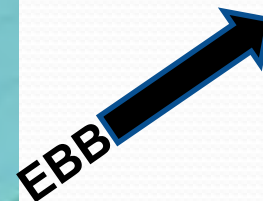
Tidal Energy Project

Turbine Installation Operations

Open Hydro Individual Cable Installation Concept



Turbine installed from a specially designed barge requiring no anchoring. Deployment takes less than 45 minutes.



Lowering East Turbine

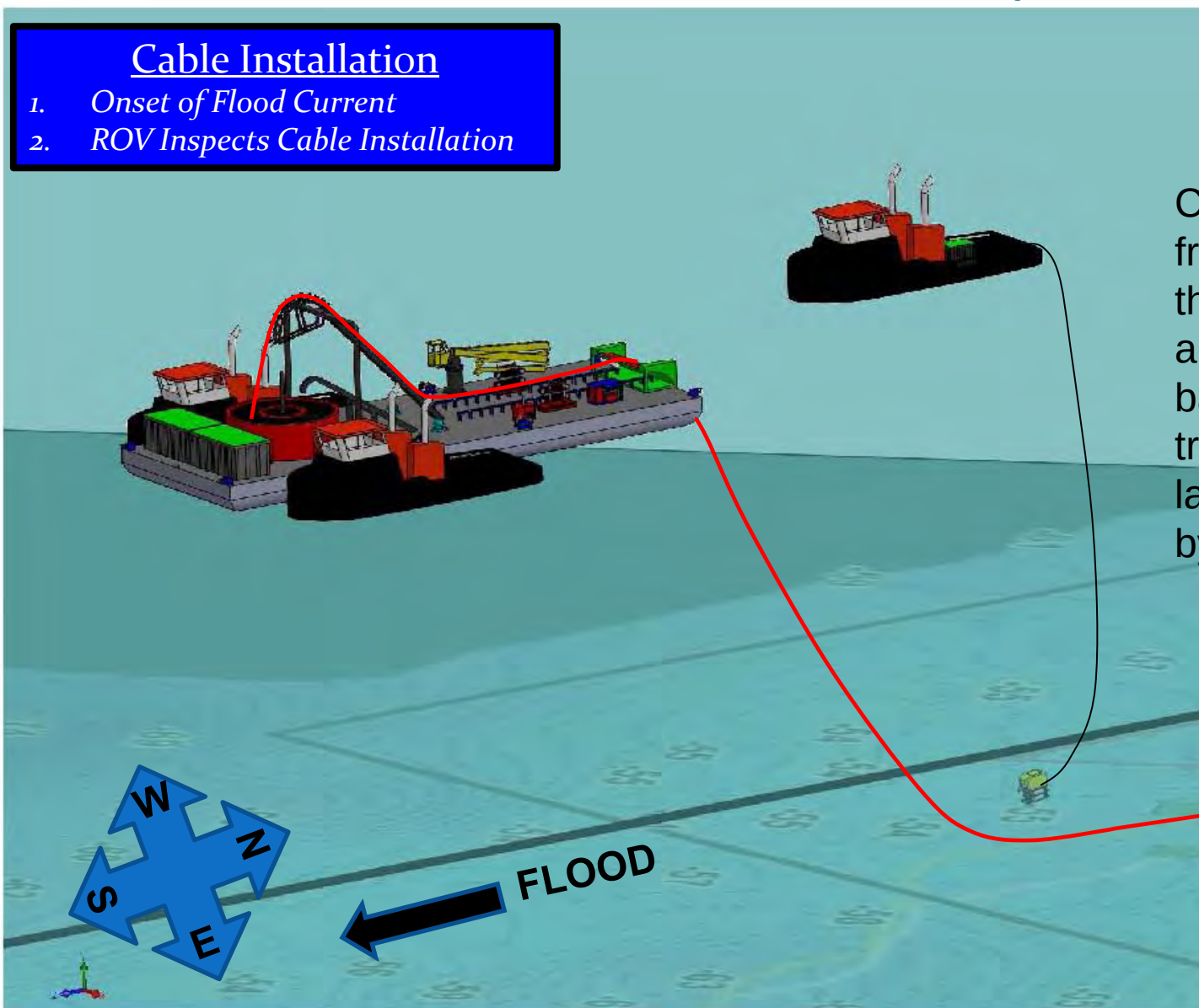
1. CLV Remains Coupled to *OH Installer*
2. Turbine is Lowered
3. Cable is Paid Out to Control Tension

Tidal Energy Project Cable Installation Operations

Cable Installation

1. Onset of Flood Current
2. ROV Inspects Cable Installation

Cable is deployed from a second barge that requires no anchoring. Cable barge is assisted by tractor tugs. Cable lay down is inspected by ROV.



PC-1 Protection and Mitigation Considerations

Threats to the Cable

- ❖ Anchors
 - Installation
 - Dragging
- ❖ Grappling
- ❖ Equipment Impingement
 - Missed location
 - Dropped



Tidal Energy Project

PC-1 Protection and Mitigation Considerations

Anchor Threat Mitigation

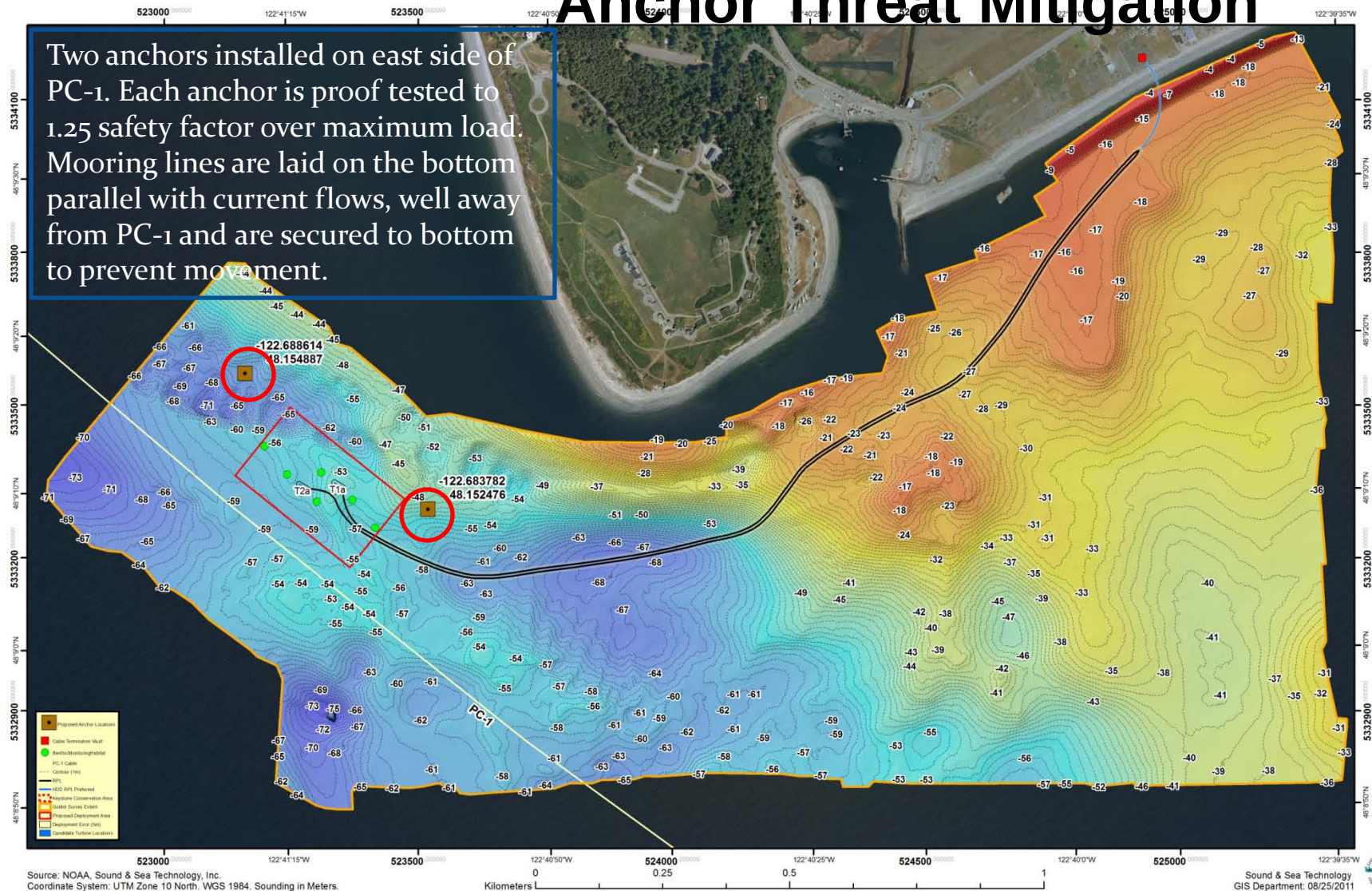
- ❖ Anchors are not used on turbine and cable installation
- ❖ Anchors only used for environmental monitoring purposes for ROV and monitoring equipment maintenance
- ❖ Precision predeploy of anchor system to east of PC-1
- ❖ Proof test anchors to 1.25 maximum load
- ❖ Use acoustic release to retrieve mooring lines to eliminate grapple
- ❖ Position mooring lines so they are parallel to PC-1 (and current direction) and anchored to prevent movement
- ❖ Maintain tug on standby during critical operations to assure no possibility of dragging

Tidal Energy Project

PC-1 Protection and Mitigation Considerations

Anchor Threat Mitigation

Two anchors installed on east side of PC-1. Each anchor is proof tested to 1.25 safety factor over maximum load. Mooring lines are laid on the bottom parallel with current flows, well away from PC-1 and are secured to bottom to prevent movement.



Tidal Energy Project

PC-1 Protection and Mitigation Considerations

Grappling Threat Mitigation

- ❖ No grappling will be done during any phase of the installation or operations
- ❖ Predeployed mooring system is retrieved using acoustic releases or ROV operations

PC-1 Protection and Mitigation Considerations

Equipment Impingement Threat Mitigation

- ❖ Movement of turbines to allow more separation
- ❖ Precision Differential GPS navigation
- ❖ Previous experience in deployments provided better than 3m deployment accuracy

Equipment Impingement Threat Mitigation

Increases turbine separation from PC-1 to 104 m and 150 m respectively

Source: Terra Sound, Golder, Sound & Sea Technology, Inc.
Coordinate System: UTM Zone 10 North, WGS 1984. Sounding in meters.

Kilometers 0 0.05 0.1 0.2

Sound & Sea Technology
GIS Department: 08/15/2011

Tidal Energy Project

PC-1 Protection and Mitigation Considerations

Impediments to Repair of PC-1

- ❖ Grappling to recover damaged section constrained
- ❖ Repair ship interference with Tidal Project subsea equipment
- ❖ Lay down constraints

Tidal Energy Project

PC-1 Protection and Mitigation Considerations

Mitigation for Repair of PC-1

Grappling to recover damaged section constrained

- Grappling may occur north or south of turbine area with no additional constraints
 - Currently constrained by navigation lanes and shore
 - Turbine location is closest approach to shore by PC-1 (less than 750 m to shore)

Tidal Energy Project

PC-1 Protection and Mitigation Considerations

Mitigation to Repair of PC-1

Repair ship interference with Tidal Project subsea equipment

- Greatest flexibility for movement is north or south of turbine area
 - Distance from shore and navigation lane
 - Avoids conflict with ferry route
 - Avoids highest and most turbulent currents at turbine site
- No cable crossings to deal with
- Cable ship may remain west of turbine area without conflict

Tidal Energy Project

PC-1 Protection and Mitigation Considerations

Mitigation to Repair of PC-1

Lay down constraints

- If repair bight is at turbine location or south parallel to turbine shore cable, lay down can be accomplished to the west side
 - Provides greater ship maneuverability than being close to shore
 - Avoids highest and most turbulent currents at turbine site
- If repair bight is north of turbine area there are no constraints

Mitigation to Repair of PC-1 -Lay down constraints



Next Steps

Prepared by District and SST

- ❖ Detailed engineering discussions with PC-1 technical experts
- ❖ Detailed engineering discussions with cable repair contractor

ATTACHMENT 2 – STAKEHOLDER DISTRIBUTION LIST

Admiralty Inlet Pilot Tidal Project [FERC P-12690]
Interested Parties Distribution List

Company Name	First Name	Last Name	Title	Address Line 1	Address Line 2	City	State	ZIP Code	Work Phone	E-mail Address
<u>Federal Agencies:</u>										
Federal Energy Regulatory Commission	William	Guey-Lee	Office of Energy Products, FERC	888 First Street, NE		Washington, D.C.		20426	202/502-6064	william.gueylee@ferc.gov
Federal Energy Regulatory Commission	Merrill	Hathaway	Office of the General Counsel, Energy Projects, FERC	888 First Street, NE		Washington, D.C.		20426	202/502-8825	merrill.hathaway@ferc.gov
** Bonneville Power Administration	John G.	Schaad, P.E.	Customer Service Engineering	TPC/Alvrey	86000 Highway 99 S	Eugene,	OR	97405	541/988-7421	jgschaad@bpa.gov
Bonneville Power Administration	Scott	Coe	Power Services, Generation Assett Management	905 NE 11th Avenue	PO Box 3621	Portland,	OR	97208-3621	503/230-3691	sacoe@bpa.gov
** U.S. Department of the Interior	Preston A.	Sleeeger	Regional Environmental Officer	Office of Environmental Policy and Compliance	500 NE Multnomah Street, Suite 356	Portland,	OR	97232-2036		preston.sleeger@ios.doi.gov
** U.S. Dept. of the Interior, Bureau of Indian Affairs	Ms. Jennifer	Frozena	Hydropower Policy Specialist	Portland Area Office	911 NE 11th Avenue	Portland,	OR	97232	503/231-6750	NO E-MAIL ADDRESS
** U.S. Dept. of the Interior, Bureau of Indian Affairs			Division of Natural Resources	The Federal Building	911 NE 11th Avenue	Portland,	OR	97232		
U.S. Department of the Interior			Office of Environmental Affairs	Room 2340 MIB	1849 C Street NW	Washington,	D.C.	20240	202/208-3100	webteam@ios.doi.gov
U.S. Department of the Interior	The Honorable Dirk	Kempthorne	Secretary	1849 C Street NW		Washington,	D.C.	20240	202/208-3100	webteam@ios.doi.gov
** National Park Service	Ms. Kelly	Powell	Environmental Compliance Reviewer	168 South Jackson Street		Seattle,	WA	98104	206/220-4106	kelly_powell@nps.gov
** National Park Service	Kelly	Powell	Rivers, Trails and Conservation Assistance/Hydropower	909 First Avenue		Seattle,	WA	98104	206/220-4121	kelly_powell@nps.gov
National Park Service	Joan	Harn							202/354-6929	joan_harn@nps.gov
National Park Service									206/220-4121	Susan_Rosebrough@nps.gov
U.S. Fish & Wildlife Office for Western Washington	Brian	Peck		510 Desmond Drive SE		Lacey,	WA	98503-1273	360/753-9560	brian_peck@fws.gov
U.S. Fish & Wildlife Services for Western Washington	Ken	Berg, Manager	U.S. Fish and Wildlife Service	510 Desmond Drive SE, Suite 102		Lacey,	WA	98503		ken_berg@fws.gov
** U.S. Fish & Wildlife Service	Tim	Romanski		Western Office	510 Desmond Drive SE	Lacey,	WA	98503	360/753-5823	Tim_Romanski@fws.gov
** National Marine Fisheries Service	Keith Ray	Kirkendall	Branch Chief	1201 NE Lloyd Blvd. Suite 1100		Portland,	OR	97232-1274	503/231-6893	Keith.Kirkendall@noaa.gov
National Marine Fisheries Service	D. Robert	Lohn	Regional Administrator	7600 Sandpoint Way NE		Seattle,	WA	98115-0070	206/526-6150	NO E-MAIL ADDRESS
National Marine Fisheries Service	Thomas	Sibley							206/526-4446	Thomas.sibley@noaa.gov
National Marine Fisheries Service	Scott	Carlon		1201 NE Lloyd Blvd., Suite 1100		Portland,	OR	97232-1274	503/231-2379	Scott.Carlon@noaa.gov
National Marine Fisheries Service	Alicia	Bishop	FERC and Water Diversions Branch	1201 NE Lloyd Blvd., Suite 1100		Portland	OR	97232	503/872-2854	Alicia.Bishop@noaa.gov
National Marine Fisheries Service	Alison	Agness	Protected Resoures Division - Marine Mammals						206/526-6152	alison.agness@noaa.gov
National Marine Fisheries Service	Brent	Norberg	Protected Resoures Division - Marine Mammals						206/526-6550	brent.norberg@noaa.gov
National Oceanic and Atmospheric Administration	William F.	Broglie	Chief Administrative Officer	SSMC4	1305 East West Hwy	Silver Spring,	MD	20910-3281	301/713-0836	william.broglie@noaa.gov
National Oceanic and Atmospheric Administration	Jane	Hannuksela	Attorney Advisor	7600 Sand Point Way NE		Seattle,	WA	98115		Jane.Hannuksela@noaa.gov
National Oceanic & Atmospheric Administration	Christopher	Fontecchio	Attorney-Advisor	7600 Sand Point Way NE		Seattle,	WA	98115	206/526-6153	Chris.Fontecchio@noaa.gov
U.S. Environmental Protection Agency	Christine	Reichgott	Hydropower Coordinator for Region 10	1200 Sixth Avenue		Seattle,	WA	98101	206/553-1601	reichgott.christine@epa.gov
<u>Military:</u>										
** U.S. Army Corp of Engineers	Marian	Valentine	Hydraulic Enginer	4735 E. Marginal Way South		Seattle,	WA	98134	206/764-3543	marian.l.valentine@usace.army.mil
** U.S. Army Corp of Engineers	Olivia	Romano							206/764-6960	Olivia.h.romano@usace.army.mil
** U.S. Army Corp of Engineers, Northwest Division	Randel J.	Perry	Seatl District Regulatory Branch	1125 NW Couch Street	PO Box 2870	Portland,	OR	97209	503/808-3700	Randel.J.Perry@usace.army.mil
U.S. Army Corp of Engineers, Seattle District	Karen L.	Durham-Aguilera, P.E.	Programs Director	Regulatory Branch	PO Box 3755	Seattle,	WA	98124-3755	206/764-3495	karen.l.durham-aguilera@mvn02.usace.army.mil
United States Navy	Dan	Hayes	Region Northwest Representative						360/315-5400	dan.hayes@navy.mil
United States Navy, Northwest Region	Richard L.	Melaas	Community Plans & Liaison Officer	3730 N Charles Porter Avenue		Oak Harbor,	WA	98278	360/257-3315	richard.melaas@navy.mil
United States Coast Guard	Chad	Smith	Vessel Control Chief						206/217-6050	chad.a.smith@uscg.mil
United States Coast Guard	Mark E.	Ashley	Vessel Control Section	1519 Alaskan Way S.		Seattle	WA	98137	206/217-6050	mark.e.ashley@uscg.mil
<u>Congressional Delegation:</u>										
** United States Senate	The Honorable Maria	Cantwell		511 Dirksen Senate Office Building		Washington,	D.C.	20510	202/224-3441	maria_cantwell@cantwell.senate.gov
United States Senate	The Honorable Maria	Cantwell	United States Senator	915 Second Avenue, Suite 3206		Seattle,	WA	98174	206/220-6400	maria_cantwell@cantwell.senate.gov
Office of Senator Maria Cantwell	Sally	Hintz	Northwest Washington Director	2930 Wetmore Avenue, Suite 9B		Everett,	WA	98201	425/303-0114	sally_hintz@cantwell.senate.gov
Office of Senator Maria Cantwell	Joel	Merkel	Legislative Analyst	511 Dirksen Senate Office Building		Washington,	DC	20515	202/	joel_merkel@cantwell.senate.gov
** U. S. House of Representatives	The Honorable Norm	Dicks	6th Congressional District, WA	2467 Rayburn House Office Bldg.		Washington,	D.C.	20515	202/225-5916	joshua.johnston@mail.house.gov
Norm Dicks Government Center, Suite 500	The Honorable Norm	Dicks	U. S. Representative for the 6th Congressional District	345 - 6th Street		Bremerton,	WA	98337	360/479-4011	joshua.johnston@mail.house.gov
6th Congressinal District for Western Washington	The Honorable Norm	Dicks	U.S. Representative for the 6th Congressional District	332 East 5th Street		Port Angeles,	WA	98362-3207	360/452-3370	joshua.johnston@mail.house.gov
** United States House of Representatives	The Honorable Jay	Inslee	U.S. House of Representatives	403 Cannon HOB		Washington,	D.C.	20515-4701	202/225-6311	jay.inslee@mail.house.gov
United States House of Representatives	The Honorable Jay	Inslee	United States Representative	17791 Fjord Drive NE, Door 12		Poulsbo,	WA	98370-8481	360/598-2342	jay.inslee@mail.house.gov
United States House of Representatives	The Honorable Jay	Inslee	United States Representative	Shoreline Center, Suite E-800	18560 - 1st Avenue NE	Shoreline,	WA	98155-2150	206/361-0233	jay.inslee@mail.house.gov
** United States House of Representatives	The Honorable Rick	Larsen	Washington State 2nd Congressional District	107 Cannon HOB		Washington,	D.C.	20515	202/225-2605	NO E-MAIL ADDRESS
2nd Congressional District DC Office	Kimberley	Johnston	Chief of Staff	107 Cannon HOB		Washington,	D.C.	20515	202/225-2605	kim.johnston@mail.house.gov
2nd Congressional District Everett Office	Jill	McKinnie	District Director	2930 Wetmore Avenue, Suite 9F		Everett,	WA	98201	425/252-3188	jill.mckinnie@mail.house.gov
<u>Native American Tribes and Tribal Councils:</u>										
** Jamestown S'Klallam Indian Tribe	The Honorable W. Ron	Allen	Chair	1033 Old Blyn Highway		Sequim,	WA	98382	360/683-1109	rallen@jamestowntribe.org
** Lower Elwha Klallam Indian Tribe	The Honorable Frances	Charles	Chair	2851 Lower Elwha Road		Port Angeles,	WA	98363	360/452-8471	fgcharles@elwha.nsn.us
** Lummi Nation	The Honorable Darrel	Hillaire	Chair	2616 Kwina Road		Bellingham,	WA	98226-9298	360/384-1489	darrellh@lummi-nsn.gov
** Lummi Nation	Harlan	James		2616 Kwina Road		Bellingham,	WA	98226	360/384-2225	harlanj@lummi-nsn.gov
Lummi Indian Nation	Leroy	D		2616 Kwina Road		Bellingham,	WA	98226	360/384-1489	leroyd@lummi-nsn.gov
Lummi Nation	Randy	Kinley		2616 Kwina Road		Bellingham,	WA	98226	360/384-1489	randyk@lummi-nsn.gov
Lummi Nation	Elden	Hillaire	Chairman, LNR	2616 Kwina Road		Bellingham,	WA	98226	360/384-1489	eldenh@lummi-nsn.gov
Lummi Nation	Merle	Jefferson	Executive Directive, Lummi Natural Resources	2616 Kwina Road		Bellingham,	WA	98226	360/384-2225	merlej@lummi-nsn.gov
Lummi Nation	Evelyn	Jefferson	Chairwoman, LIBC	2616 Kwina Road		Bellingham,	WA	98226	360/384-1489	evelynj@lummi-nsn.gov
Lummi Nation	Alan	Chapman		2616 Kwina Road		Bellingham,	WA	98226	360/384-1489	alanc@lummi-nsn.gov
Lummi Nation	Jeremy	Freimund		2616 Kwina Road		Bellingham,	WA	98226	360/384-1489	jeremyf@lummi-nsn.gov
Lummi Nation	Dan	Raas	Tribal Attorney	2616 Kwina Road		Bellingham,	WA	98226	360/384-1489	danr@lummi-nsn.gov
Makah Tribal Council	Vince	Cook	Environmental Division Coordinator	PO Box 115		Neah Bay,	WA	98357	360/645-2201	mtcedm@centurytel.net
Muckleshoot IndianTribal Council	The Honorable John	Daniels, Jr.	Chair	39015 - 172nd Avenue SE		Auburn,	WA	98092	253/939-3311	john.danielsjr@muckleshoot.nsn.us
Nisqually Indian Tribe	The Honorable Cynthia	Iyall	Chair	4820 She-Nah-Num Drive SE		Olympia,	WA	98513	360/456-5221	iyall.cynthia@nisqually-nsn.gov

Admiralty Inlet Pilot Tidal Project [FERC P-12690]
Interested Parties Distribution List

Company Name	First Name	Last Name	Title	Address Line 1	Address Line 2	City	State	ZIP Code	Work Phone	E-mail Address
Nooksack Indian Tribal Council	The Honorable Narcisco	Cunanan	Chair	5017 Deming Road	PO Box 157	Deming,	WA	98244	360/592-5176	narz@nooksack-tribe.org
Northwest Indian Fisheries Commission	The Honorable Billy	Frank, Jr.	Chairman	6730 Martin Way E.		Olympia,	WA	98516	360/528-4320	bfrank@nwifc.org
Northwest Indian Fisheries Commission	Mike	Grayum	Executive Director	6730 Martin Way E		Olympia,	WA	98516	360/528-4305	grayum@nwifc.org
** Port Gamble S'Klallam Tribe	The Honorable Ronald	Charles	Chair	31912 Little Boston Road NE		Kingston,	WA	98346	360/297-2646	roncharles@pgst.nsn.us
Puyallup Tribal Council	The Honorable Herman	Dillon	Chair	3009 East Portland Avenue		Tacoma,	WA	98404	253/573-7835	NO E-MAIL ADDRESS
Samish Indian Nation	Christine	Woodward		PO Box 217		Anacortes,	WA	98221	360/293-6404	samish@samishtribe.nsn.us
Samish Tribe of Indians	The Honorable Tom	Wooten	Chair	2918 Commercial Avenue	PO Box 217	Anacortes,	WA	98221	360/293-6404	tomwooten@samishtribe.nsn.us
** Sauk-Suiattle Indian Tribe	The Honorable Janice	Mabee	Chair	5318 Chief Brown Lane		Darrington,	WA	98241-9420	360/436-0131	annarae@sauk-suiattle.com
** Skagit River System Cooperative	Stan M.	Walsh	Fisheries Biologist	11426 Moorage Way	PO Box 368	LaConner,	WA	98257	360/466-7228	swalsh@skagitcoop.org
Skokomish Indian Tribal Council	The Honorable Denese	LaClair	Chair	N. 80 Tribal Center Road		Shelton,	WA	98584	360/877-2200	laclair@hcpc.com
Squaxin Island Tribal Council	The Honorable Jim	Peters	Chair	SE 10 Squaxin lane		Shelton,	WA	98584-9200	360/426-9781	jpeters@squaxin.nsn.us
Stillaguamish Indian Tribe	The Honorable Shawn	Yanity	Chair	3310 Smokey Point Drive	PO Box 277	Arlington,	WA	98223	360/652-7362	syanity@stillaguamish.nsn.us
Suquamish Tribe	Michelle	Hansen	Attorney	PO Box 498		Suquamish,	WA	98392-0498	360/598-3311	nhansen@suquamish.nsn.us
Suquamish Tribe	Melody (Mel)	Allen	Tribal Attorney	PO Box 498		Suquamish,	WA	98392	360/394-8488	mallen@suquamish.nsn.us
Suquamish Tribal Council	Mark	Bubenik, Esq.	Legal Counsel	PO Box 498		Suquamish,	WA	98392	360/598-3311	mbubenik@suquamish.nsn.us
** Suquamish Tribal Council	The Honorable Leonard	Forsman	Executive Director	PO Box 498		Suquamish,	WA	98392	360/598-3311	lforsman@suquamish.nsn.us
** Suquamish Tribe Fisheries Department	Tom	Ostrom	Technical Contact	PO Box 498		Suquamish,	WA	98392	360/394-8446	tostrom@suquamish.nsn.us
Swinomish Tribe	James	Jannetta	Attorney	PO Box 817		LaConner,	WA	98257	360/466-3163	jjannetta@swinomish.nsn.us
** Swinomish Indian Tribal Community	The Honorable M. Brian	Cladoosby	Chairman	11404 Moorage Way	PO Box 817	LaConner,	WA	98257-0817	360/466-3163	bcladoosby@swinomish.nsn.us
Tulalip Tribes of Washington	Daryl Brent	Williams	Environmental Liaison	7411 Tulalip Bay Drive		Tulalip,	WA	98271	800/869-8287	dwilliams@tulaliptribes-nsn.gov
** Tulalip Tribes of Washington	The Honorable Mel	Sheldon	Chairman, Board of Directors	6700 Totem Beach Road		Tulalip,	WA	98271	360/651-4500	melsheldon@tulaliptribes-nsn.gov
** Tulalip Tribes of Washington			Office of Reservation Attorney	6700 Totem Beach Road		Tulalip,	WA	98271-9694	360/651-4000	
** Upper Skagit Tribal Council	The Honorable Marilyn	Scott	Chairman	25944 Community Plaza		Sedro Woolley,	WA	98284-9739	360/854-7000	marilyns@upperskagit.com
Upper Skagit Tribal Council	The Honorable Louis	Cloud	Chair	PO Box 151		Toppenish,	WA	98948	509/865-5121	raemelle@yakama.com
State Agencies:										
Office of the Governor	The Honorable Christine O.	Gregoire	Governor	PO Box 40002		Olympia,	WA	98504-0002	360/902-4111	NO E-MAIL ADDRESS
Office of the Governor	Matt	Steuerwalt	Executive Policy Advisor to the Governor	PO Box 43113		Olympia,	WA	98504	360/	matt.steuerwalt@gov.wa.gov
Governor's Office of Indian Affairs	Craig A.	Bill	Executive Director	210 - 11th Avenue SW, Suite 415	PO Box 40909	Olympia,	WA	98504-8827	360/902-8827	cbill@goia.wa.gov
Governor's Office of Regulatory Affairs	Sally	Toteff	Regulatory Assistant Lead, Southwest Region	PO Box 47775		Olympia,	WA	98504-7775	360/407-6957	sally.toteff@ora.wa.gov
Governor's Office of Regulatory Affairs	Annie	Szvetecz							360/407-6957	Annie.szvetecz@ora.wa.gov
Governor's Office of Regulatory Affairs	Zelma	Zieman							425/649-7179	zelma.zieman@ora.wa.gov
Office of the Attorney General	Tiffany R.	Gilbertson	Legal Assistant	7141 Clearwater Drive SW		Tumwater,	WA	98501-6503		TiffanyG@atg.wa.gov
** Office of the Attorney General, Fish and Wildlife Division	William C.	Frymire	Senior Council	1125 Washington Street SE	PO Box 40100	Olympia,	WA	98504-0100		billf@atg.wa.gov
Office of the Attorney General, Natural Resources Division	Terence A.	Pruit	Assistant Attorney General	1125 Washington Street SE	PO Box 40100	Olympia,	WA	98504-0100	360/586-0642	terryp@atg.wa.gov
Office of the Attorney General, Ecology Division	Brian	Faller, Esq.	Assistant Attorney General	PO Box 40117		Olympia,	WA	98504-0117	360/586-6740	brianf@atg.wa.gov
Office of the Attorney General, Parks and Recreation Division	Michael B.	Ferguson, Esq.	Assistant Attorney General	1125 Washington Street SE	PO Box 40100	Olympia,	WA	98504-0100	360/753-6200	michaelf2@atg.wa.gov
** WA State Parks and Recreation Commission	Rex	Derr	Director	7150 Clearwater Drive SW	PO Box 42650	Olympia,	WA	98504-2650	360/902-8501	rex.derr@parks.wa.gov
WA State Parks and Recreation Commission	Terry	Doran	Northwest Region Manager	220 North Walnut Street		Burlington,	WA	98233		Terry.Doran@parks.wa.gov
WA State Parks and Recreation Commission	Don	Hoch	Puget Sound Regional Manager	2840 Riverwalk Drive SE		Auburn,	WA	98002-8207		Don.Hoch@parks.wa.gov
** WA State Dept. of Community, Trade & Economic Development	Tony	Usibelli	Division Director, Energy Policy Division	925 Plum Street SE, Building 4	PO Box 43173	Olympia,	WA	98504-3173	360/725-3110	tonyu@cted.wa.gov
WA State Dept. Community, Trade & Economic Development	Tim	Stearns							206/256-6121	tims@cted.wa.gov
WA State Department of Transportation	Lisa	Savoia	Assistant Attorney General	7141 Cleanwater Drive SW		Tumwater,	WA	98501-6503		LisaS6@atg.wa.gov
WA State Department of Transportation	David	Lemcke							206/705-7211	LemckeD@WSDOT.WA.GOV
WA State Department of Transportation	David	Lemcke							206/705-7211	LemckeD@WSDOT.WA.GOV
** WA State Dept. of Ecology	Rebekah	Padgett							425/649-7129	Rpad461@ecy.wa.gov
WA State Dept. of Ecology	Skip	Albertson							360/407-6676	Salb461@ecy.wa.gov
WA State Dept. of Ecology	Sheila	Hosner	Office of Regulatory Assistance	3190 - 160th Avenue SE		Bellevue,	WA	98008-5452	425/649-7114	sheila.hosner@ora.wa.gov
WASate Dept. of Ecology	Margaret	Dutch								mdut461@ECY.WA.GOV
WA State Dept.of Ecology	Richard K.	Wallace	Southwest Regional Office	PO Box 47775		Olympia,	WA	98504-7775		dwal461@ecy.wa.gov
WA State Dept. of Ecology	Alice	Kelly		3190 - 160th Avenue SE		Bellevue,	WA	98008-5452		akel461@ecy.wa.gov
WA State Dept. of Ecology	Robert	Reuter							425/649-7086	rreu461@ecy.wa.gov
WA State Dept. of Ecology	Norm	Davis	Northwest Regional Office Spill Prevention Unit	3190 - 160th Avenue SE		Bellevue,	WA	98008	425/649-4491	NDAV461@ecy.wa.gov
WA State Dept. of Ecology	Kathy	Taylor	Marine Habitat Specialist	3190 - 160th Avenue SE		Bellevue,	WA	98008	360/407-7125	Ktay461@ecy.wa.gov
WA State Dept. of Ecology	Joan M.	Marchioro	Senior Counsel		PO Box 40117	Olympia,	WA	98504-0117		JoanM2@atg.wa.gov
WA State Dept. of Ecology, SEA Program	Jennifer L. T.	Hennessey	Ocean Policy Associate	PO Box 47600		Olympia,	WA	98504-7600	360/407-6595	jenh461@ecy.wa.gov
** WA State Dept. of Natural Resources	Brady	Scott	Manger, Tidal Energy Resources							brady.scott@dnr.wa.gov
WA State Dept. of Natural Resources	Boyd	Powers	External SEPA Coordinator	1111 Washington Street SE		Olympia,	WA	98504-7015		boyd.powers@wadnr.gov
WA State Dept. of Natual Resources	Richard	Doenges	Division Manager, Aquatic Resources Division	1111 Washington Street SE	PO Box 47207	Olympia,	WA	98504-7027	360/902-1100	rich.doenges@dnr.wa.gov
WA State Dept. of Natural Resources	Larry	Dominguez							360/902-1718	Larry.dominguez@dnr.wa.gov
WA State Dept. of Natural Resources	Jim	Speaks	Product Sales & Leasing							jim.speaks@dnr.wa.gov
WA State Dept. of Natural Resources	Terry	Carten					WA		360/854-2846	terry.carten@dnr.wa.gov
WA State Dept. of Natural Resources	JoAnn	Gustafson	Aquatic Lands, Orcas Strait District						360/854-2832	joann.gustafson@dnr.wa.gov
WA State Dept. of Natural Resources	Elizabeth	Ellis	Aquatic Resources Program	1111 Washington Street SE	PO Box 47027	Olympia,	WA	98504		elizabeth.ellis@wadnr.gov
** Washington State Ferries	Kojo	Fordjour	Environmental Program Manager	1901 - 3rd Avenue, Suite 500		Seattle,	WA	98121		Fordjok@wsdot.wa.gov
Washington State Ferries	Michelle	Elling	Senior Environmental Coordinator	2901 - 3rd Avenue, Suite 500		Seattle,	WA	98121-1012	206/515-3400	ellingm@wsdot.wa.gov
Washington State Ferries	Steve	Beadle		2901 - 3rd Avenue Suite 500		Seattle,	WA	98121		BeadleS@WSDOT.WA.GOV
WA State Transportation & Public Construction Division	Mark S.	Lyon, Esq.	Assistant Attorney General	7141 Cleanwater Drive SW	PO Box 40113	Olympia,	WA	98504-0013	360/586-0641	mark11@atg.wa.gov
Washington State Inter Agency Committee	Jim	Eychaner		PO Box 40917		Olympia,	WA	98504-0917	360/902-3011	jime@iac.wa.gov
WA State Dept. of Fish & Wildlife, Region 4	Bob	Everitt	Regional Director	16018 Mill Creek Blvd.		Mill Creek,	WA	98012-1296	425/775-1311	everirde@dfw.wa.gov

Admiralty Inlet Pilot Tidal Project [FERC P-12690]
Interested Parties Distribution List

Company Name	First Name	Last Name	Title	Address Line 1	Address Line 2	City	State	ZIP Code	Work Phone	E-mail Address
** WA State Department of Fish and Wildlife	Mark A.	Hunter	Habitat Program	600 Capitol Way N		Olympia,	WA		360/902-2542	huntermah@dfw.wa.gov
** Office of the Commissioner of Public Lands	Peter	Goldmark	Commissioner of Public Lands	1111 Washington Street SE	PO Box 47001	Olympia,	WA	98504	360/902-1004	cpl@dnr.wa.gov
WA State Board of Pilotage Commissioners	Peggy	Larson	Administrator	2901 Third Avenue		Seattle,	WA	98121	206/515-3904	laronsp@wsdot.wa.gov
State Parks:										
Deception Pass State Park	Jack	Hartt	Park Ranger	41229 SR 20		Oak Harbor,	WA	98277-2924	360/675-2417	jack.hartt@parks.wa.gov
** Fort Casey State Park	Ken	Hageman	Park Manager	1280 Engle Road		Coupeville,	WA	98239	360/678-4519	fort.casey@parks.wa.gov
Fort Flagler State Park	Mike	Zimmerman	Park Ranger	10451 Flagler Road		Nordland,	WA	98358	360/385-1259	fort.flagler@parks.wa.gov
Fort Ward State Park	Mlee	Barlow	Park Ranger	2241 Pleasant Beach Drive NE		Bainbridge Island,	WA	98110	206/842-4041	fay.bainbridge@parks.wa.gov
Fort Worden State Park	Kate	Burke	Park Manager	200 Battery Way		Port Townsend,	WA	98368	360/385-4730	Kate.Burke@parks.wa.gov
Fort Worden State Park	Anne	Murphy	Executive Director, Port Townsend Marine Science Center	200 Battery Way		Port Townsend,	WA	98368	360/385-4730	info@ptmsc.org
South Whidbey State Park			Park Ranger	4128 S. Smugglers Cove Road		Freeland,	WA	98249	360/321-4559	NO E-MAIL ADDRESS
Cities/Towns:										
City of Anacortes	The Honorable Dean	Maxwell	Mayor	904 - 6th Street	PO Box 547	Anacortes,	WA	98221	360/299-1950	dean@cityofanacortes.org
City of Anacortes, Anacortes Municipal Building	Ian	Munce	City Attorney	904 - 6th Street	PO Box 547	Anacortes,	WA	98221-0547	360/293-1912	ian@cityofanacortes.org
City of Arlington	Bill	Blake	Community Development	238 N. Olympic Avenue		Arlington,	WA	98223	360/403-3551	bblake@ci.arlington.wa.us
City of Bellingham	The Honorable Tim	Douglas	Mayor	210 Lottie Street		Bellingham,	WA	98225-4089	360/676-6979	tdouglas@cob.org
City of Bellingham	Dick	McKinley	Public Works Director	322 N. Commercial Street, Suite 210		Bellingham,	WA	98225	360/676-6961	rmckinley@cob.org
City of Bellevue	The Honorable Grant	Degginger	Mayor	450 - 110th Avenue NE	PO Box 90012	Bellevue,	WA	98009	425/452-7810	gdegginger@bellevue.wa.gov
City of Bremerton	The Honorable Cary	Bozeman	Mayor	345 - 6th Street, Suite 600		Bremerton,	WA	98337	360/473-5290	cbozeman@ci.bremerton.wa.us
City of Burien	The Honorable Joan	McGilton	Mayor	415 SW 150th Street		Burien,	WA	98166	206/248-5515	joanm@ci.burien.wa.us
City of Burlington	The Honorable Roger "Gus"	Tjeerdsma	Mayor	900 Fairhaven Avenue		Burlington,	WA	98233	360/755-0531	cityhall@ci.burlington.wa.us
City of Des Moines	The Honorable Bob	Sheckler	Mayor	21630 - 11th Avenue South		Des Moines,	WA	98198-6398	206/878-4595	bsheckler@desmoineswa.gov
** City of Everett	The Honorable Ray	Stephanson	Mayor	2930 Wetmore Avenue		Everett,	WA	98201	425/257-7112	rstephanson@ci.everett.wa.us
** City of Edmonds	The Honorable Gary	Haakenson	Mayor	121 - 5th Avenue		Edmonds,	WA	98020	425/771-0247	haakenson@ci.edmonds.wa.us
City of Friday Harbor	The Honorable David	Jones	Mayor	60 Second Street	PO Box 219	Friday Harbor,	WA	98250	360/378-8996	ssbn599@rockisland.com
City of Mercer Island	The Honorable Bryan	Cairns	Mayor	9611 SE 36th Street		Mercer Island,	WA	98040	206/236-5323	bryan.cairns@mercergov.org
City of Normandy Park	The Honorable Shawn	McEvoy	Mayor	801 SW 174th Street		Normandy Park,	WA	98166	206/248-7603	shawn.mcevoy@ci.normandy-park.wa.us
City of Tukwila	The Honorable Steve	Mullet	Mayor	6200 Southcenter Blvd.		Tukwila,	WA	98188	206/433-1805	tukwila@ci.tukwila.wa.us
City of Kenmore	The Honorable Randy	Eastwood	Mayor	6700 NE 181st Street	PO Box 82607	Kenmore,	WA	98028-0607	425/398-8900	cityhall@ci.kenmore.wa.us
City of Kirkland	The Honorable Jim	Lauinger	Mayor	123 Fifth Avenue		Kirkland,	WA	98033	425/587-3000	jlauinger@ci.kirkland.wa.us
City of Mountlake Terrace	The Honorable Jerry	Smith	Mayor	23204 - 58th Avenue W	PO Box 72	Mountlake Terrace,	WA	98043	425/744-6206	cityhall@ci.mlt.wa.us
City of Port Townsend	David G.	Timmons	City Manager	250 Madison Street		Port Townsend,	WA	98368	360/379-5047	dtimmons@cityofpt.us
** City of Lynnwood	The Honorable Don	Gough	Mayor	19100 - 44th Avenue W	PO Box 5008	Lynnwood,	WA	98046	425/670-6613	dgough@ci.lynnwood.wa.us
City of Mount Vernon	The Honorable Bud	Norris	Mayor	910 Cleveland Avenue	PO Box 809	Mount Vernon,	WA	98273	360/336-6211	mvmayor@ci.mount-vernion.wa.us
** City of Mukilteo	The Honorable Joe	Marine	Mayor	4480 Chennault Beach Road		Mukilteo,	WA	98275	425/355-4141	mukilteo@ci.mukilteo.wa.us
** City of Oak Harbor	The Honorable Patricia	Cohen	Mayor	865 SE Barrington Drive		Oak Harbor,	WA	98277	360/279-4503	mayor@oakharbor.org
City of Port Orchard	The Honorable Kim E.	Abel	Mayor	216 Prospect Street		Port Orchard,	WA	98366	360/876-4409	cityhall@ci.port-orchard.wa.us
** City of Port Townsend	The Honorable Mark	Welch	Mayor	250 Madison Street		Port Townsend,	WA	98368	360/379-5047	citycouncil@cityofpt.us
City of Port Townsend	John P.	Watts, Esq.	City Attorney	250 Madison Street No. 201		Port Townsend,	WA	98368	360/379-5048	jwatts@cityofpt.us
City of Port Townsend	Judy	Surber	Shoreline Planner, Development Services Dept.			Port Townsend,	WA	98368	360/379-5084	jsurber@cityofpt.us
** City of Poulsbo	The Honorable Kathryn	Quade	Mayor	19050 Jensen Way NE	PO Box 98	Poulsbo,	WA	98370	360/779-3901	kquade@cityofpoulsbo.com
City of SeaTac	The Honorable Gene	Fisher	Mayor	4800 South 188th Street		SeaTac,	WA	98188	206/973-4800	info@ci.seatac.wa.us
City of Seattle	The Honorable Greg	Nickels	Mayor	600 Fourth Avenue		Seattle,	WA	98104	206/386-1234	mayors.office@ci.seattle.wa.us
City of Shoreline	The Honorable Robert	Ransom	Mayor	17544 Midvale Avenue North		Shoreline,	WA	98133	206/546-1303	ransom@ci.shoreline.wa.us
** City of Stanwood	The Honorable Dianne	White	Mayor	10220 - 270th NW		Stanwood,	WA	98292	360/629-2181	melissa@ci.stanwood.wa.us
Counties:										
Clallam County Marine Resources Committee	David	Freed	WSU Beach Watcher Coordinator	223 E. 4th Street, Suite 15		Port Angeles,	WA	98362	360/565-2619	dfreed@wsu.edu
Island County Board of Commissioners	The Honorable John	Dean	Commissioner	1 NE 7th Street	PO Box 5000	Coupeville,	WA	98239	360/679-7354	district3@co.island.wa.us
Island County Board of Commissioners	The Honorable Mike	Shelton	Commissioner	1 NE 7th Street	PO Box 5000	Coupeville,	WA	98239	360/679-7354	district1@co.island.wa.us
Island County Board of Commissioners	The Honorable William L. "Mac"	McDowell	Commissioner	1 NE 7th Street	PO Box 5000	Coupeville,	WA	98239	360/679-7354	district2@co.island.wa.us
** Island County Commissioners Office	Ingrid	Smith	Coordinator							IngridS@co.island.wa.us
** Island County Marine Resources Committee	Dick	Toft	Chair, Island County Marine Resources Committee	101 NE 6th Street	PO Box 5000	Coupeville,	WA	98239	360/679-7327	dtoft@whidbey.net
Island County Marine Resources Committee	Rex	Porter	Executive Director	101 NE 6th Street	PO Box 5000	Coupeville,	WA	98239	360/679-7327	portergroup@whidbey.net
** Island County Planning Department	Phil	Bakke, AICP	Director	PO Box 5000		Coupeville,	WA	98239	360/679-7309	philb@co.island.wa.us
Island County Planning Department	Kimberley	Bredensteiner	Salmon Recovery Coordinator	PO Box 5000		Coupeville,	WA	98239	360/240-5543	kimb@co.island.wa.us
Jefferson County	The Honorable John	Fischbach	Administrator	1820 Jefferson Street	PO Box 1220	Port Townsend,	WA	98368	360/385-9100	jfischbach@co.jefferson.wa.us
Jefferson County Natural Resources Division	Neil	Harrington	Environmental Health Specialist	615 Sheridan Street		Port Townsend,	WA	98368	360/385-9444	nharrington@co.jefferson.wa.us
Jefferson County Natural Resources Division	Tami	Pokorny	Environmental Health Specialist	615 Sheridan Street		Port Townsend,	WA	98368	360/385-9444	tpokorny@co.jefferson.wa.us
Jefferson County Marine Resources Committee	Pat	Pearson	WSU Water Quality Field Agent	201 West Pattison		Port Hadlock,	WA	98339	360/379-5610	pearsonp@wsu.edu
Jefferson County Planning Commission	Michelle	McConnell	Shoreline Project Coordinator	1820 Jefferson Street		Port Townsend,	WA	98368	360/379-4484	mmcconnell@co.jefferson.wa.us
Jefferson County Dept. of Community Development	Karen L.	Barrows	Assistant Planner, Long Range Planning Division	621 Sheridan Street		Port Townsend,	WA	98368	360/379-4482	kbarrows@co.jefferson.wa.us
King County	The Honorable Ron	Sims	Executive	516 Third Avenue		Seattle,	WA	98104	206/296-4040	ron.sims@metrokc.gov
Kitsap County	The Honorable Jan	Angel	Commissioner	614 Division Street, MS-4		Port Orchard,	WA	98366	360/337-7146	jangel@co.kitsap.wa.us
Kitsap County	The Honorable Steve	Bauer	Commissioner	614 Division Street, MS-4		Port Orchard,	WA	98366	360/337-7146	Sbauer@co.kitsap.wa.us
Kitsap County	The Honorable Josh	Brown	Commissioner	614 Division Street, MS-4		Port Orchard,	WA	98366	360/337-7146	JWBrown@co.kitsap.wa.us
Kitsap County	Nancy	Buonnano Grennan	Kitsap County Administrator	614 Division Street, MS-4		Port Orchard,	WA	98366		NBGrennan@co.kitsap.wa.us
Kitsap County	Jim	Bolger	Kitsap County Dept. of Cummunity Development	614 Division Street, MS-36		Port Orchard,	WA	98366		Jbolger@co.kitsap.wa.us

Admiralty Inlet Pilot Tidal Project [FERC P-12690]
Interested Parties Distribution List

Company Name	First Name	Last Name	Title	Address Line 1	Address Line 2	City	State	ZIP Code	Work Phone	E-mail Address
San Juan County	Randall K.	Gaylord, Esq.	Prosecuting Attorney	350 Court Street	PO Box 760	Friday Harbor,	WA	98250	360/378-4101	randvg@co.san-juan.wa.us
San Juan County Pomona Grange #50	Richard	Civille	Legislative Chairperson	152 - 1st Street N		Friday Harbor,	WA	98250	360/378-6632	pomona@islandgrange.org
San Juan County Council	The Honorable Alan	Lichter	Councilman	350 Court Street #1		Friday Harbor,	WA	98250	360/370-7474	alanl@co.san-juan.wa.us
San Juan County Council	The Honorable Kevin M. M.	Ranker	Councilman	350 Court Street #1		Friday Harbor,	WA	98250	360/370-7473	kevinr@co.san-juan.wa.us
San Juan County Council	The Honorable Bob	Myhr	Councilman	350 Court Street #1		Friday Harbor,	WA	98250	360/378-2898	bobm@co.san-juan.wa.us
San Juan County Marine Resources Committee	Mary	Knackstedt	Coordinator	PO Box 947	512 Guard Street	Friday Harbor,	WA	98250	360/378-1095	maryk@co.san-juan.wa.us
Skagit County	Gary	Rowe	Administrator	Administration Building	1801 Continental Place Suite 100	Mount Vernon,	WA	98273	360/336-9300	garyr@co.skagit.wa.us
Skagit County Administration Building	Dan	Berentson	Skagit County Communications Director / Community Liaison	1800 Continental Place		Mount Vernon,	WA	98273	360/419-3461	danb@co.skagit.wa.us
Skagit County Planning and Development Services	Betsy	Stevenson	Senior Planner	1800 Continental Place		Mount Vernon,	WA	98273	360/336-9410	pds@co.skagit.wa.us
Snohomish County Planning Department	Will	Hall	Division Manager	3000 Rockefeller Avenue	M/S 604	Everett,	WA	98201		will.hall@co.snohomish.wa.us
Snohomish County Marine Resources Committee	Stef	Frenzl	Marine Resource Steward	3000 Rockefeller Avenue		Everett,	WA	98201	425/388-6466	Stephan.Frenzl@co.snohomish.wa.us
Snohomish County Surface Water Management	Tim	Walls	WRIA 7 Salmon Recovery Coordinator	3000 Rockefeller Avenue		Everett,	WA	98201	425-388-3464	Timothy.Walls@co.snohomish.wa.us
Snohomish County Surface Water Management	Sean	Edwards	WRIA 5 Salmon Recovery Coordinator	3000 Rockefeller Avenue		Everett,	WA	98201	425/388-3464	Sean.Edwards@co.snohomish.wa.us
Whatcom County Planning and Development Services	Hal H.	Hart	Director	5280 Northwest Road		Bellingham,	WA	98227	360/676-6907	pds@co.whatcom.wa.us
Port Districts:										
Port of Anacortes	Bob	Hyde	Executive Director	PO Box 297		Anacortes,	WA	98221	360/293-3134	hyde@portofanacortes.com
Port of Bellingham	James S.	Darling	Executive Director	PO Box 1677		Bellingham,	WA	98227	360/676-2500	jimd@portofbellingham.com
Port of Bremerton	Ken	Atteberry	Chief Executive Officer	8550 SW State Highway 3		Port Orchard,	WA	98367	360/674-2381	kena@portofbremerton.org
Port of Coupeville	James M.	Patton	Executive Director	PO Box 577		Coupeville,	WA	98239	306/678-5020	execjim@verizon.net
Port of Everett	John	Mohr	Executive Director	PO Box 538		Everett,	WA	98206	425/259-3164	johnm@portofeverett.com
Port of Friday Harbor	Steve	Simpson	Director	PO Box 889		Friday Harbor,	WA	98250	360/378-2688	steves@portfridayharbor.org
Port of Kingston	Tom	Berry	Harbormaster	PO Box 559		Kingston,	WA	98346	360/297-3545	ptkingston@aol.com
Port of Port Angeles	Bob	McChesney	Executive Director	PO Box 1350		Port Angeles,	WA	98362	360/457-8527	bobm@portofpa.com
Port of Port Townsend	Larry	Crockett	General Manager	PO Box 1180		Port Townsend,	WA	98368	360/385-0656	larry@portofpt.com
Port of Poulsbo	Kirk	Stickels	Manager	PO Box 732		Poulsbo,	WA	98370	360/779-3505	portofpoulsbo@yahoo.com
Port of Seattle	Tay	Yoshitani	Chief Executive Officer	PO Box 1209	2711 Alaskan Way	Seattle,	WA	98111	206/728-3000	yoshitani.t@portseattle.org
Port of Skagit County	Jerrold W.	Heller	Executive Director	PO Box 348		Burlington,	WA	98233	360/757-0011	posc@portofskagit.com
Utilities/Energy Related:										
Hydropower Reform Coalition	Rebecca	Sherman	Northwest Coordinator	320 SW Stark Street	Suite 412	Portland,	OR	97204	503/827-8653	northwest@hydroreform.org
Northwest Energy Coalition	Mark	Tilstra	Transmission and Distribution							Mtilstra@opalco.com
Northwest Energy Coalition	Marc	Krasnowsky	Communications Director	219 First Avenue South	Suite 100	Seattle,	WA	98104	206/621-0094	marc@nwenergy.org
Puget Sound Energy	Joe	Seabrook	Transmission and Distribution						425/462-3577	joe.seabrook@pse.com
Law Firms/Consulting Firms:										
Foster Pepper PLLC	P. Stephen	DiJulio, Esq.	Attorney-at-Law	1111 Third Avenue, Suite 3400		Seattle,	WA	98101	206/447-4400	DIJUP@Foster.com
Foster Pepper PLLC	Joseph A.	Brogan, Esq.	Attorney-at-Law	1111 Third Avenue, Suite 3400		Seatte,	WA	98101	206/447-4400	BROGJ@Foster.com
Island County Prosecutor's Office	Gregory M.	Banks	Island County Prosecuting Attorney	PO Box 5000		Coupeville,	WA	98239-5000	360/679-7363	gregb@co.island.wa.us
K&L Gates	Craig	Trueblood	Partner	925 Fourth Avenue	Suite 2900	Seattle,	WA	98104	206/370-8368	craig.trueblood@klqates.com
Kitsap County Prosecuting Attorney's Office	Shelley	Kneip	Senior Deputy Prosecuting Attorney	614 Division Street, MS-35		Port Orchard,	WA	98366		Skneip@co.kitsap.wa.us
LaRoche & Associates	Gabrielle E.	LaRoche	Marine Resource Policy Shoreline & Watershed Planning	555 Blue Sky Drive		Port Townsend,	WA	98368	360/385-2559	seabries@olypen.com
Morisette, Schlosser, Jozwiak & McGaw	Mason D.	Morisset, Esq.	Attorney-at-Law	801 Second Avenue, Suite 1115		Seattle,	WA	98104	206/386-5200	m.morisset@msaj.com
Morisset, Schlosser, Ayer & Jozwiak	Anita	Castillo	Paralegal	1115 Norton Building	801 Second Avenue	Seattle,	WA	98104		a.castillo@msaj.com
PC Landing Corporation	Kurt	Johnson	Chief Financial Officer	319 Diablo Road	Suite 213	Danville,	CA	94526	415/200-0308	kjohnson@pc1.com
Educational Institutions/Labs/Museums/Historical Reserves :										
Cascadia Research Collective	John	Calambokidis	Research Biologist	218-1/2 West 4th Avenue		Olympia,	WA	98501	360/943-7325	calambokidis@cascadiaresearch.org
** Ebey's Landing National Historical Reserve	Mark	Preiss	Reserver Manager	PO Box 774	162 Cemetary Road	Coupeville,	WA	98239	360/678-6084	mark_preiss@partner.nps.gov
North Cascade Institute	Saul	Weisberg, M.S.	Executive Director	810 Route 20		Sedro-Wooley,	WA	98284	360/856-5700	saul_weisberg@ncascades.org
Pacific Shellfish Institute	Dr. Daniel	Cheney	Executive Director	120 State Avenue NE	PMB #142	Olympia,	WA	98501	360/754-2741	cheney@pacshell.org
** Seattle Pacific University Camp Casey Conference Center	Darrell	Jacobson		1276 Engle Road		Coupeville,	WA	98239	866/661-6604	NO E-MAIL ADDRESS
The Whale Museum	Richard	Osborne, Ph.D.	Director	62 First Street N	PO Box 945	Friday Harbor,	WA	98250	360/378-4710	tracie@whalemuseum.org
University of Washington	Brian	Polagye								bpolagye@u.washington.edu
University of Washington	Philip	Malte, Ph.D.	Professor of Mechanical Engineering			Seattle,	WA		206/685-2171	malte@u.washington.edu
University of Washington	Kristen	Thyng	Doctoral Student			Seattle,	WA		206/919-0525	thyngkm@u.washington.edu
Alliances/Associations/Coalitions/Councils/Networks/Partnerships/Taskforces :										
** American Waterways Operators (AWO)	Jason	Lewis	Vice President, Pacific Region	801 North Quincy Street, Suite 200		Arlington	VA	22203	703/841-9300	jlewis@vesselalliance.com
Association of Washington Business	Don	Brunell	President	PO Box 658		Olympia,	WA	98507-0658	360/943-1600	donb@awb.org
Association of Washington Cities	Stan	Finkelstein	Executive Director	1076 Franklin Street SE		Olympia,	WA	98501-1346	800/562-8981	stanf@awcnet.org
Audubon Washington	Nina	Carter	Executive Director	1411 - 4th Avenue, Suite 920		Seattle,	WA	98101-2204	206/652-2444	ncarter@audubon.org
Building Industry Association of Washington	Jeff	Hansel, GGB	President	PO Box 1909		Olympia,	WA	98507	360/352-7801	jeffh@biaw.com
Federation of Western Outdoor Clubs	Fran	Troje	WA State Vice-President	4257 - 123rd Ave SE		Bellevue,	WA	98006	206/322-3041	ftroje@eskimo.com
Friend of the San Juans	Kyle	Loring	Legal Director		PO Box 1344	Friday Harbor,	WA	98250	360/378-2319	kyle@sanjuans.org
Friends of Discovery Park				PO Box 99662		Seattle,	WA	98199	206/283-8643	info@discoveryparkfriends.org
Georgia Strait Alliance	Laurie	MacBride	Executive Director	#210 - 195 Commercial Street		Nanaimo,	BC	V9R 5G5	250/753-3459	gsa@georgiastrait.org
Hood Canal Coalition				PO Box 65279		Port Ludlow,	WA	98365		contactus@hoodcanalcoalition.org
Hood Canal Coordinating Council	Jay	Watson	Executive Director	17791 Fjord Drive NE	Box HH	Poulsbo,	WA	98380		jwatson@hccc.wa.gov
Hood Canal Environmental Council	Bill	Matchett, President	Board of Directors	PO Box 87		Seabeck,	WA	98380	206/692-3443	hcec2000@hotmail.com

Admiralty Inlet Pilot Tidal Project [FERC P-12690]
Interested Parties Distribution List

Company Name	First Name	Last Name	Title	Address Line 1	Address Line 2	City	State	ZIP Code	Work Phone	E-mail Address
Independent Business Association				7981 - 168th Avenue NE		Redmond,	WA	98052	425/453-8621	iba@isomedia.com
Islands Oil Spill Association				PO Box 2316		Friday Harbor,	WA	98250	360/378-5322	iosaoffice@rockisland.com
Izaak Walton League of Greater Seattle	Bruce	McGlenn	President	4000 - 95th Avenue NE		Bellevue,	WA	98004	425/455-1986	info@seattleikes.org
League of Women Voters	Barbara	Seitle	President	4710 University Way NE	Suite #214	Seattle,	WA	98105	206/622-8961	lwvwa@lwvwa.org
Marine Exchange of Puget Sound	John	Veentjer	Executive Director	100 West Harrison Street, Suite S-560		Seattle,	WA	98119	206/443-3830	www.marineexchangeSEA.com
Nisqually Delta Association				PO Box 7444		Olympia,	WA	98507	360/357-3792	NO E-MAIL ADDRESS
Nisqually River Council				12501 Yelm Hwy SE		Olympia,	WA	98513	360/407-1686	info@nisquallyriver.org
North Pacific Fishing Vessels Owners Association	Leslie	Hughes	Executive Director	1900 West Emerson, Suite 101		Seattle,	WA	98119	206/285-3883	info@npfvoa.org
Northwest Marine Trade Association	Alan	Bohling	Chair, Board of Directors	1900 N. Northlake Way	Suite #233	Seattle,	WA	98103-9087	206/634-0911	alan@seattleboat.com
Northwest Straits Commission	Lew	Moore	Director	10441 Bayview-Edison Road		Mount Vernon,	WA	98273	360/428-1084	info@nwstraits.org
Orca Network	Susan	Berta	Event Coordinator & VP /Treasurer	2403 S. North Bluff Road		Greenbank,	WA	98253	360/678-3451	info@orcانetwork.org
Pacific Coast Shellfish Growers Association	Robin	Downey	Executive Director	120 State Avenue NE	PMB #142	Olympia,	WA	98501	360/379-9041	RobinDowney@pcsga.org
Pacific Marine Conservation Council	Matt	Van Ess	Executive Director	PO Box 794		Port Townsend,	WA	98368	360/385-2746	caroline@pmcc.org
Pacific Merchant Shipping Association Seattle	Mike	Moore	Vice President	World Trade Center	2200 Alaska Way, Suite 160	Seattle,	WA	98121	206/441-9700	mmoore@pmsaship.com
Pacific States Marine Fisheries Commission	Randy	Fisher	Executive Director	205 SE Spokane Street, Suite 100		Portland,	OR	97202	503/595-3100	randy_fisher@psmfc.org
Passenger Vessels Association	Joel	Hudspeth	All American Marine, Inc.	200 Harris Avenue		Bellingham,	WA	98225	360/647-7602	jhudspeth@allamericanmarine.com
People for Puget Sound	Kathy	Fletcher	Executive Director	911 Western Avenue, Suite #580		Seattle,	WA	98104	206/382-7007	kfletcher@pugetsound.org
Protect the Peninsula's Future	Tyler	Ahlgren	President	PO Box 1677		Sequim,	WA	98382	360/683-6644	tallgreen@earthlink.net
Puget Sound Action Team	John	Cambalik	Regional Liaison			Sequim,	WA			jcambalik@psat.wa.gov
Puget Sound Action Team	Stuart	Glasoe	Regional Liaison, Shellfish Program Manager	PO Box 40900		Olympia,	WA	98504-0900	800/547-6863	sglasoe@psat.wa.gov
Puget Sound-Georgia Basin Task Force	Ron	Shultz	Director of Government Affairs	PO Box 40900		Olympia,	WA	98504-0900	360/725-5440	rshultz@psat.wa.gov
Puget Sound Gillnetters Association				1402 West Marine View Drive	Suite C	Everett,	WA	98201	206/252-6699	ptmaccon@olympus.net
** Puget Sound Harbor Safety Committee	Bruce	Reed	Chair	100 West Harrison Street, Suite S-560		Seattle,	WA	98119	206/281-4708	bruce@foss.com
Puget Sound Keeper Alliance	Tom	Diller	President, Board of Directors	5309 Shilshole Avenue NW	Suite #215	Seattle,	WA	98104-1035	206/464-7532	psa@pugetsoundkeeper.org
Puget Sound Partnership	Linda	Lushall	Regional Liaison	7924 - 212th Street SW #110		Edmonds,	WA	98206	425/640-3557	llyshall@psat.wa.gov
Puget Sound Pilots Association	Andy	Coe	Captain	101 Stewart Street	Suite 900	Seattle,	WA	98101	206/728-6400	president@pspilots.org
Puget Sound Regional Council	Rick	Olson	Directror of Government Relations	1011 Western Avenue	Suite #500	Seattle,	WA	98104-1035	206/464-7532	rolson@psrc.org
Recreational Boating Association of Washington				PO Box 23601		Federal Way,	WA	98093		NO E-MAIL ADDRESS
Save Our Wild Salmon	Darcie	Larson	Associate Director	200 First Avenue West	Suite 201	Seattle,	WA	98119	206/286-4455	darcie@wildsalmon.org
Save Our Wild Salmon	Jill	Wasberg	Associate Communications Director	200 First Avenue West	Suite 201	Seattle,	WA	98119	206/286-4455	jill@wildsalmon.org
Seattle Master Builders Association	Samuel	Anderson	Executive Officer	2155 - 112th Avenue NE	Suite #100	Bellevue,	WA	98004	425/451-7920	sanderson@mbaks.com
Sierra Club	Christopher	Chapman								cjchapman@comcast.net
Sierra Club Cascade Chapter	Trevor	Kaul	Director	180 Nickerson Street	Suite #202	Seattle,	WA	98109	206/378-0114	Trevor.Kaul@sierraclub.org
Snohomish County Sportsmen	Bob	Heirman	Vice-President	2120 Lake Avenue		Snohomish,	WA	98290-1032	360/568-4083	heirman@comcast.net
Sound Experience	Brian	Larsenstafki	Education Director	PO Box 1390		Port Townsend,	WA	98368	360/379-0438	brian@soundexp.org
Swinomish Yacht Club	Shannon	Hugel	Commodore	PO Box 60		LaConner,	WA	98257		st.hugel@verizon.net
The Nature Conservancy	David	Weekes	State Director	1917 - 1st Avenue		Seattle,	WA	98101	206/343-4344	wa_reception@nrc.org
Washington Scuba Alliance	Mike	Racine	President	6758 Cascade Avenue SE		Snoqualmie,	WA	98065		info@wascuba.org
Western States Petroleum Association, Northwest Office	Frank E.	Holmes	Manager, Northwest Region	975 Carpenter Road NE, Suite 106		Lacy,	WA	98516	360/352-4506	fholmes@wspa.org
Whidbey Environmental Action Network	Steve	Erickson		PO Box 53		Langley,	WA	98260	360/579-4202	wean@whidbey.net

