

TRANSMITTAL MEMORANDUM

TO: The Honorable Mayor and City Council

FROM: Karl R. Amylon, City Manager

DATE: February 25, 2020

RE: **Authorizing Budget Transfer – Contract No. 20-07, Design of Berth III New Mooring Dolphin and Bollards, PND Engineers, Inc.**

The motion detailed below was prepared at the request of Port & Harbors Director Steve Corporon, who asked that it be placed before the City Council for consideration at its meeting of March 5, 2020. If adopted, the motion provides for authorizing a professional services agreement with PND Engineers, Inc. for permitting and design of an additional Berth III northerly mooring dolphin and two southerly double-bitt mooring bollards. Such improvements are necessary to enable Berth III to accommodate 1,100' neo-Panamax vessels. Permitting and design work must begin immediately if the Port is to have any chance of completing work in advance of the 2021 cruise ship season.

Mr. Corporon has secured a proposal from PND Engineers, Inc. of Seattle to undertake thirty percent design and permitting at an anticipated cost of \$163,000. As Councilmembers may recall, PND Engineers, Inc. designed the original Berth III facility.

As no appropriation for this work was included in the 2020 General Government Operating and Capital Budget, a budget transfer from Appropriated Reserves of the Port Enterprise Fund will be required.

Acting Port & Harbors Director Dan Berg will be attending the City Council meeting of March 5, 2020, in order to address any questions and/or concerns that Councilmembers may have.

A motion has been prepared for City Council consideration.

RECOMMENDATION

It is recommended the City Council adopt the motion approving Contract No. 20-07, Design of Berth III New Mooring Dolphin and Bollards, between the City of Ketchikan and PND Engineers, Inc. of Seattle in an amount not to exceed \$163,000; authorizing a budget transfer in the amount of \$163,000 from Appropriated Reserves of the Port Enterprise Fund to the Port Department's 2020 Berth III New Mooring Dolphin & Bollards capital account; and directing the City Manager to execute the contract documents on behalf of the City Council.

Recommended Motion: I move the City Council approve Contract No. 20-07, Design of Berth III New Mooring Dolphin and Bollards, between the City of Ketchikan and PND Engineers, Inc. of Seattle in an amount not to exceed \$163,000; authorize a budget transfer in the amount of \$163,000 from Appropriated Reserves of the Port Enterprise Fund to the Port Department's 2020 Berth III New Mooring Dolphin & Bollards capital account; and direct the City Manager to execute the contract documents on behalf of the City Council.



2933 Tongass Avenue
Ketchikan, Alaska 99901
Phone (907) 228-5632
Fax (907) 247-3610

MEMORANDUM

To: Karl Amylon, City Manager
From: Steve Corporon, Port & Harbors Director
Date: February 21, 2020
Re: **Design of Berth III New Mooring Dolphin & Bollards, Contract No. 20-07**

As discussed in numerous City Council meetings over the past year, Berth III is in need of an additional mooring dolphin to the north and two double-bitt mooring bollards to the south in order to adequately accommodate neo-panamax vessels up to 1,100 feet in length. While it would be desirable to wait until a decision has been reached on the port expansion proposals I recommend starting the permitting and design work as soon as possible in order to have any chance of the improvements being constructed in time for the beginning of the 2021 season. Final design work and the award of a construction contract would be scheduled for after a decision on the port expansion proposals has been finalized.

Attached is proposed contract with PND's Seattle office in an amount not to exceed \$163,000 to cover the cost of preparing and submitting all of the necessary permits and preparing design documents up to 30%. It is anticipated that an Incidental Harassment Authorization (IHA) will be required as part of the permitting process which is a driving factor in both the cost and schedule. I am recommending this contract be awarded to PND without advertising for design proposals due to their intimate familiarity with the facility and the project and the extremely tight schedule. They designed the Berth III facility which was constructed in 2006-2007 and completed the design analysis and engineering recommendations in 2019 for upgrading the facility to accommodate neo-panamax vessels.

Since this project was not included in the 2020 Port capital budget a capital project will need to be established and a budget transfer will be required from the Port reserves.

Recommended motion: I move to establish the Berth III New Mooring Dolphin & Bollards capital account, authorize a budget transfer in the amount of \$163,000 from the appropriated reserves of the Port Enterprise Fund to the Berth III New Mooring Dolphin & Bollards capital account and authorize the Manager to execute Contract 20-07 with PND Engineers, Inc. in an amount not to exceed \$163,000 for the permitting and initial design work of the Berth III New Mooring Dolphin & Bollards with funding provided from the Berth III New Mooring Dolphin & Bollards capital account.

AGREEMENT

PROFESSIONAL SERVICES

DESIGN OF BERTH III NEW MOORING DOLPHIN & BOLLARDS

CONTRACT NO. 20-07

THIS AGREEMENT made and entered into this ____ day of _____, 2020, by and between the **City of Ketchikan, Alaska**, a municipal corporation, 334 Front Street, Ketchikan, Alaska 99901, hereinafter called "**OWNER**", and **PND Engineers, Inc.**, a firm organized and existing under the laws of the State of Alaska, whose address is **1736 Fourth Avenue S, Suite A, Seattle, Washington 98134**, and licensed and qualified to do business within the State of Alaska, hereinafter called "**CONSULTANT**."

RECITALS

- (a) The **OWNER** desires the performance, provision, and accomplishment tasks 1 and 2 of the work, services and materials described and set forth in Exhibit A.
- (b) **CONSULTANT** represents that it is ready, able and qualified to perform, and will perform, in all respects, all of the work, services, and materials, and to otherwise perform all of the terms, covenants, conditions and provisions of the agreement in the manner, at the times, and for the consideration hereafter provided.

NOW, THEREFORE, for and in consideration of the terms, covenants, conditions, and provisions contained herein, and/or attached and incorporated herein and made a part hereof, the parties hereto agree as follows:

1. **Agreement to Perform.** The **OWNER** hereby agrees to engage the **CONSULTANT**, and the **CONSULTANT** hereby agrees to perform, complete, provide and furnish, in a timely and proper manner, and pursuant to and in accordance with all of the terms, covenants, conditions and provisions of this Agreement, all of the work, services, labor and materials required to accomplish all of the work for tasks 1 and 2 described in Exhibit A.

2. **Scope of Professional Services.** The **CONSULTANT** shall perform, supply, and provide all of the work, services and materials [hereinafter collectively referred to as "professional services"] as follows:

As set forth and described as tasks 1 and 2 in Exhibit A, attached hereto and incorporated herein by this reference

3. **Time for Commencement and for Completion of Professional Services.**

- (a) **Commencement.** CONSULTANT shall commence the professional services called for in this Agreement upon the giving of a Notice to Proceed by the OWNER, or as otherwise indicated by OWNER.
- (b) **Completion.** Upon giving of Notice to Proceed, the professional services called for in this Agreement shall be performed and completed as mutually agreed upon by the OWNER and CONSULTANT.

4. **Compensation and Payment.** For and in consideration of the timely and proper performance of work authorized as provided herein, the OWNER shall pay the CONSULTANT as set forth for tasks 1 and 2 described in Exhibit A hereto.

5. **No Additional Work.** No claim for additional work, services or materials, not specifically and expressly requested and authorized as provided for in this Agreement, or by a written amendment thereto signed by both parties, done or furnished by the CONSULTANT, will be allowed or paid by the OWNER and CONSULTANT expressly waives any claim therefore.

6. **OWNER'S Contracting Officer.** For purposes of this Agreement, the OWNER'S contracting officer shall be Steve Corporon, Director of Port and Harbors, or such other person as is designated in writing by such person.

7. **Compliance with Guidelines and Procedures.** The CONSULTANT shall provide and perform all work, services and materials in full compliance with all the following procedures and guidelines: International Building Code 2012 edition, International Fire Code 2012 edition, AASHTO Standard Specifications for Highway Bridges, latest edition, and the National Electric Code 2011 edition.

8. **CONSULTANT Qualified.** The CONSULTANT expressly represents and warrants it is now and shall continue to be at all times during the performance of this Agreement, the holder of all required or necessary professional, business or other licenses or permits and is qualified and capable of performing all of the work covered or called for by this Agreement and is presently ready, able and willing to undertake and perform all of such work and services, and to supply all necessary materials and equipment, at the times, and in a non-negligent professional and workmanlike manner, and pursuant to the terms, conditions and provisions, and for the compensation and payments as herein provided.

9. **CONSULTANT Responsible for Personnel.** The CONSULTANT has or will secure, at CONSULTANT'S own cost and expense, all personnel required to perform this Agreement in a timely and proper manner. The parties hereto agree and understand that such personnel shall in no event be deemed to be, and are not, employees, agents, or representatives of the OWNER and such persons shall have no contractual or other relationship with the OWNER, and the OWNER shall have no responsibility or liability whatsoever to any of said persons, or for the acts or omissions of any of such persons.

10. **Supervision.** CONSULTANT agrees that all work and services required or provided under this Agreement shall be performed by the CONSULTANT, unless otherwise

authorized in writing by the OWNER'S contracting officer, and in such event all personnel engaged in any such work shall be fully qualified, and shall be licensed and authorized under applicable State, federal and local laws to perform such services.

11. **Independent Contractor.** The parties hereto expressly agree that the CONSULTANT shall be and is an independent contractor and is not an employee or agent of the OWNER, and is, therefore, entitled to no insurance coverage, whether worker's compensation or otherwise, and no other benefits accorded to OWNER'S employees. No withholding, FICA, or other taxes (whether income, sales or otherwise) or other amounts will be withheld from the payments due to the CONSULTANT, it being understood that the CONSULTANT is solely responsible therefore, provided OWNER shall be entitled to withhold such retainage or other amounts from any progress or other payments as have been provided for elsewhere in this Agreement.

12. **Forms To Be Provided To CONSULTANT.** The OWNER shall provide the CONSULTANT with any special forms required by the OWNER for reporting to the OWNER and the necessary instruction regarding proper use of the forms.

13. **Termination.**

(a) The obligation to continue performance under this Agreement may be terminated for cause:

(1) By either party upon 30 days' written notice in the event of substantial failure by the other party to perform in accordance with the Agreement's terms through no fault of the terminating party. Failure to pay CONSULTANT for its services is a substantial failure to perform and a basis for termination. Notwithstanding the foregoing, this Agreement will not terminate as a result of a substantial failure if the party receiving such notice begins, within seven days of receipt of such notice, to correct its substantial failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of notice; provided, however, that if and to the extent such substantial failure cannot be reasonably cured within such 30 day period, and if such party has diligently attempted to cure the same and thereafter continues diligently to cure the same, then the cure period provided for herein shall extend up to, but in no case more than, 60 days after the date of receipt of the notice.

(2) By CONSULTANT upon seven days written notice if OWNER demands that CONSULTANT furnish or perform services contrary to CONSULTANT's responsibilities as a licensed civil engineer, or if the CONSULTANT's services for the professional services are delayed for more than 90 days for reasons beyond CONSULTANT's control. CONSULTANT shall have no

liability to **OWNER** on account of a termination by **CONSULTANT** under this paragraph.

(b) For convenience, by **OWNER** effective upon **OWNER** providing notice to **CONSULTANT** as provided in Paragraph 25. Upon receipt of notice of a termination for convenience, **CONSULTANT** shall promptly discontinue all services (unless the notice directs otherwise), and deliver or otherwise make available to the **OWNER** all data, drawings, notes, specifications, reports, estimates, summaries, work in progress, and any and all other information and/or materials as may have been accumulated by the **CONSULTANT** in performing this Agreement, whether completed or in process, and free and clear of any mechanics or other liens or claims in favor of **CONSULTANT** or any other person.

(c) The terminating party under Paragraph 13(a) may set the effective date of termination at a time up to 30 days later than otherwise provided to allow **CONSULTANT** to complete tasks whose value would otherwise be lost, to prepare notes as to the status of completed and uncompleted tasks, and to assemble materials in orderly files.

(d) In the event of any termination under Paragraph 13(b) **CONSULTANT** will be entitled to invoice **OWNER** and to receive full payment for all services performed or furnished in accordance with this Agreement and all reimbursable expenses incurred through the effective date of termination.

14. **Changes or Modifications.** Any change in any regulations or requirements applicable to the work called for herein, made, caused or imposed by, or as a result of, the action of any State, federal or other governmental agency that has or will provide all or any portion of any funds for payment for the work or project which is the subject of this Agreement shall automatically become a part of and amendment to this Agreement and the **CONSULTANT** shall comply therewith and shall be given additional appropriate compensation for making changes to drawings and specifications that are needed, provided however, in the event, and at such time as **CONSULTANT** becomes aware of any change in any laws, rules, regulations, standards or other requirements that are applicable to the work, **CONSULTANT** shall promptly notify **OWNER** thereof, and in the event **CONSULTANT** intends to request any additional compensation by reason thereof, **CONSULTANT** shall, not later than ten (10) days after becoming aware of such change give the **OWNER** written notice of such intent to claim additional compensation and set for the amount of such compensation, or the method of computing such additional compensation. In the event a request for additional compensation is made as provided herein, **OWNER** and **CONSULTANT** shall meet and confer in order to negotiate additional compensation as mutually agreed upon. Failure of **CONSULTANT** to provide notice as required herein shall constitute waiver of any claim for additional compensation for extra work performed in complying with new or changed laws, rules, regulation, standards, or requirements which become applicable to the project after the date of this Contract.

15. **Conflict of Interest.** The CONSULTANT covenants, warrants and represents that the CONSULTANT has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner with the subject matter or the performance of this Agreement. The CONSULTANT further covenants, warrants and represents that in the performance of this Agreement, no person having any such interest shall be employed.

16. **Information Confidential.** All information, and work products relating to or generated pursuant to this Agreement shall be kept confidential and shall not be disclosed, discussed or made available to any other person or organization by the CONSULTANT, its employees or representatives, unless required for the performance and completion of the work called for under this Agreement, without the prior written approval of the OWNER and the further consent of any other agency as may be required by the OWNER; provided, however, the OWNER shall have the right to audit, inspect and otherwise obtain any information as provided in Section 17, or regarding performance of this Agreement by the CONSULTANT.

17. **Reporting and Records.**

- (a) At any time during normal business hours, and upon five days notice, and as often as the OWNER or any agency providing any portion of the funds provided to the OWNER for this project deems necessary, there shall be made available to the OWNER or to such other funding agency and/or their representatives, at a location within the City of Ketchikan, or other location acceptable to the OWNER, any and all books, records and documents regarding matters covered or related to this Agreement or the performance of, or payment for, the work called for herein, and the OWNER and/or such agencies shall be entitled to make audits and copies of all books, records, contracts, invoices, receipts, payrolls, records of personnel, and other documents or data relating to any and all matters covered by this Agreement or performance or payment for the work called for herein.
- (b) The performance and administration of this program and this Agreement will be monitored by the OWNER and such other agencies as may be required or authorized pursuant to the terms of any grant to the OWNER. Necessary reports, in proper form, will be required as a prerequisite to any payment to the CONSULTANT.
- (c) All project records shall be maintained by the CONSULTANT for not less than three (3) years after completion and final acceptance of all work by the OWNER and shall be subject to inspection and copying by the OWNER or any funding agency during said period.

18. **Indemnification and Mutual Waiver.**

(a) **Indemnification by CONSULTANT.** The OWNER, its officers, employees and agents shall not be held liable for any claims, liabilities, penalties, fines or for damage to any goods, properties or effects of any person whatsoever, nor for any personal injury or death, caused by or resulting from any negligent act or omission of CONSULTANT, or by any of CONSULTANT 'S officers, employees, agents, representatives, contractors, or subcontractors in the performance or nonperformance of this Agreement, and CONSULTANT further agrees to appear and defend, and to indemnify and save free and harmless to the extent of the CONSULTANT's negligence, the OWNER and its officers, employees and agents from and against any of the foregoing claims, liabilities, penalties, fines or damages, and for any cost and expense, including reasonable attorney's fees, incurred by the OWNER, its officers, employees or agents on account of any claim therefore, including claims by reasons of any defects in any plans, drawings, specifications, computer programs, technical reports, or other work product of CONSULTANT prepared for or submitted to the OWNER pursuant to this Agreement provided said claim is not based upon a use of said plans, drawings, specifications or other work product for other than the purposes for which such data was prepared and submitted to the OWNER. Notwithstanding any other provision herein contained the parties hereto agree that liability (including costs of defense and attorney's fees) for claims arising from the concurrent negligence of both parties to this Agreement shall be apportioned according to the respective percentage of fault attributable to each party as determined by agreement or by the trier of fact.

(b) **Indemnification by OWNER.** OWNER shall indemnify and hold harmless CONSULTANT and its officers, directors, members, partners, agents, and employees as required by law. In addition, to the fullest extent permitted by law, OWNER shall indemnify and hold harmless CONSULTANT and its officers, directors, members, partners, agents, and employees from reasonable claims, costs, losses, and damages arising out of or relating to the professional services, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property, including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of OWNER or OWNER's officers, directors, members, partners, agents, consultants, employees, or others retained by or under contract to the OWNER with respect to this Agreement.

(c) **Environmental Indemnification.** To the fullest extent permitted by law, OWNER shall indemnify and hold harmless CONSULTANT and its officers, directors, members, partners, agents, and employees from and against any and all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys and other

professionals, and all court, arbitration, or other dispute resolution costs) caused by, arising out of, relating to, or resulting from environmental issues related to the professional services, provided that (1) any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property, including the loss of use resulting therefrom, and (2) nothing in this paragraph shall obligate OWNER to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence or willful misconduct.

(d) **Percentage Share of Negligence.** To the fullest extent permitted by law, a party's total liability to the other party and anyone claiming by, through, or under the other party for any cost, loss, or damages caused in part by the negligence of the party and in part by the negligence of the other party or any other negligent entity or individual, shall not exceed the percentage share that the party's negligence bears to the total negligence of Owner, Engineer, and all other negligent entities and individuals.

(e) **Mutual Waiver.** To the fullest extent permitted by law, OWNER and CONSULTANT waive against each other, and the other's employees, officers, directors, members, agents, insurers, partners, and consultants, any and all claims for or entitlement to special, incidental, indirect, or consequential damages arising out of, resulting from, or in any way related to this Agreement.

19. **Insurance.**

(a) **Public Liability Insurance.** CONSULTANT agrees to keep and maintain in full force at CONSULTANT'S own expense during the entire period of the project or work called for herein, broad form comprehensive public liability insurance with limits of not less than One Million Dollars (\$1,000,000) combined single limit insuring CONSULTANT, and the OWNER as an additional named insured, from any and all claims for bodily injury and death, and for property damage, that may arise out of, or in relation to, this Agreement. Such insurance shall require the insurance company give not less than thirty (30) days prior written notice to OWNER prior to any cancellation, non-renewal or reduction in the amount of coverage of such insurance coverage.

(b) CONSULTANT shall in addition to (a) above, keep and maintain a professional liability insurance policy with limits of not less than \$1,000,000 insuring CONSULTANT. Such insurance shall require the insurance company give not less than thirty (30) days prior written notice to OWNER prior to any cancellation, non-renewal or reduction in the amount of coverage of such insurance coverage.

- (c) Each policy, or a certificate of the policy, together with evidence of payment of premiums, shall be deposited with the OWNER prior to execution of this Agreement.

20. **Ownership of and Access to Drawings and Contract Documents.** All original documents, including but not limited to, tracings, plans, specifications, maps, basic work notes, sketches, charts, computations, photographs and original negatives thereof, and all other data prepared, obtained or received by CONSULTANT, its employees, agents, or representatives, under the terms of, or in the performance of this Agreement, shall be and become the sole and exclusive property of the OWNER, and shall upon request be delivered to the OWNER at no cost and without restriction or limitation on their use; and provided further, the OWNER shall be entitled to withhold payment of any amounts otherwise due CONSULTANT unless and until all of said documents and writings are delivered to OWNER free and clear of any liens or claims of CONSULTANT or any third parties relating thereto. The OWNER agrees not to reuse the drawings and/or contract documents prepared by CONSULTANT under this contract without the prior written consent of CONSULTANT. Any reuse of the drawings and contract documents by the OWNER shall be at the sole expense and liability of the OWNER. The CONSULTANT may retain copies of these documents and reuse them at its sole expense and liability.

21. **Independent Consultant; No Authority to Bind OWNER.** The parties hereto agree that CONSULTANT is an independent CONSULTANT and is not, and shall not be construed to be a partner, joint venturer, employee or agent of the OWNER and shall not, and is not authorized to, enter into or make any contracts, agreements, or enter into any other understanding with any other person, corporation, partnership, joint venturer, or other entity, in the name of or for the benefit of the OWNER.

22. **No Third Party Beneficiaries.** Nothing in this Agreement shall be construed to give any person other than the OWNER and the CONSULTANT any legal or equitable right, remedy or claim under this Agreement, but it shall be held to be for the sole and exclusive benefit of the OWNER and the CONSULTANT.

23. **Payment of Taxes.** The CONSULTANT shall timely pay all federal, State, and local sales, excise or other taxes or assessments incurred by the CONSULTANT.

24. **Assignment and Subletting Prohibited.** The CONSULTANT shall not assign, transfer, convey, pledge, hypothecate, sublet, subcontract, or otherwise dispose of or encumber this Agreement, or the rights thereunder, nor shall the CONSULTANT delegate any of his/her/its duties hereunder without the prior written consent of the OWNER. Any such attempted assignment, transfer, conveyance, pledge, hypothecation, subletting, or other disposition, or the attempted assignment, disposition or delegation of duties or rights shall be null and void and of no force or effect and shall be grounds and cause for immediate termination of this Agreement without liability by and at the option of the OWNER.

25. **Notice.** Any notice, demand, request, consent, approval, or other communication that either party desires or is required to give to the other party or any other person shall be in

writing and either served personally or sent by prepaid, first-class mail at the address set forth below. Either party may change its address by notifying the other party of its change of address in writing. Notice shall be deemed to have been duly made and given when delivered if served personally, or upon the expiration of twenty-four (24) hours after the time of mailing if mailed as provided in this section.

OWNER: CITY OF KETCHIKAN
334 Front Street
Ketchikan, Alaska 99901
Attention: Karl R. Amylon, City Manager

CONSULTANT: PND Engineers, Inc.
1736 Fourth Avenue S, Suite A
Seattle, Washington
Attention: Todd Belsick, PE

26. **Equal Employment Opportunity.**

- (a) The **CONSULTANT** shall not discriminate against any employee or applicant for employment because of race, color, religion, national origin, ancestry, age, or sex. The **CONSULTANT** will take affirmative action to insure that applicants are employed and that employees are treated during employment without regard to their race, color, religion, national origin, ancestry, age or sex. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination, rates of pay or other forms of compensation; and selection for training, including apprenticeship. The **CONSULTANT** agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
- (b) The **CONSULTANT** shall state in all solicitations or advertisements for employees to work on contract jobs to be let in the performance of this Agreement, that all qualified applicants will receive consideration for employment without regard to race, color, religion, national origin, ancestry, age, or sex.
- (c) The **CONSULTANT** agrees to fully cooperate with the office or agency of the State of Alaska, which seeks to deal with the problem of unlawful or invidious discrimination, and with all other State efforts to guarantee fair employment practices under this Agreement, and said **CONSULTANT** will comply promptly with all requests and directions from the State Commission of Human Rights or any of its officers or against relating to prevention of discriminatory employment practice.

- (d) Full cooperation as expressed in the foregoing clause © shall include, but not be limited to, being a witness in any proceeding involving questions of unlawful or invidious discrimination if such is deemed necessary by any official or agency of the State of Alaska, permitting employees of said **CONSULTANT** to be witnesses or complainants in any proceeding involving questions of unlawful or invidious discrimination, if such is deemed necessary by any official or agency of the State of Alaska, or the **OWNER**, participating in meetings, submitting periodic reports on the equal employment aspects of present and future employment, assisting in inspection of relevant facilities, and promptly complying with all State directives deemed essential by any office or agency of the State of Alaska, or the **OWNER**, to insure compliance with all Federal and State laws, regulations, and policies pertaining to the prevention of discriminatory employment practices.
- (e) Failure to perform any of the above agreements pertaining to equal employment opportunities shall be deemed a material breach of the contract and sufficient grounds for termination of this Agreement for cause without liability.

27. **Worker's Compensation Coverage.** The **CONSULTANT**, if subject to the provisions of the Alaska Worker's Compensation Act (AS 23.30), shall, upon request, provide the **OWNER** and the State of Alaska with proof, furnished by the insurance carrier, of current coverage by worker's compensation with an insurance company or association authorized to transact such business in the State of Alaska, or an approved current certificate of self-insurance by the Alaska Worker's Compensation Board. The **CONSULTANT** further acknowledges and agrees that in the event it fails to maintain proper Worker's Compensation coverage, the State will implement the provisions of AS 23.30.045© and the **OWNER**, at its option, may terminate this Agreement for cause without liability.

28. **Pay Requests, Statement Concerning Claims and Final Release.**

- (a) All pay requests, whether for a progress payment or final payment, shall be made upon the form attached hereto as Exhibit B.
- (b) Upon satisfactory completion of all of the work to be performed hereunder, and prior to final payment under this Agreement for such work, or prior to payment of any amounts upon termination of the agreement, and as a condition precedent thereto, the **CONSULTANT** shall execute and deliver to the **OWNER** a release of all claims against the **OWNER** arising under or by virtue of this Agreement on the form attached hereto as Exhibit D.

29. **Miscellaneous.**

- (a) **Relationship of the Parties.** Nothing herein contained shall be deemed or construed by the parties hereto, nor by any third party, as creating the relationship of principal and agent or of partnership or of joint venture between the parties hereto, it being understood and agreed that neither method of computation of payment nor any other provision contained herein, nor any acts of the parties hereto, shall be deemed to create any relationship between the parties hereto other than the relationship of OWNER and an independent contractor.
- (b) **Terminology.** Whenever herein the singular number is used, the same shall include the plural, and the masculine gender shall include the feminine and neuter genders.
- (c) **Non-waiver.** No delay or omission of the right to exercise any power by either party shall impair any such right or power, or be construed as a waiver of any default or as acquiescence therein. One or more waivers of any covenant, term or condition of this Agreement by either party shall not be construed by the other party as a waiver of a subsequent breach of the same covenant, term or condition. The consent or approval by either party to any act by the other party of a nature requiring consent or approval shall not be deemed to waive or render unnecessary consent to or approval of any subsequent similar act.
- (d) **Law Applicable.** The laws of the State of Alaska shall govern the construction, validity, performance and enforcement of this Agreement. Venue as to any action, claim, or proceeding arising out of, or based upon this Agreement, including, but not limited to, any action for declaratory or injunctive relief, shall be the appropriate Court sitting in the City of Ketchikan, First Judicial District, Alaska.
- (e) **Paragraph Headings.** The headings of the several sections and subsections contained herein are for convenience only and do not define, limit or construe the contents of such sections and subsections.
- (f) **Successors and Assigns.** Except as otherwise provided herein, the covenants, agreements and obligations herein contained shall extend to bind and inure to the benefit not only of the parties hereto but their respective personal representatives, heirs, successors and assigns.
- (g) **Compliance with Laws and Regulations.** CONSULTANT shall, at CONSULTANT'S sole cost and expense, comply with all of the requirements of all local, State, or Federal laws, ordinances, or regulations now in force, or which may hereafter be in force, pertaining to this Agreement, or the project or work to be performed, and shall faithfully observe in the performance of this Agreement, all local, State, and Federal laws, ordinances and regulations now in force or which may hereafter be in force.

- (h) **Terms Construed as Covenants and Conditions.** Every term and each provision of this Agreement performable by CONSULTANT and OWNER shall be construed to be both a covenant and a condition.
- (i) **Time of the Essence.** Time is of the essence of each term, condition, covenant and provision of this Agreement.
- (j) **Entire Agreement.** This Agreement and any schedules, appendices or exhibits attached hereto sets forth all the covenants, promises, agreements, conditions and understandings between the parties hereto, and there are no covenants, promises, agreements, conditions or understandings, either oral or written, between them other than as herein set forth. Except as herein otherwise expressly provided, no contemporaneous or subsequent agreement, understanding, alteration, amendment, change or addition to this Agreement, or any schedule, appendix, exhibit or attachment thereto shall be binding upon the parties hereto unless reduced to writing and signed by both parties. This Agreement constitutes a final, complete, and exclusive statement of the agreement between the parties.
- (k) **Severability.** In the event any provision of this Agreement is adjudicated or held to be invalid or unenforceable, the remaining provisions shall remain in full force and effect.
- (l) **Corporate Authority.** If CONSULTANT is a corporation CONSULTANT shall deliver to the OWNER at the time of execution of this Agreement a certified copy of a resolution of its board of directors authorizing the execution of this Agreement and naming the officers that are authorized to execute this Agreement on behalf of the corporation.
- (m) **Construction Means, Methods, and Safety.** Notwithstanding anything in this Agreement, CONSULTANT shall not have control or charge of and shall not be responsible for construction means, methods, techniques, sequences or procedures, or for safety measures, precautions and programs including enforcement of Federal and State safety requirements, in connection with construction work performed by Client's construction contractors.

30. **Additional Terms and Conditions.** This Agreement is subject to each of the additional terms, covenants, conditions and provisions attached hereto in Exhibits A, B and C, which are hereby expressly referred to and incorporated herein as though set forth in full.

31. **Maximum Amount of Contract.** CONSULTANT acknowledges and agrees OWNER'S funding is of a limited nature and source and OWNER shall in no event be liable for payment of any amounts under this Agreement, or otherwise, in excess of the total amount of One Hundred Sixty Three Thousand dollars (\$163,000.00), and at such times as the total amount

paid or due, or claimed by **CONSULTANT**, reaches a total of One Hundred Sixty Three Thousand dollars (\$163,000.00), **CONSULTANT** shall forthwith notify **OWNER** thereof. It shall be the **CONSULTANT'S** obligation to notify **OWNER** and to assure no work in excess of said total sum of One Hundred Sixty Three Thousand dollars (\$163,000.00), is done and any work done in excess thereof shall not entitle **CONSULTANT** to any payment and **CONSULTANT** expressly waives any claim therefore, unless such additional work was separately authorized in writing as a written change order or amendment to this Agreement prior to commencement and performance of any such additional work.

WHEREFORE the parties have entered into this Agreement the date and year first above written at the City of Ketchikan, Alaska.

OWNER:
CITY OF KETCHIKAN, ALASKA

By: _____
Karl R. Amylon, City Manager

ATTEST:

Kim Stanker, City Clerk

CONSULTANT:
PND Engineers, Inc.
1736 Fourth Ave S, Suite A
Seattle, WA 98134

(Corporate Seal)

By: _____
(signature of authorized officer)

(title of person signing)

CITY ACKNOWLEDGMENT

STATE OF ALASKA)

) ss.

FIRST JUDICIAL DISTRICT)

THIS IS TO CERTIFY that on this _____ day of _____, 2020, before me, the undersigned, a notary public in and for the State of Alaska, duly commissioned and sworn, personally appeared **KARL R. AMYLON** and **KIM STANKER**, to me known to be the **CITY MANAGER** and the **CITY CLERK** of the **CITY OF KETCHIKAN**, a municipal corporation, the corporation which executed the above and foregoing instrument; who on oath stated that they were duly authorized to execute said instrument and affix the corporate seal thereto on behalf of said corporation; who acknowledged to me that they signed and sealed the same freely and voluntarily on behalf of said corporation for the uses and purposes therein mentioned.

WITNESS my hand and official seal the day and year in the certificate first above written.

NOTARY PUBLIC FOR ALASKA
My Commission Expires: _____

(Seal)

CORPORATE CERTIFICATE

I, _____, certify that I am the Secretary of the Corporation named as Consultant in the foregoing instrument; that _____, who signed said instrument on behalf of the Consultant, was then _____ of said Corporation; that said instrument was duly signed for and in behalf of said Corporation by authority of its governing body and is within the scope of its corporate powers.

(Corporate Seal)

CORPORATE ACKNOWLEDGMENT

STATE OF ALASKA)) ss.
FIRST JUDICIAL DISTRICT)

THIS IS TO CERTIFY that on this ____ day of _____, 2020, before me, the undersigned, a Notary Public in and for the State of Alaska, duly commissioned and sworn, personally appeared _____ known to be the Secretary of _____, the corporation which executed the above and foregoing instrument, and who on oath stated he/she was duly authorized to execute said instrument and affix the corporate seal thereto on behalf of said corporation, and that the seal affixed thereto is the corporate seal thereof, and acknowledged that he/she signed the same freely and voluntarily on behalf of said corporation for the purposes therein mentioned.

WITNESS my hand and official seal the day and year in this certificate above written.

NOTARY PUBLIC FOR ALASKA
My Commission Expires: _____



February 21, 2020

PND 20S-403

Mr. Steve Corporon
 City of Ketchikan
 Port and Harbors Director
 334 Front Street
 Ketchikan, AK 99901

Re: KTN Berth III New Mooring Dolphin and Bollards – Scope of Work and Fees

Dear Mr. Corporon:

PND is pleased to provide the City of Ketchikan this scope of work and fee proposal to provide engineering, permitting and construction administration services for a new mooring dolphin at the north end of the existing Berth III in Ketchikan. In addition, two new double bit bollards at the Berth III Concrete Dock will be included in this work.

It is understood that the City would like to prepare Berth III for the larger class cruise ship vessels (NCL Bliss/Joy) that are current calling to Ketchikan. To support this planning, PND previously prepared two memorandums for the City. The first was PND's Ketchikan Berth III – Mooring and Berthing Analysis for NCL Bliss memorandum dated 6/8/18 and the second a follow up memorandum Ketchikan Berth III – New Dolphin and Bollards for NCL Bliss Class dated 9/16/19. The latter memo provided a rough order magnitude construction cost estimate to implement the recommendations from the first memo.

The scope of work and fees for this work will be broken into multiple tasks as described below.

1. Scope of Work

Task 1: Permitting

A number of environmental permitting services may be required to obtain all local, state and federal authorizations necessary to construct this project, such as:

- United States Army Corps of Engineers (USACE) Individual Permit Application, including:
 - Purpose and Need Statement
 - Detailed Project Description
 - Mitigation Statement
 - Practicable Alternatives Analyses
 - Essential Fish Habitat Assessment
 - Biological Assessment for Formal Endangered Species Act Consultation
 - ADEC Antidegradation analysis for Water Quality Assurance Certificate
 - National Marine Fisheries Service (NMFS) Incidental Harassment Authorization (IHA), including:
 - Marine Mammal Monitoring Plan for Construction
- In order for the US Army Corps of Engineers' (USACE) to complete a formal consultation with NMFS under the Endangered Species Act (ESA) a Biological Assessment (BA) will be required. While USACE is not required to consult with NMFS under the MMPA, all marine mammals are protected under the MMPA and during the Incidental Harassment Authorization (IHA) process these species must either be included for take during

construction or the applicant must demonstrate how they will shut down in the event these species are within the applicable harassment zones. The BA will be prepared to address the USACE Section 7 ESA consultation with the local division of NMFS and will address the impacts of the project in terms of effects to endangered species and critical habitat against the environmental baseline. The USACE may request additional studies including an Essential Fish Habitat Analysis and an Alternatives Analysis, however due to the lack of in-water fill associated with the project these are not anticipated. Should the design be altered to include in-water fill it is anticipated these studies will be required. Compensatory mitigation is not anticipated due to the lack of in-water fill, however, may be required if the USACE determines it is warranted.

- The IHA application will address all marine mammal species in the area covered under the MMPA including humpback whales, Steller sea lions, harbor seals, Dall's porpoise, harbor porpoise, killer whales, minke whales, gray whales and the Pacific white-sided dolphin. In order to minimize costs, PND is proposing to prepare the application based on existing marine mammal data, from the City of Ketchikan's Rock Pinnacle project and other sources, in lieu of pre-application marine mammal surveys to form the basis of takes. However, should NMFS request additional field monitoring surveys during their review process, we will prepare an additional proposal.
- In addition to the IHA application, PND is proposing to prepare the accompanying Marine Mammal Monitoring Plan (MMMP) which details the applicable monitoring and shutdown zones, monitoring and reporting procedures and monitoring locations as required by NMFS. Prior to NMFS publishing the IHA in the Federal Register for a comment period, it is typical for NMFS to have questions and/or require revisions to the application. PND will address all comments and any applicable revisions as soon as practicable, however response time varies dependent on the nature of agency requests. PND will be available to help answer questions about the permitting process and to help address agency questions and comments throughout the environmental review process.

Task 2: Schematic Design

PND anticipates the following services will be provided under this task:

- During the **Schematic Design** phase, the design team will provide those services necessary to prepare Schematic design documents consisting of drawings and other documents illustrating the general scope, scale, and relationship of project components for approval by project stakeholders. Design will be conceptual in character, based on the requirements developed during the previous design program requirements, predesign phase and anticipated criteria to be approved by the permitting agencies. Design drawings will be prepared to an approximate 30% level of completion.

Task 3: Design Development, Construction Documents and Bidding

- The basic objectives of the **Design Development** phase are to prepare sufficient plans, details, material and installation specifications, to understand the character, quality, content, and cost of the intended scope of the project. This is where the information in the Schematic Design is further expanded, refined, and modified as required to meet desired design criteria. This will require regular input and coordination between the design team and stakeholders to completely satisfy the specific needs and objectives for the project. Design drawings and specifications will be prepared to an approximate 60% level of completion.
- During the Construction Documents phase, the design team shall provide the services necessary to prepare for approval, from the approved design development documents; construction documents consisting of drawings, specifications, and other documents describing the requirements for construction of the project; and bidding and contracting for the construction of the project.
- Bidding will consist of the following tasks:
 - Assist in advertising and providing documents to post to the City's webpage
 - Attend and lead a pre-bid meeting (via phone)
 - Prepare and distribute addenda
 - Review bids and recommend award
 - Finalize and issue a conformed set of plans (and specifications if necessary) including all addenda items from bidding

Task 4: Construction Support Services:

PND anticipates the following services will be provided under this task:

- Construction contract administration and on-site construction observation tasks
- Act as the point of contact for the Contractor
- Attend and lead pre-construction conference
- Review all submittals and RFI's
- Process all pay requests, change orders, and other contractual items with oversight by the City
- Perform fabrication observations within 3 hours of Seattle, WA as necessary (9 trips assumed)
- Provide office support during construction
- Provide one full time engineer (CWI) on site for the duration of the project. (12 weeks / 72 work days assumed)
- Final review of completed assembly

2. Assumptions / Exclusions:

The following assumptions have been made in developing the scope of work for this task:

- No new geotechnical investigations / reports will be prepared for this work. It is assumed that past geotechnical information, that is available, will be adequate and subsurface conditions will be similar to adjacently constructed dolphins.
- It is estimated that site construction will take three to four months to complete.
- PND will have the BA, IHA and MMMP prepared for initial review within 60 days of receiving a formal notice to proceed, however the timeline to obtain the IHA, and subsequently USACE approval, is projected by NMFS to be 5-8 months following the submittal of the IHA application to NMFS headquarters. While NMFS published time to issue an IHA is 5-8 months, this time frame is highly dependent on NMFS review schedules beyond our control and it is common for IHA's to take up to a year to be issued after the application is received by NMFS. Excludes any permit fees.
- Excludes the fees associated with any mitigation design or implementation.
- Excludes any fees associated with marine mammal monitoring during construction
- Any additional specialized scientific studies or permit applications requested by the agencies and not been included above shall be compensated on a T&M basis. These additional studies may include, but are not limited to, an Essential Fish Habitat Analysis, Alternatives Analysis, or marine mammal data collection. Additionally, marine mammal observation services during construction are not included. We will advise you immediately if any agency requires additional study efforts beyond what we have budgeted.
- Excludes any other work item not specifically mentioned in the scope of work items listed above.

3. Compensation:

The total compensation for the work on this project will be completed for the following time and expenses (T&E) amount:

Task	Item	Subtotal
1	Permitting	\$103,000
2	Schematic Design	\$66,000
3	Design Development, Construction Documents and Bid Support	\$110,000
4	Construction Support Services	\$190,000
Total (USD)		\$ 469,000

PND understands the City of Ketchikan may elect to award each task individually as separate work orders.

4. Schedule:

<u>Item:</u>	<u>Date:</u>
Notice To Proceed	Assume on or around March 1, 2020
Permitting	Anticipate 8-12 months from NTP
Schematic Design - SD (30%)	8 week after NTP (May 1, 2020)
Design Development – DD (60%)	6 weeks after Schematic Design submittal (June 17, 2020)
Construction Documents - CD (100%)	6 week after Design Development submittal (August 1, 2020)
Bidding	4 weeks (Early September 2020)
Bid Award	2 weeks (Mid September 2020)
Fabrication / Mobilization	October 2020 – January 2021
Construction	January 2021 through April 1, 2021 (assume permits obtained)
Substantial Completion	April 1, 2021.

The above schedule is aggressive if the City would like to have the improvements in place by start of the 2021 cruise season and will depend heavily on the permitting agencies timeframes. PND makes no guarantee that permits will be obtained to meet this schedule due to the unpredictable nature of the permitting review process. In addition, if the above schedule is able to be met, the project will likely need to be bid and awarded prior to obtaining permits or an alternative contracting method employed.

If the above scenarios are not acceptable to the City, it is recommended that the project be delayed for completion prior to the start of the 2022 cruise season.

If you have any questions, please do not hesitate to ask.

Sincerely,

PND Engineers, Inc. | Seattle Office



Todd Belsick, P.E.
Vice President, Principal-in-Charge



Brian Porter, P.E.
Senior Engineer, Project Manager



**PND ENGINEERS, INC. - SEATTLE OFFICE
STANDARD RATE SCHEDULE
EFFECTIVE NOVEMBER 2019**

<u>Professional:</u>	Senior Engineer VII	\$205.00
	Senior Engineer VI	\$190.00
	Senior Engineer V	\$175.00
	Senior Engineer IV	\$165.00
	Senior Engineer III	\$150.00
	Senior Engineer II	\$140.00
	Senior Engineer I	\$130.00
	Staff Engineer V	\$115.00
	Staff Engineer IV	\$110.00
	Staff Engineer III	\$105.00
	Staff Engineer II	\$95.00
	Staff Engineer I	\$90.00
	Environmental Scientist VI	\$170.00
	Environmental Scientist V	\$155.00
	Environmental Scientist IV	\$140.00
	Environmental Scientist III	\$125.00
	Environmental Scientist II	\$110.00
	Environmental Scientist I	\$95.00
	GIS Specialist	\$95.00
<u>Surveyors:</u>	Senior Land Surveyor III	\$125.00
	Senior Land Surveyor II	\$115.00
	Senior Land Surveyor I	\$105.00
<u>Technicians:</u>	Technician VI	\$130.00
	Technician V	\$115.00
	Technician IV	\$95.00
	Technician III	\$85.00
	Technician II	\$75.00
	Technician I	\$50.00
	CAD Designer VI	\$115.00
	CAD Designer V	\$105.00
	CAD Designer IV	\$90.00
	CAD Designer III	\$75.00

CONTRACTOR'S REQUEST FOR PAYMENT

CITY OF KETCHIKAN
334 Front Street
Ketchikan, Alaska 99901

PROGRESS PAYMENT SUMMARY

Project: Design of Berth III New Mooring Dolphin & Bollards

Contract Number: No. 20-07

Contractor: PND Enginers, Inc. **Address:** 1736 Fourth Ave S, Suite A, Seattle, WA 98134

Dated: _____ **Invoice Number:** _____

Purchase Order: 2020-XXXX

For Period from: _____ **to** _____

In accordance with the attached schedule, the Contractor is entitled to payment of the amount set forth below.
The present status of the account for this Contract is as follows:

For City Use Only		
Reg. PO#	Vendor #	
Account Number	Amount	
	\$	
Petty PO#	Rec'd By	Dept. Head

Requested Payment

Original Contract sum \$ _____

Change Orders \$ _____

Total Additions \$ _____

Sub Total \$ _____

Total Deductions \$ _____

Total Contract to Date \$ _____

Total Completed to Date \$ _____

Less Previous Payments \$ _____

Balance to Complete \$ _____

Payment Request No. _____ \$ _____

To be completed by Owner:

Adjustment: _____	\$ _____
Due this Pay Request	\$ _____

Comments: _____

By: _____ Date: _____

CONTRACTOR'S Certification:

The undersigned CONTRACTOR certifies that (1) all previous progress payments received from OWNER on account of Work done under the Contract referred to above have been applied to discharge in full all obligations of CONTRACTOR incurred in connection with Work covered by prior Requests for Payment numbered 1 through _____ inclusive; and (2) title to all materials and equipment incorporated in said Work or otherwise listed in or covered by this Request for Payment will pass to OWNER at time of payment free and clear of all liens, claims, security interests and encumbrances. The undersigned CONTRACTOR further certifies, represents, and agrees that there are no claims for additional work or other claims not put in writing prior to this date.

Subscribed and Sworn to before me this _____ day
of _____, 20____.

CONTRACTOR

Notary Public for the State of _____
My Commission expires: _____

By: _____
Must be signed by Principal of Firm
Dated: _____, 20____

APPROVAL:
Dated: _____, 20____

By: _____
OWNER'S

CONSULTANT'S STATEMENT CONCERNING CLAIMS

The **CONSULTANT**, under that certain Agreement dated _____, 20____, by and between the City of Ketchikan (**OWNER**), and _____, represents and warrants that **CONSULTANT** has fully completed all services included in the Agreement and all amendments thereto, and has fully paid for all materials, service taxes and all other costs and expenses of the work and that there are no disputes, claims or liens against the City of Ketchikan, the **CONSULTANT** or any subcontractor, and that the **CONSULTANT** will have no claims against the City of Ketchikan of any kind whatsoever arising from or growing out of such Agreement except as follows:

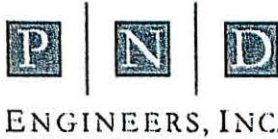
Claimant	Description of Claim	Amount
_____	_____	_____
_____	_____	_____

CONSULTANT

By: _____

Title: _____

Date: _____



MEMORANDUM

To: City of Ketchikan (Attn: Steve Corporon) Date: 9/6/19
From: Chris Fornace, PE, Brian Porter, PE, and Todd Belsick, PE Project No: 194067
Subject: Ketchikan Berth III – New Dolphin and Bollards for NCL Bliss Class

1. INTRODUCTION

In 2018, the City of Ketchikan hired PND to provide a mooring and berthing study for the NCL Bliss class vessel at Berth III (PND project number 184046, memo dated 6/8/18). Included with the study results were recommendations to add a new mooring dolphin and additional bollards to facilitate the needs of larger class vessels such as the Bliss. Following up on these recommendations, the City of Ketchikan has requested PND provide a rough order magnitude construction cost estimate for the recommended improvements.

2. ROUGH ORDER MAGNITUDE CONSTRUCTION COST ESTIMATE

This memorandum provides a Rough Order of Magnitude (ROM) Construction Cost Estimate for these improvements. The improvements include a new 250-ton mooring dolphin located approximately 130' west of the current western most dolphin and two 100-ton double bit bollards at the Berth III Concrete Dock similar to the modifications previously made to Double Bollard No. 8.

Based on our preliminary analysis, the new 250-ton mooring dolphin would require 5-piles and would be located in water depths around 130' +/- . The piles are estimated to be 48" diameter piles with rock anchors or socketed pile tips. It is assumed that the dolphin will have two 150-ton Quick Release Hooks (QRH) units. Each QRH unit would be similar to the other Dolphins at Berth III. A new 120-ft catwalk is included for access to the new dolphin from the current western most dolphin.

See table below for summary of ROM Construction Cost Estimate. Estimate does not include permitting, surveying, engineering, or other soft costs.

Table 1: ROM Construction Cost Estimate

Description	Cost
Furnish and Install Dolphin Piles	\$1,100,000
Furnish and Install Dolphin Cap w/ (2) QRH Units	\$350,000
Furnish and Install Catwalk	\$100,000
Furnish and Install (2) Double Bit Bollards	\$200,000
Electrical Work	\$25,000
Mobilization and Demobilization (20%)	\$355,000
Contingency (20%)	\$355,000
Total =	\$2,485,000



ENGINEERS, INC.

MEMORANDUM

To: City of Ketchikan (Attn: Steve Corporon)

Date: 6/8/18

From: Brian Porter, PE and Todd Belsick, PE

Project No: 184046

Subject: Ketchikan Berth III – Mooring and Berthing Analysis for NCL Bliss

1. INTRODUCTION

Beginning in 2018, the Norwegian Cruise Line (NCL) Bliss cruise ship vessel will begin servicing the Alaskan waterways. The Bliss vessel will be the largest class cruise ship vessel to visit Alaska to date. The NCL Bliss is a Breakaway Plus class vessel.

In preparation of the Bliss' arrival, Southeast Alaska Pilots' Association (SEAPA) and NCL recently completed a nine-month study and simulation evaluation of the Bliss vessel (SEAPA, 2018). The primary focus of the SEAPA study was to help prepare the Port Directors and Harbormasters in Ketchikan, Juneau, and Skagway, with a list of safe operating guidelines for the Bliss.

In response to the SEAPA study, the City of Ketchikan (City) contracted PND to provide a mooring and berthing analysis desktop study for the Bliss vessel which will be positioned at Berth III while in Ketchikan. Guidelines provided in the SEAPA study were reviewed by PND and used in developing recommendations presented in this technical memorandum.

2. BACKGROUND

Construction of Berth III in Ketchikan was completed in 2008. The new berth provided the City with the capability of berthing cruise ships up to 1,000 feet in length. Berth III utilizes a 50-foot by 300-foot steel floating dock that is moored by steel pipe pile dolphins drilled and anchored to the sea floor in water depths up to 170 feet. In addition, berth III utilizes a fixed dock structure to the south and Mooring and Breasting dolphins to the north to secure vessels. Access to the floating dock is provided by a 130-foot steel transfer bridge.

Berth III was originally designed for a vessel in a similar class to the Norwegian Jewel. The Norwegian Bliss presents a significant increase in ship length and overall displacement tonnage when compared to the original design vessel. The following table (Table 1) provides a side by side comparison of the Norwegian Bliss to the original design vessel.

Table 1: Overview comparison between Norwegian Bliss and Original Design Vessel

Vessel Characteristics:	NCL Bliss	Original Design Vessel
Displacement Tonnage:	75,350 tonnes	65,000 tonnes
Draft:	8.4 m	8.5 m
Length Overall:	333.46 m	305 m
Moulded Breadth on WL:	41.40 m	41.15 m
Side Wind Area:	13,988 m ²	12,077 m ²

3. MOORING ANALYSIS

3.1. Overview:

A preliminary layout of a preferred vessel orientation/position and tie-up configuration was developed by the City of Ketchikan and Cruise Line Agencies of Alaska (CLAA) and provided to PND for reference. The preliminary layout assumed a 'bow to the west' vessel orientation. After reviewing and analyzing the preliminary layout, PND optimized the tie-up configuration as presented in this technical memorandum. A 'bow to the west' vessel orientation was maintained for the optimized condition. PND performed a mooring analysis on the Norwegian Bliss vessel berthed at Berth III in Ketchikan.

The numerical modeling was performed using the computer program *OPTIMOOR Plus* (version 6.2.9), from Tension Technology International in accordance with industry standard methods (UFC 4-159-03, 23 June 2016, Change 2). Program inputs included:

- Non-linear mooring line and fender load-deflection characteristics
- Mooring arrangement and berth geometry
- Mean Tide conditions (+8.1-ft, MLLW)
- Dimensionless wind force and moment coefficients for the vessel (Rice, April 2010)
- Magnitude and direction of the applied wind environment (Coastal Assessment - Ketchikan Port Berth Reconfiguration, 2006)

The computer program results include:

- Static mooring line loads
- Bollard loads
- Fender Reactions
- Ship movement (surge, sway, and yaw)

3.2. Berth Data

The project site is in Ketchikan, Alaska on the east side of the Tongass Narrows. Ketchikan is located on the western coast of Revillagigedo Island, near the southernmost boundary of Alaska. Ketchikan is located approximately 680 miles north of Seattle and 235 miles south of Juneau. Ketchikan is the first Alaska port of call for northbound cruise ships and State ferries and lies at approximately 55° 20' N latitude, 131° 38' W longitude.

The cruise ship berth at Berth III is located adjacent to the Casey Moran Harbor (City Float) near Harbor View Park. Berth III consists of a multitude of in water structures including: 300-foot x 50-foot steel floating dock, three deep water mooring and/or breasting dolphins, fixed elevation pile supported dock structures, and a 130-foot steel transfer bridge. The berthing line bearing is approximately N110° 58' 14"E. Water depths along the berthing line vary between -140-feet to -80-feet (MLLW). The top of dock elevation at Berth III platform is approximately +24-feet (MLLW). The top of dolphin elevation for the mooring and berthing dolphins is approximately +30-feet (MLLW). The floating dock free board is approximately 8-feet.

Each mooring and breasting dolphin is equipped with a 150 Tonne Triple Quick Release Hook unit. Each hook has a safe working load of 150 tonnes; one line per hook. The dolphin mooring units are identified as bollards 1 thru 3; increasing west to east. On berth III platform extension, there are four original 100 ton mooring bollards and one new 50 ton bollard. Bollard units are identified as bollards 4 thru 7A; increasing west to east. On Berth II/III, bollard units include a 200 ton double bit pipe bollard (100 ton/bit), 100 ton horn bollard (50 ton/bit), and a 50 ton horn bollard (25 ton/bit). Bollard units are identified as bollards 8 thru 10 working west to east. Refer to Appendix C for plan view.

Figure 1 (below) presents area map view of the region surrounding Ketchikan. Figure 2 (below) presents an aerial photo of the project site. Appendix C presents plan view tie up configuration and additional information regarding the Berthing Data which is relevant for the OPTIMOOR analysis.

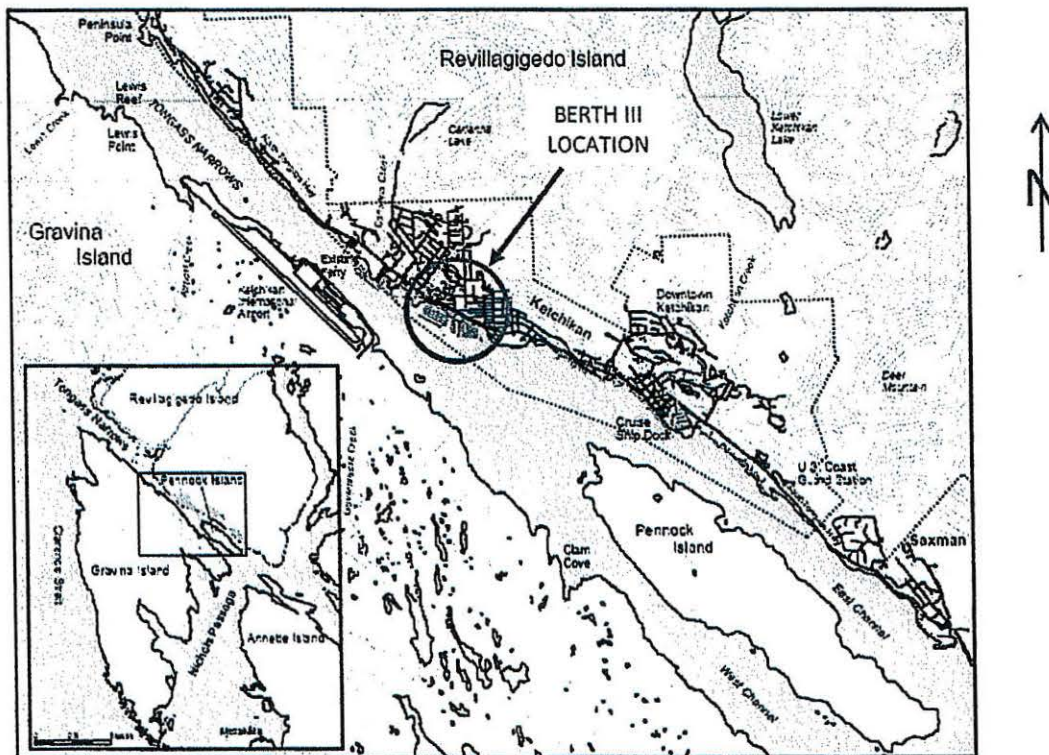


Figure 1. Ketchikan Area Map

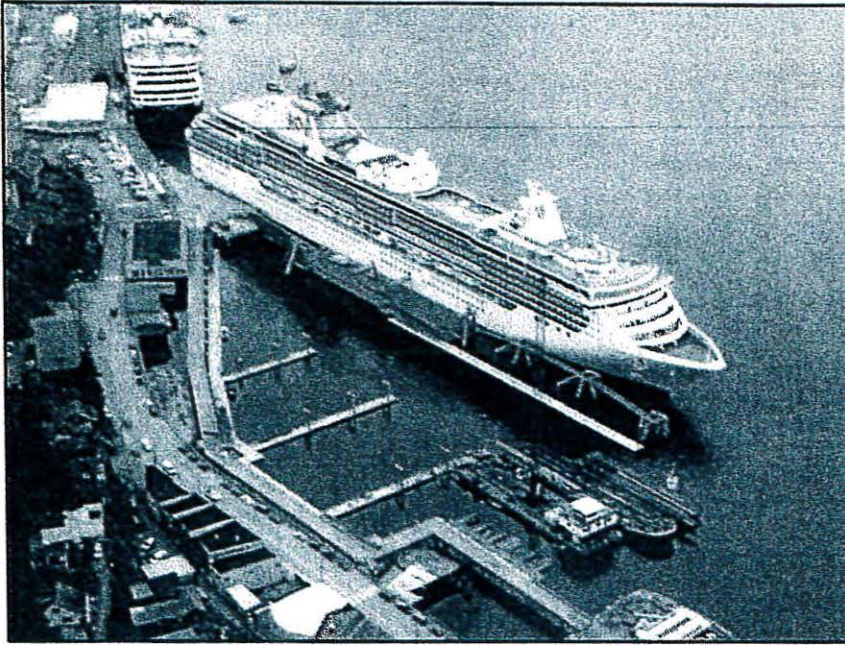


Figure 2. Ketchikan Berth III Aerial Photo

3.3. Environment

In 2006, during the design phase of Ketchikan Berth III, PND developed a coastal analysis at the project site which included recommendations on design wind speeds, wave heights and currents (Coastal Assessment - Ketchikan Port Berth Reconfiguration, 2006). The 2006 Coastal Analysis is referenced for this desktop study.

During the summer months, the prevailing wind direction occur out of the southeast approximately 50% of the time, followed by winds out of the northwest, which occur approximately 30% of the time. The maximum summer month wind speeds top out around 30 knots from the southeast and 20 knots from the northwest. Summer month winds typically fall between 0-10 knots (71%), followed by 10-20 knots (28%), and 20-30+ knots (1%).

Tidal currents generally flow parallel to the channel to the southeast on ebb and to the northwest on the flood. A current speed of 1 knot flowing in the direction of wind is recommended per the 2006 PND coastal study (Coastal Assessment - Ketchikan Port Berth Reconfiguration, 2006). By inspection, the effects of a 1 knot current in the prevailing north west or south east direction are minimal and are omitted from the results presented in this analysis.

Appendix A provides information regarding berth design elevations (i.e. water, dock), site wind rose data, and assumed wind/wave/current design values. In addition, Table 5 in Appendix A provides reference to the wind and current speeds recommended in the SEAPA study.

3.4. Vessel Data

Vessel Characteristics:

The Norwegian Bliss vessel was used in this mooring analysis study. The Bliss is part of NCL's largest class vessels (Breakaway Plus) and will be the largest cruise ship to visit Ketchikan to date. The Bliss is scheduled to arrive in Ketchikan starting in June of 2018. See Appendix B for the relevant vessel characteristics used in the OPTIMOOR analysis.

Mooring Line Characteristics:

In a mooring analysis, the outputted mooring forces are highly sensitive to the assumed mooring line properties (i.e. stiffness, lengths, etc). In working closely with the cruise line agencies and captains, PND has gathered a library of information on actual lines used for mooring multiple cruise ship vessels; including the Norwegian Bliss.

See Appendix B for more information on the OPTIMOOR program inputs assumed for the mooring analysis line properties.

3.5. Mooring Forces

A wind capability analysis at a mean tide elevation of +8.1' (MLLW) was analyzed to calculate the maximum allowable wind loads to the berth at varying wind directions. The wind capability rose considers the permissible limits for a maximum wind force to achieve 33%, 40%, and 50% line strength, Brake Slip, Bollard Strength, and target vessel movement ($\pm 3.0'$ sway and surge).

For this analysis, one line configuration was considered for the vessel in a Bow to the west orientation. This configuration models a common tie up configuration for the vessel under normal wind conditions (reference Table 2):

- Bow Side: 6 head/breast lines and 2 spring lines (6+2)
- Stern Side: 5 head/breast lines and 2 spring lines (5+2)

All dock foam filled fenders were modeled as 6x16 std grade fenders. Bollard capacities and line angle limitations were researched based on available as-built drawings information. Bollard capacities inputted for analysis represent the bollard Safe Working Limit (SWL).

Figure 3 (below) presents diagrams of the wind capability rose for the Norwegian Bliss vessel for the analyzed case. For comparison, the maximum wind speed and direction rose during the summer months in Skagway is superimposed over the diagrams. A wind probability rose can be referenced in Appendix A.

Results from the wind capability analysis are presented Table 2 (below). See Appendix D for additional information regarding OPTIMOOR mooring forces analysis and results.

Table 2: Wind Capability Analysis Results

	FOS _{min}	Maximum Wind Speed
		(Normal Winds, Bow to West, Lines: Bow 6+2, Stern 5+2)
Mooring Line Limits		
Maximum Wind in the Prevailing Direction (From SE)	> 3.0	> 40 knots
Maximum wind in all directions (wind sweep)	2.0	20 knots
Bollard Limits		
Maximum Wind in the Prevailing Direction (From SE)	> 2.0	> 40 knots
Maximum wind in all directions (wind sweep)	2.0	19 knots
Vessel Movement (max sway/surge = ± 3.0-ft)		
Maximum Wind in the Prevailing Direction (From SE)	-	> 40 knots
Maximum wind in all directions (wind sweep)	-	23 knots

Key:

FOS_{min} = Minimum Factor of Safety on SWL, SWL = Safe Working Limit

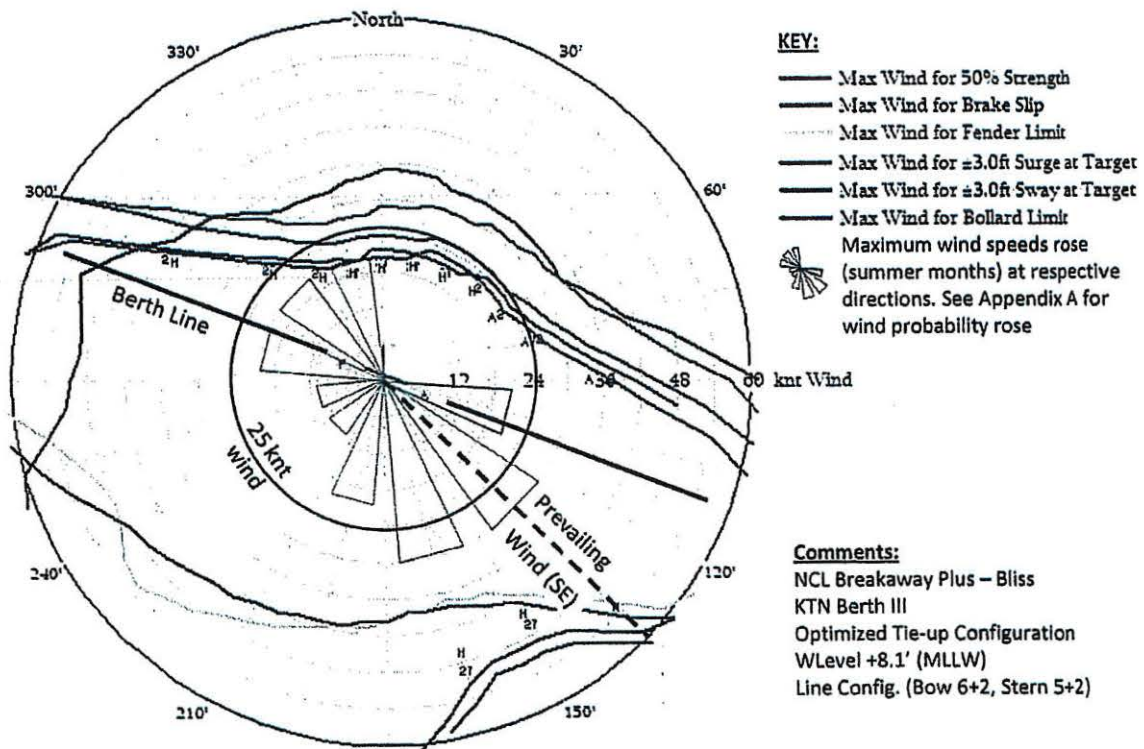


Figure 3. Wind Capability Rose for NCL Bliss at KTN Berth III with maximum wind speed rose (summer months) superimposed.

4. BERTHING ANALYSIS

4.1. Overview:

A berthing analysis was conducted on the Norwegian Bliss berthing at Berth III in Ketchikan. Berth III was originally designed for a smaller design vessel (refer to the 'BACKGROUND' section above for comparison). A berthing analysis comparison between the original design vessel and the Norwegian Bliss was considered in this study. For more information on the berth and vessel data, refer to 'MOORING ANALYSIS' in section 3 above.

4.2. Berthing Exposure:

During the summer months, vessels berthing at Berth III generally experience "Good Berthing Conditions" in a "Moderate" environment (UFC 4-152-01). A "Moderate" environment is defined as having currents more than 0.18 knots or strong winds exceeding 40 knots. While normal winds during the summer months are not anticipated to exceed 25 knots, current speeds are anticipated to be around 1 knot (Coastal Assessment - Ketchikan Port Berth Reconfiguration, 2006).

Infrastructure supporting vessels in the Norwegian Bliss class under the anticipated berthing exposure conditions are recommended to be designed for a vessel berthing speed around 0.3 ft/s. Refer to Figure 11 in Appendix D.

4.3. Characteristics of Existing Fenders:

All of the existing fenders at Berth III all utilize 6x16 standard grade foam filled fenders. During berthing, the foam filled fenders react against steel pile supported fender panels. The foam filled fenders are designed to float and are free to travel up and down on the fender panel's guide piles during tidal fluctuations.

4.4. Permissible Berthing Parameters:

The existing capacity of the Berth III fender system was reviewed during this study. Through analysis and based on manufacturer's recommendation, it was determined that the abnormal energy demand for the berth III fendering system should be limited to 300 ft-kips at 62.5% fender compression, in order to prevent permanent damage to the fendering system. A minimum factor of safety of 1.5 is applied to the normal berthing energy demand calculations.

4.5. Berthing Analysis Summary:

A maximum berthing velocity of 0.30 ft/s is recommended for the Norwegian Bliss berthing at Berth III. This represents an approximate 15% decrease in the recommended berthing speed when compared to the original design vessel (0.35 ft/s). It is important to note that the berthing speed represents the speed at which the vessel moves perpendicular to the berthing line. For this analysis it was assumed that the vessel will approach at a 10° angle and contact the fendering system at the 1/4 points along the vessels length.

The following table (Table 3) summarizes the berthing analysis inputs and results. See Appendix D for additional information regarding the berthing analysis.

Table 3: Berthing Analysis for Norwegian Bliss and Original Design Vessel

Vessel Characteristics:	NCL Bliss	Original Design Vessel
Displacement Tonnage:	75,350 tonnes	65,000 tonnes
Added Mass Coefficient, C_M : (per PIANC 2002)	1.5	1.5
Eccentricity Coefficient, C_E : (1/4 pt berthing, 10° Approach)	0.564	0.5
Berthing Configuration Coefficient, C_C : (Open Structure)	1.0	1.0
Softness Coefficient, C_S : (Soft fenders)	1.0	1.0
Permissible Approach Velocity, V_A :	1.74 ft/s	2.00 ft/s
Permissible Berthing Velocity, V :	0.30 ft/s	0.35 ft/s
Normal Berthing Energy Demand, E_N :	200 ft-kips	200 ft-kips
Abnormal Berthing Energy Demand, E_A : (FOS = 1.5)	300 ft-kips	300 ft-kips

*Maximum normal berthing velocity for the Bliss was iterated in order to not exceed the capacity of the existing fender system.

5. CONCLUSION AND RECOMMENDATIONS

A mooring and berthing analysis of the Norwegian Bliss at Ketchikan Berth III was performed. The results from the mooring and berthing analysis indicate that the Norwegian Bliss can safely be moored at Berth III provided cautionary measures are followed.

The SEAPA study provided general guidelines for the maximum design wind and current speeds at which the Bliss can safely operate at Ketchikan Berth III during docking/undocking procedures (SEAPA, 2018). The study concluded that the Bliss can safely operate at Berth III in winds up to 25 knots and currents up to 1 knot in the same direction as the wind.

Local wind data for the Summer months in Ketchikan indicate that the average number of days which winds range between 20-30 knots occurs around 1 percent of the time during the summer months. Prevailing winds from the southwest exceeding 40 knots or secondary winds blowing offshore from the northwest exceeding 20 knots should be avoided while the Bliss is moored.

At a 10-degree approach, the Bliss vessel should limit its approach velocity to 1.74 ft/s (1 knot). In addition, a 1/4-point berthing procedure should be practiced by the ship pilots.

It should be noted that this mooring analysis assumes a total of 6 lines will be tied to the triple quick release hook unit on the western most mooring dolphin (bollard 1). Tying up 6 lines

would require a minimum of two lines per hook. Manufacturer recommendations for the quick release unit recommend only one line per hook. Longshoreman and line handlers should exercise caution when tying up multiple lines per hook and provide continuous monitoring to help mitigate the potential for damage to the units.

To better suit the City of Ketchikan's needs at Berth III, PND would recommend a new 200-ton dolphin approximately 130-ft to the west of the current western most dolphin (bollard 1). In addition, an additional 200-ton double bit bollard along Berth II/III fixed dock is recommended between bollards 7A and 8. Refer to Appendix C for more information.

6. REFERENCES

(2006). *Coastal Assessment - Ketchikan Port Berth Reconfiguration*. PND Engineers, Inc.

Rice, S. D. (April 2010). Cruise Vessel Wind Coefficients for Mooring Analysis. *ASCE Ports and Harbors Conference*.

SEAPA. (2018). *Simulator-Based Evaluation and Recommended Guidelines for the VLCS Norwegian Bliss in Southeast Alaska*. SEAPA and NCL.

UFC 4-152-01. (n.d.). *UFC 4-152-01*. UFC.

UFC 4-159-03. (23 June 2016, Change 2). *Design: Moorings*.

APPENDIX A

Project Site Environmental Design Conditions

Table 4. Berth Design Elevation Parameters

Water Level	Elevation, ft (MLLW Datum)
Highest Observed (12/02/1967)	+21.3
Mean Higher High Water (MHHW)	+15.4
Mean High Water (MHW)	+14.5
Mean Sea Level (MSL)	+8.1
Mean Tide Level (MTL)	+8.1
Mean Low Water (MLW)	+1.6
Mean Lower Low Water (MLLW)	0.0
Lowest Observed (01/01/1991)	-5.2
Dock Characteristics:	
Top of Dock	+24.0
Top of Deck Dolphin	+30.0
Top of Deck Floating Pontoon	varies

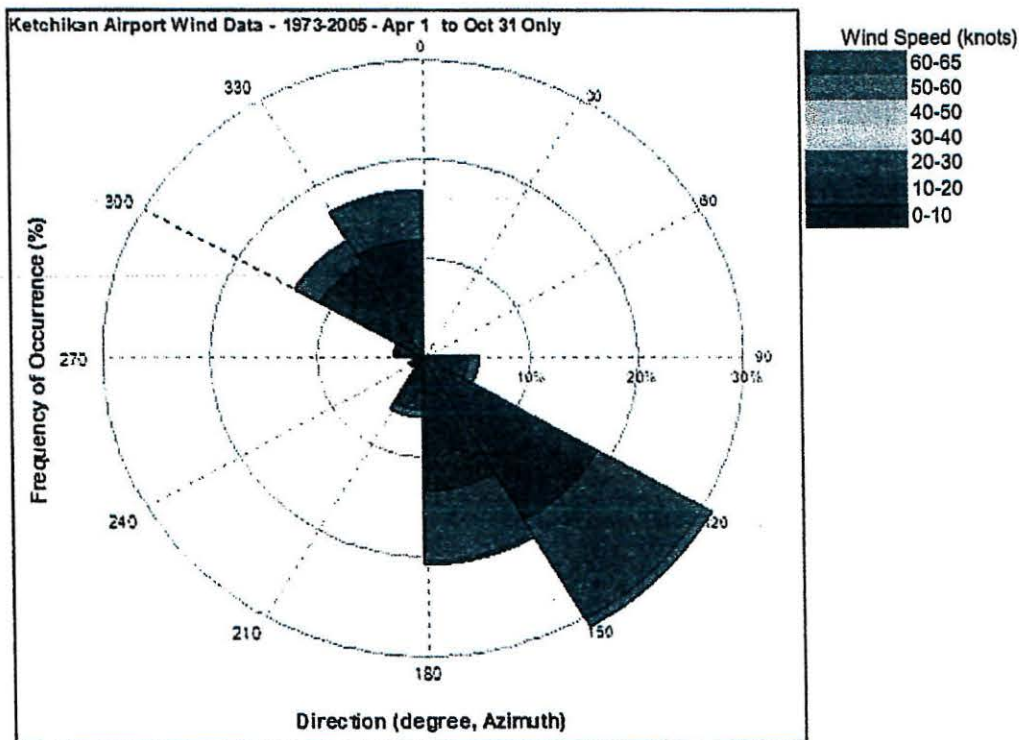


Figure 4. Wind Rose – Summer Months (April – October) – All wind speeds – Ketchikan Airport (1973 – 2005) (Coastal Assessment - Ketchikan Port Berth Reconfiguration, 2006)

APPENDIX A

Project Site Environmental Design Conditions

(con't)

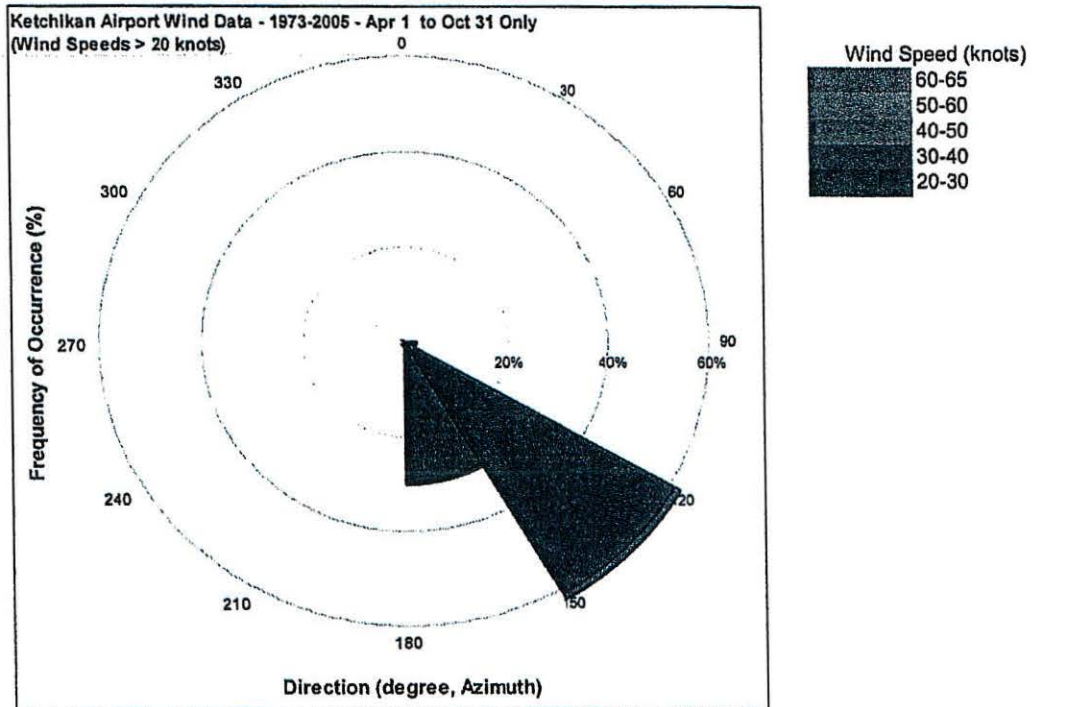


Figure 5. Wind Rose – Summer Months (April – October) – Winds exceeding 20 knots – Ketchikan Airport (1973 – 2005) (Coastal Assessment - Ketchikan Port Berth Reconfiguration, 2006)

Vessel: NCL Breakaway Plus				at Berth: KTN Berth III				Ref: KTN Berth III Bills		TOTAL FORCE (kips)	
Initial Setup:	1337	Apr 01 2017	Draft: 28.5	Trim: 0.0	WLevel: 8.1	GM:	Side of Vessel Facing Up:	Sub	Total Force on Vessel:	0.0	
Final:	1338	Oct 01 2017	Draft: 28.5	Trim: 0.0	WLevel: 8.1		Vessel Offset Beyond Berth Target:	10.0	Effective Angle to Vessel:	0°	
Elapsed:	0001	183 days	Units: ft & Kips	steady	(ft)		8 Fenders within Range		Longitudinal Component:	0.0	
Analysis for:	1337	Apr 01 2017	Draft: 28.5	Trim: 0.0	WLevel: 8.1		Lowest Bottom Clearance:	99.6	Transverse Component:	0.0	
							Present Clearance under Keel:	99.6	Total Yaw Moment / LBP:	0.0	
WIND			WAVES			SWELL			HARBOUR SEICHE/SURGE		
Mean Windspeed (knots):	0		Significant Wave Height:	0.0		Significant Swell Height:	0.0		Significant Seiche Height:	0.0	
Wind Direction (from) True:	135°		Wave Direction (from) True:	135		Swell Direction (from) True:	0°		Thrust Direction (from) True:	0°	
Angle to Berth Line X-axis:	24°		Angle to Berth Line X-axis:	24		Angle to Berth Line X-axis:	-111		Angle to Berth Line X-axis:	0°	
Wind X-Force (Longitudinal):	0.0		Average Wave Period Tz:	2.7		Average Swell Period Tz:	1.0		Harbour Seiche Period:	60	
Wind Y-Force (Transverse):	0.0		Mean Drift X-Force (Long):	0.0		Mean Drift X-Force (Long):	0.0		Drag X-Force (Long):	0.0	
Wind Yaw Moment / LBP:	0.0		Mean Drift Y-Force (Trans):	0.0		Mean Drift Y-Force (Trans):	0.0		Drag Y-Force (Trans):	0.0	
Wind Spectrum:	0.0		Mean Drift Yaw Mom / LBP:	0.0		Mean Drift Yaw Mom / LBP:	0.0		Inertial X-Force (Long):	0.0	
Wave response has not been set for this ship and wave motions are not calculated by Optimoor. You can specify a radius of circular motion on vessel window.											
CURRENT Const			Natural Periods (Approx) Surge: 57 Sway: 46 secs								
Velocity (knots):	0.0		Remarks:								
Dirctn (from) True:	315°		NCL Breakaway Plus - Bills:								
Angle to Berth Line:	-156°		KTN Berth III								
X-Drag (Longitudinal):	0.0		Optimized Tie-up Configuration								
Y-Drag (Transverse):	0.0		WLevel - 8.1' (MILLW)								
Drag Yaw Moment / LBP:	0.0		Line Config: (Bow 6-2, Stern 5-								
			OTHER FORCE (kips)								
			Extra Force Applied:								
			Angle of Force to Vessel:								
			Longitudinal Component:								
			Transverse Component:								
			Point of Application at FL:								

Figure 6. OPTIMOOR General Environment Input Screen

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Project Site Environmental Design Conditions

(con't)

Table 5. Very Large Cruise Ship Norwegian Bliss Guidelines (SEAPA, 2018)

Norwegian Cruise Lines and Southeast Alaska Pilots		
VLCS Committee Recommended 2018 Guidelines for VLCS Norwegian Bliss		
"What We Can Do Without Compromising Safety"		
AREA	GENERAL GUIDELINES	
	WIND	CURRENT
Tongass Narrows East Channel (California and Idaho Rocks)	20 Knots	1 Knot of current in same direction as wind
Ketchikan Berth 3 Docking	25 Knots	1 Knot of current in same direction as wind
Ketchikan Berth 3 Undocking	25 Knots	1 Knot of current in same direction as wind
Tongass Narrows Ketchikan Harbor to Lewis Reef (Airport / Drydock Area)	25 Knots	1 Knot of current in same direction as wind
Tracy Arm	ADVISE AGAINST ANY ENTRY INTO TRACY ARM BY A VESSEL OF THIS SIZE	
Juneau AJD Docking, utilizing a 3000 HP tug	SE / NW 25 Knots	1 Knot of current in same direction as wind
	SE / NW 30 Knots	No current
Juneau AJD Undocking, utilizing a 3000 HP tug	NW 25 Knots	1 Knot of current in same direction as wind
	NW 30 Knots	No current
Skagway Railroad Aft Docking	30 Knots	N/A
Skagway Railroad Aft Undocking	35 Knots	N/A

APPENDIX B

Vessel, Mooring Line and Winch Characteristics

Table 6. Vessel Characteristics

Vessel Characteristics	Breakaway Plus
Gross Tonnage:	167,400 GT
Displacement:	75,350 tonnes
Draft:	8.4 m
Length Overall:	333.46 m
Length P/P:	302.76 m
Moulded Breadth on WL:	41.40 m
Freeboard (to main deck):	16.6 m
End Wind Area:	2,201 m ²
Side Wind Area:	13,988 m ²
Typical Winch Brake Holding Capacity:	880 kN
Mooring Deck Elevation (Bow)	Deck 7 / 13.00 m
Mooring Deck Elevation (Stern)	Deck 5 / 6.10 m

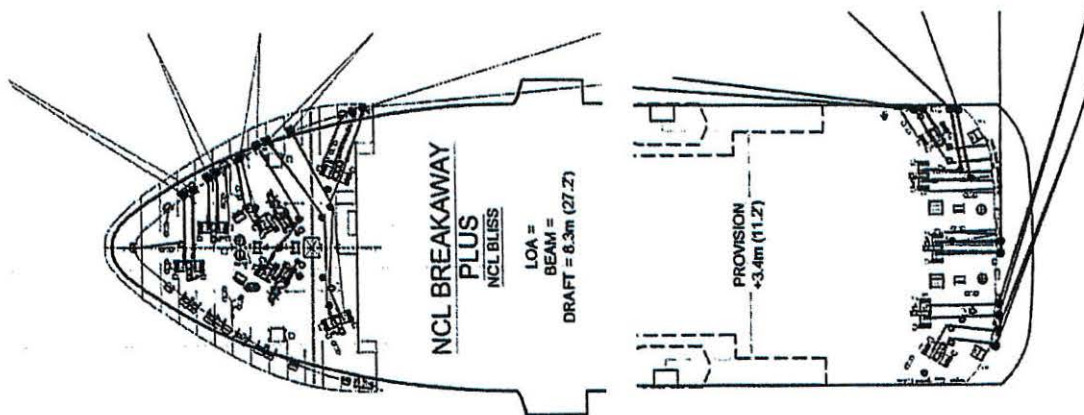


Figure 7. Breakaway Plus Class Vessel fwd and aft mooring deck plan.

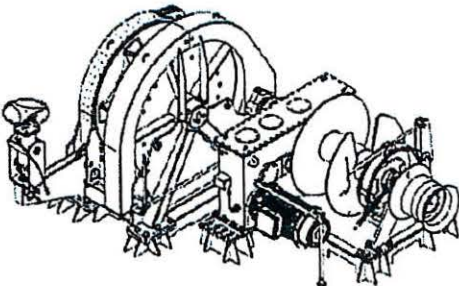
APPENDIX B

Vessel, Mooring Line and Winch Characteristics

(con't)

Norwegian Joy – Mooring Winches

INSTRUCTION MANUAL



Combined Anchor/Mooring Winch
7 AMW 300.1/117 K3 L/R
41.485/486

MacGregor Hatlapa GmbH & Co.KG

Tel: + 49 41227711 + 502
 Fax: + 49 41227711 + 508
 e-mail: hallapa.servico@macgregor.com

TECHNICAL SPECIFICATION

41.485/486-9011

COMB. ANCHOR/SINGLE DRUM MOORING WINCH 300.1/117K3 (W1-W2)

1 cable lifter	made of cast steel, separate anchor part, detachable by disk clutch payout speed / rating device, mounted sensors for digital drum length indication, automatic recording of drum speed for mooring the anchor brake rim surface	cast steel		
drum data	lift out for a water depth of	100 m		
	diameter / grade	117 mm	U 3	
	nom. pull / slow speed	650 kN	4 m/min	
	nom. pull / speed	650 kN	12 m/min	
	max. pull for short periods for breaking loose the anchor	976 kN		
hand brake (electro hydraulic)	manual / local and electro hydraulic remote controlled from bridge, see item 11			
brake holding load clutch with push button and limit switch	4 128 kN - 45 % of drum breaking load		manual and local operation	
1 rope drum	lift out for synthetic rope MBL of rope spacing of rope	diameter	74 mm	
		length	220 m	
	sp. 4 type drum diameter length flange diameter rope capacity height	tension part	470 mm	storage part
			450 mm	720 mm
			1 140 mm	1 650 mm
		30 m	150 m	
		3	7	
	nominal pull / slow speed (1st layer)	300 kN		6 m/min
	nominal pull / speed (1st layer)	300 kN		19,5 m/min
clutch bypass speed			19 m/min	
auto tension pull (adjustable)	125 kN/250 kN		6 m/min	
spring brake	manual and local operation			

MACGREGOR

brake rim surface stainless steel
 static holding load 880 kN
 clutch with push button manual and local operation

mounted fixed on the shaft:
 diameter / length 630 mm / 630 mm
 slack heavier load 45 m/min

acc. to general arrangement
 ambient temperature -20°C to 45°C

open 1-step spur gear with protection,
 grease lubricated, designed for strip foundation,
 use of steel liners for alignment

3-step gear, fully enclosed, splash lubricated
 designed for strip foundation, use of steel liners for alignment

without motor (approx.) 27.000 kg
 with motor (approx.) 28.300 kg
 foundation (approx.) 3.000 kg

make of air motor
 3-phase A/C squirrel cage motor - pole change type
 with built-in electro-magnetic brake and anti-condensation heating

Type	form B5 - 1/2/4/2 poles - S2-532/10 mm
power / protection class	55/160/169 kW / IP 58
voltage / frequency	690 V / 60 Hz
weight approx.	1.300 kg

with protection cap

Mooring winches

Nominal Pull: 300 kN
 Static holding load (Brake holding load): 880 kN
 Maximum breaking load: 1100 kN



ENGINEERS, INC.

APPENDIX B

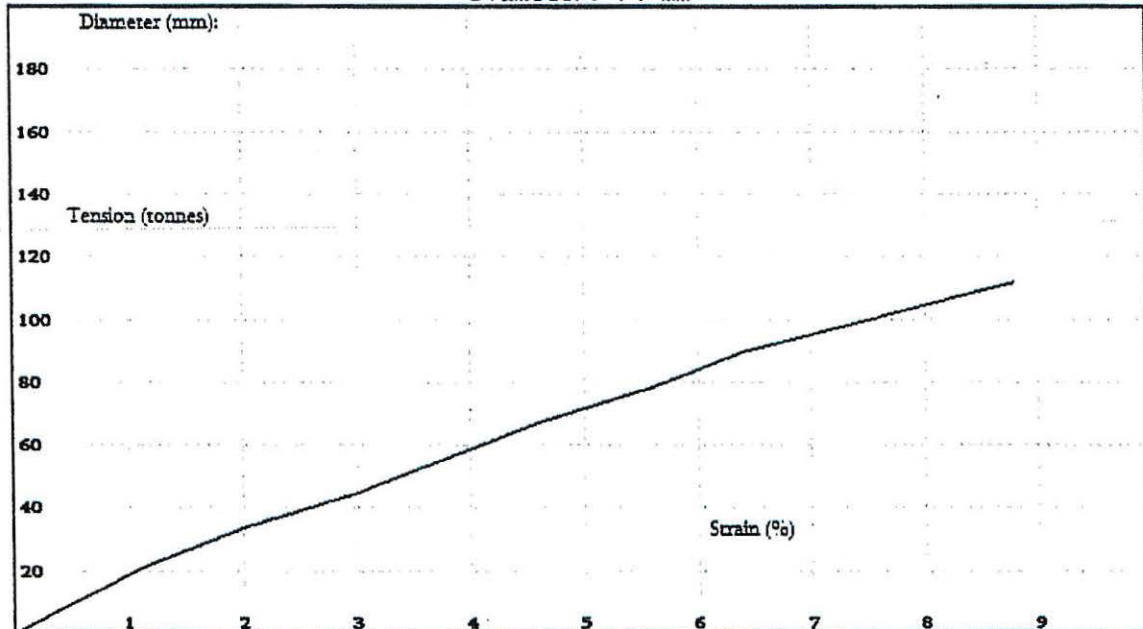
Vessel, Mooring Line and Winch Characteristics

(con't)

Table 7. Line Characteristics

Line Characteristics:	Breakaway Plus
Type:	Tipto Winchline
Manufacturer:	Lankhorst Ropes
Diameter:	74mm
Breaking Load:	990 kN / 100 tonnes
Factor of Safety:	3.0
Construction	7 Strands w/ Tipto Jacket
Fiber	PP/PE BI-Constituent
Elongation	7-8% at break
Other:	Assumed Broken-in

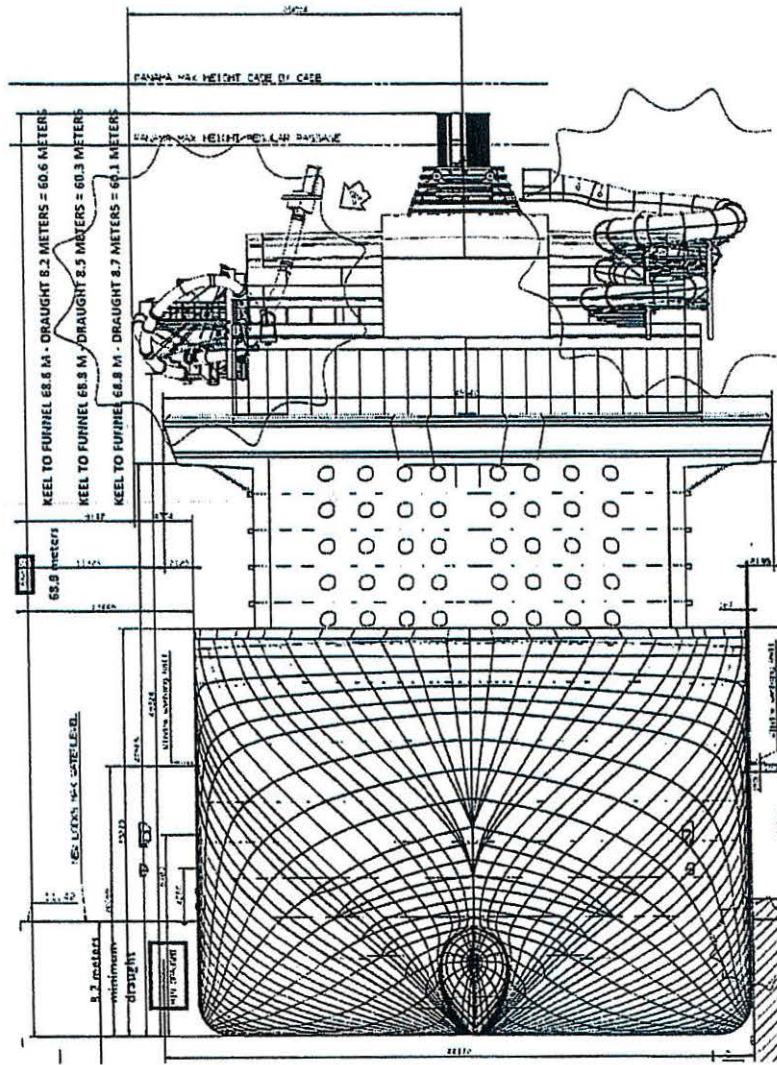
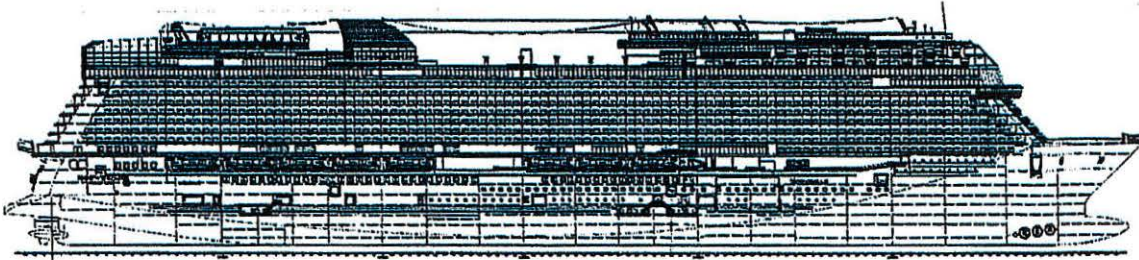
Tension-Strain Curve for TI: TIPTO WINCHLINE, 7-strand pp
(broken-in) Lankhorst Ropeworks Ltd.
Diameter: 74 mm



APPENDIX B

Vessel and Mooring Line Characteristics

(con't)



APPENDIX B

Vessel and Mooring Line Characteristics

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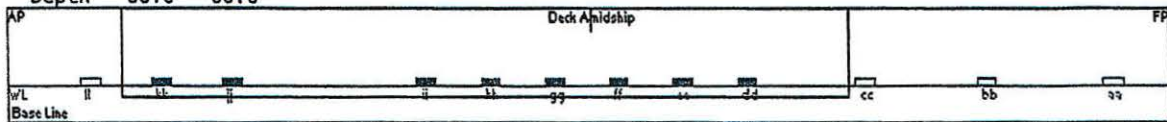
Vessel Data for NCL Breakaway Plus

(file J:\2018 Project Files\184046 - KTN Berth III Bliss Check\I. Structural\Mooring and Berthing Study\NCL Breakaway Plus - Bliss.vsl)
 Units in ft, inches, & kips
 Longitudinal datum at Midship

LBP: 993.5
 Breadth: 135.8
 Depth: 89.2
 Target: 0.0 fwd from midship and 0.0 above deck at side
 End-on projected windage area: 23694 above deck level
 Side projected windage area: 150580 above deck level
 Fendering possible from: 0.403 LBP aft of midship
 to: 0.221 LBP fwd of midship
 Current drag data based on: OPTIMOOR (Generic Data)
 Wind drag data based on: Breakaway+ Cruise Ship Vessel

Flatside Contour

X-dist -400.3 219.8
 Depth 68.6 68.6



Line No.	Fair-Lead X	Fair-Lead Y	Ht on Deck	Dist to winch	Brake Limit	Pre-Tension	Line Size-Type-BL	Tail Segment-1 Lgth-Size-Type-BL
1	523.0	0.0	-10.8	42.7	198	24	9.2 TI 220	
2	500.7	22.0	-10.8	12.5	198	24	9.2 TI 220	
3	496.7	24.6	-10.8	14.8	198	24	9.2 TI 220	
4	488.9	30.5	-10.8	38.7	198	24	9.2 TI 220	
5	483.9	33.5	-10.8	41.7	198	24	9.2 TI 220	
6	480.3	36.4	-10.8	44.0	198	24	9.2 TI 220	
7	475.1	39.0	-10.8	28.9	198	24	9.2 TI 220	
8	472.1	40.7	-10.8	28.9	198	24	9.2 TI 220	
9	461.3	46.3	-10.8	64.6	198	24	9.2 TI 220	
10	456.4	48.6	-10.8	88.6	198	24	9.2 TI 220	
11	448.8	51.8	-10.8	89.2	198	24	9.2 TI 220	
12	427.8	58.7	-10.8	20.7	198	24	9.2 TI 220	
13	421.3	60.0	-10.8	24.6	198	24	9.2 TI 220	
14	417.4	61.4	-10.8	26.9	198	24	9.2 TI 220	
15	-468.5	67.6	-33.5	21.7	198	24	9.2 TI 220	
16	-478.0	67.6	-33.5	16.1	198	24	9.2 TI 220	
17	-480.3	67.6	-33.5	14.4	198	24	9.2 TI 220	
18	-494.8	67.6	-33.5	53.8	198	24	9.2 TI 220	
19	-497.7	67.6	-33.5	63.7	198	24	9.2 TI 220	
20	-515.4	50.9	-33.5	29.9	198	24	9.2 TI 220	
21	-517.1	43.3	-33.5	37.4	198	24	9.2 TI 220	
22	-518.1	36.7	-33.5	37.4	198	24	9.2 TI 220	
23	-518.4	32.5	-33.5	37.7	198	24	9.2 TI 220	
24	-518.1	25.9	-33.5	37.7	198	24	9.2 TI 220	
25	-518.7	5.2	-33.5	32.5	198	24	9.2 TI 220	
26	-519.4	0.0	-33.5	33.1	198	24	9.2 TI 220	
27	-519.4	-4.6	-33.5	33.1	198	24	9.2 TI 220	
28	-518.1	-25.9	-33.5	37.7	198	24	9.2 TI 220	
29	-518.4	-32.5	-33.5	37.7	198	24	9.2 TI 220	
30	-518.1	-36.7	-33.5	37.4	198	24	9.2 TI 220	
31	-517.1	-43.3	-33.5	37.4	198	24	9.2 TI 220	
32	-515.4	-50.5	-33.5	29.9	198	24	9.2 TI 220	

Codes for Types of Line:
 TI: TIPTO WINCHLINE, 7-strand pp (broken-in) Lankhorst Ropeworks Ltd.

APPENDIX C

Ketchikan Berth III - Berth Data

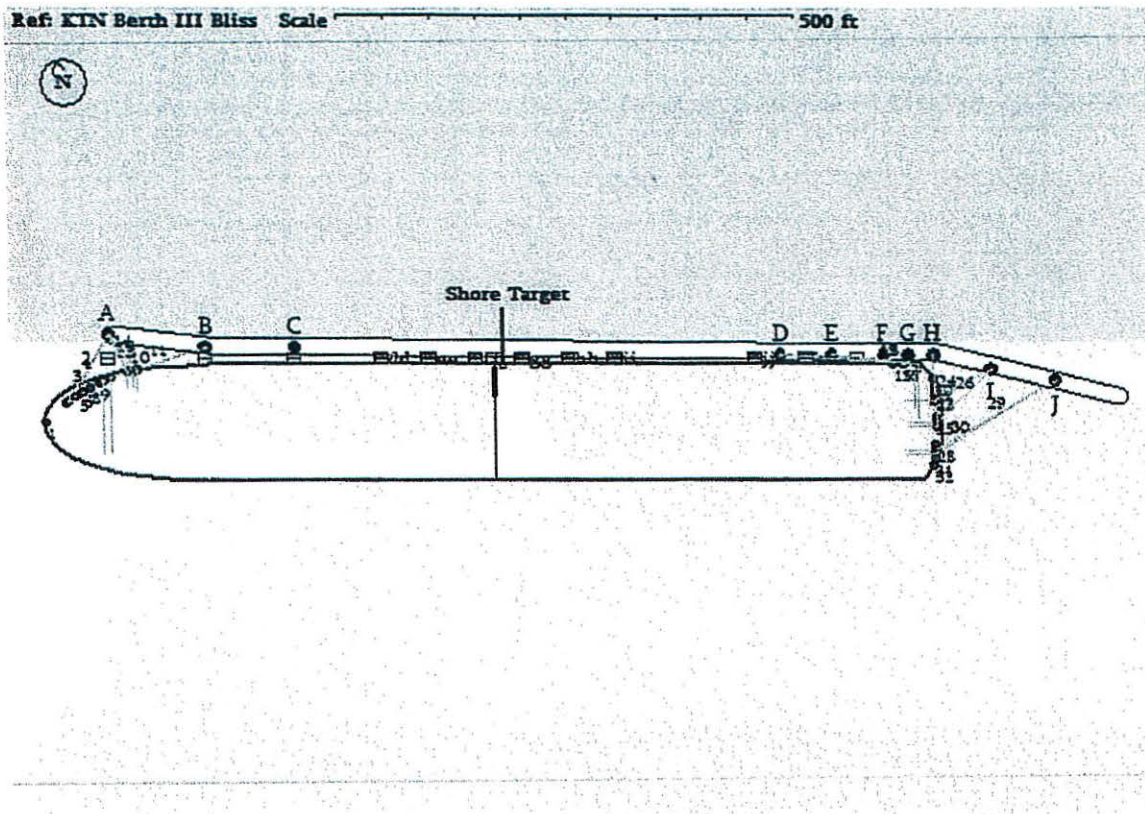


Figure 8. OPTIMOOR Arrangement plan for Breakaway Plus Class vessel at Ketchikan Berth III.

APPENDIX C

Ketchikan Berth III – Berth Data

(con't)

Berth Data for KTN Berth III

(file J:\2018 Project Files\184046 - KTN Berth III Bliss Check\I. Structural\Mooring and Berthing Study\KTN BIII - Berth - MSL.bth)
Units in ft & kips

Left to Right of Screen Site Plan Points: 111'
 Width of Channel (for Current): 2000
 Pier Height (Fixed) above Datum: 24.0
 Dredged Depth below Datum: 120.0
 Permissible Surge Excursion Fwd/Aft: ± 3.00
 Permissible Sway Excursion Port/Stbd: ± 3.00
 Permissible Vertical Movement: ± 3.00
 Dist of Berth Target to Right of Origin: 0.0
 Wind Speed Specified at Height: 32.8
 Current Specified at Depth: mean

Hook/ Bollard	X-Dist to Origin	Dist to Fender Line	Ht above Pier	Allowable Load
A	-460.0	34.5	6.0	350
B	-348.0	19.5	6.0	350
C	-244.0	19.5	6.0	350
D	327.3	10.5	0.0	200
E	387.3	10.5	0.0	200
F	447.3	10.5	0.0	200
G	477.3	10.5	0.0	200
H	507.3	10.5	0.0	100
I	574.5	-5.0	0.0	400
J	651.0	-19.5	0.0	200

Fender to Origin	X-Dist	Ht above Datum	Width Along Side	Face Contact Area (ft ²)
aa	-460.0	11.1	16.0	96.0
bb	-348.0	11.1	16.0	96.0
cc	-244.0	11.1	16.0	96.0
dd	-142.5	11.1	16.0	96.0
ee	-87.5	11.1	16.0	96.0
ff	-32.5	11.1	16.0	96.0
gg	22.5	11.1	16.0	96.0
hh	77.5	11.1	16.0	96.0
ii	132.5	11.1	16.0	96.0
jj	297.3	11.1	16.0	96.0
kk	357.3	11.1	16.0	96.0
ll	417.3	11.1	16.0	96.0

APPENDIX C

Ketchikan Berth III – Berth Data

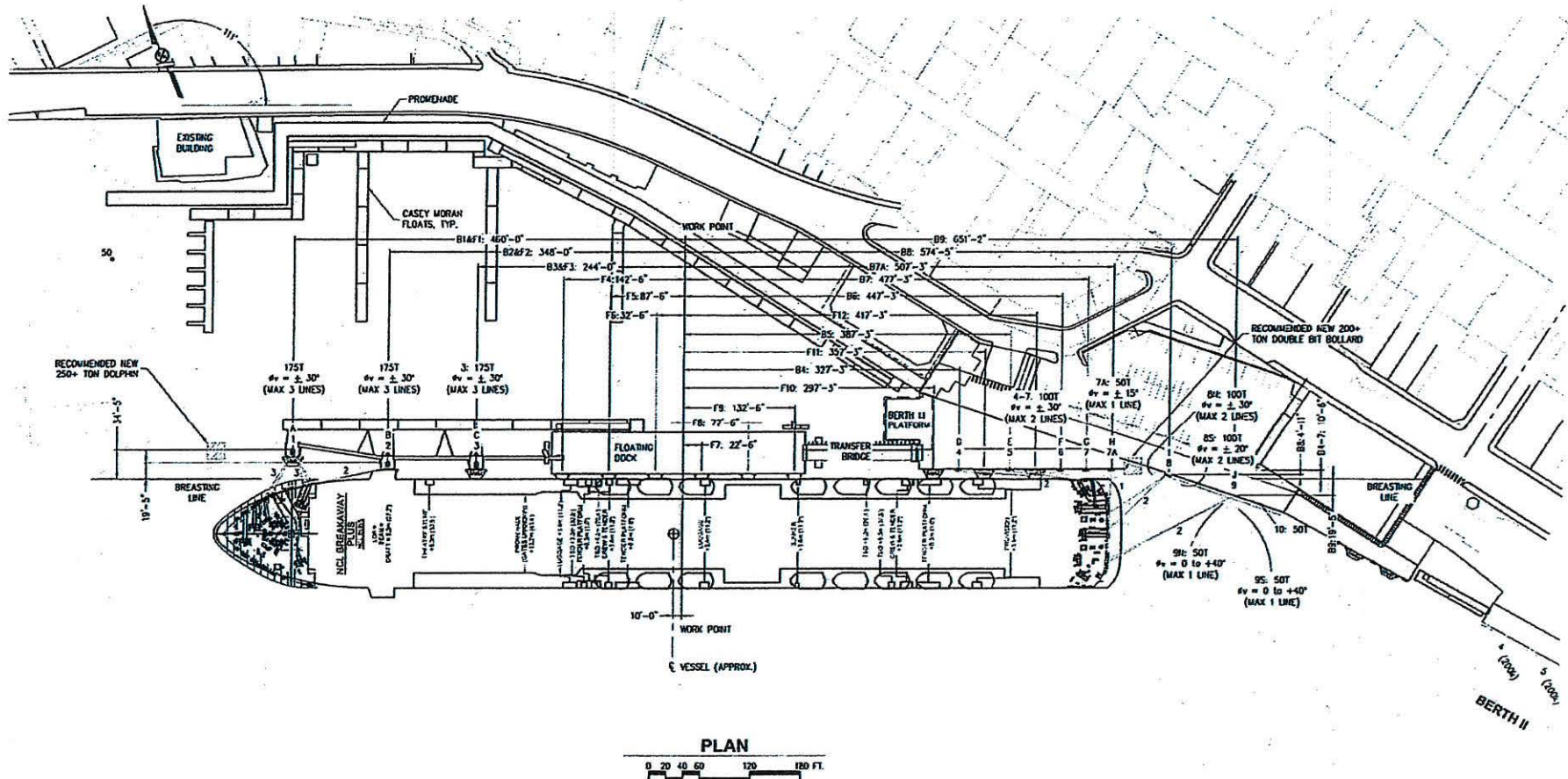
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Fender	Load-Compression Data									
aa	12	47	82	122	164	210	262	315	350	388 kips
	0.15	0.60	1.05	1.50	1.95	2.40	2.85	3.30	3.60	3.90 ft
bb	12	47	82	122	164	210	262	315	350	388 kips
	0.15	0.60	1.05	1.50	1.95	2.40	2.85	3.30	3.60	3.90 ft
cc	12	47	82	122	164	210	262	315	350	388 kips
	0.15	0.60	1.05	1.50	1.95	2.40	2.85	3.30	3.60	3.90 ft
dd	12	47	82	122	164	210	262	315	350	388 kips
	0.15	0.60	1.05	1.50	1.95	2.40	2.85	3.30	3.60	3.90 ft
ee	12	47	82	122	164	210	262	315	350	388 kips
	0.15	0.60	1.05	1.50	1.95	2.40	2.85	3.30	3.60	3.90 ft
ff	12	47	82	122	164	210	262	315	350	388 kips
	0.15	0.60	1.05	1.50	1.95	2.40	2.85	3.30	3.60	3.90 ft
gg	12	47	82	122	164	210	262	315	350	388 kips
	0.15	0.60	1.05	1.50	1.95	2.40	2.85	3.30	3.60	3.90 ft
hh	12	47	82	122	164	210	262	315	350	388 kips
	0.15	0.60	1.05	1.50	1.95	2.40	2.85	3.30	3.60	3.90 ft
ii	12	47	82	122	164	210	262	315	350	388 kips
	0.15	0.60	1.05	1.50	1.95	2.40	2.85	3.30	3.60	3.90 ft
jj	12	47	82	122	164	210	262	315	350	388 kips
	0.15	0.60	1.05	1.50	1.95	2.40	2.85	3.30	3.60	3.90 ft
kk	12	47	82	122	164	210	262	315	350	388 kips
	0.15	0.60	1.05	1.50	1.95	2.40	2.85	3.30	3.60	3.90 ft
ll	12	47	82	122	164	210	262	315	350	388 kips
	0.15	0.60	1.05	1.50	1.95	2.40	2.85	3.30	3.60	3.90 ft

APPENDIX C

KETCHIKAN BERTH III - BERTH DATA

(CON'T)



PLAN



DRAFT

**CITY OF KETCHIKAN
BERTH III NCL BLISS CHECK**

MOORING ARRANGEMENT AND SITE PLAN

DESIGNED BY:	DATE:	PROJECT NO:	SCALE:	SHEET NO:
CHECKED BY:	DATE:	PROJECT NO:	SCALE:	SHEET NO:
				21 of 25

PND INCORPORATED IS NOT RESPONSIBLE FOR SAFETY PROGRAMS, METHODS OR PROCEDURES OF OPERATION, OR THE CONSTRUCTION OF THE DESIGN SHOWN ON THESE DRAWINGS. WHERE SPECIFICATIONS ARE GENERAL OR NOT CALLED OUT, THE SPECIFICATIONS SHALL CONFORM TO STANDARDS OF INDUSTRY. DRAWINGS ARE FOR USE ON THIS PROJECT ONLY AND ARE NOT INTENDED FOR REUSE WITHOUT WRITTEN APPROVAL FROM PND. DRAWINGS ARE ALSO NOT TO BE USED IN ANY MANNER THAT WOULD CONSTITUTE A DETRIMENT DIRECTLY OR INDIRECTLY TO PND.



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APPENDIX D

Ketchikan Berth III – Berthing Analysis



BERTHING ENERGY CALCULATIONS

(in accordance with BS6349: Part 4)

PROJECT INFORMATION

Project Title	Ketchikan Berth III Berthing Analysis - NCL Bliss Vessel
Country	United States
Project Reference	184046
Prepared By	BKP

SHIP DATA

Ship Category		Cruise Liner
Select Dimensions By		Displacement
Deadweight	dwt	167,400 t*
Displacement	M ₀	75,350 t*
Overall Length	LOA	333.5 m*
Length Between Perpendiculars	L _{BP}	302.6 m*
Beam	B	41.40 m*
Laden Draft	D	6.40 m*
Freeboard	F	11.60 m*
Block Coefficient	C _B	0.698

BERTHING DATA

Berthing Mode		Side Berthing
Structure Type		Semi-Closed Structure
Eccentricity Calculation Method		Full Calculation
Under Keel Clearance	K _D	30.00 m
Impact from Bow	x	25.00 %
		75.69 m
Radius of Gyration	K	73.46 m
Impact to Centre of Mass	R	78.47 m
Berthing Angle	α	10.00 deg
Velocity Vector Angle	φ	64.70 deg
Added Mass Coefficient	C _M	1.500
Eccentricity Coefficient	C _E	0.564
Berth Configuration Coefficient	C _C	1.000
Softness Coefficient	C _S	1.000

PIANC (2002)

BERTHING ENERGY

Berthing Velocity	V _B	92 mm/s*
Normal Energy	E _N	270 kNm 27.5 t-m
Factor of Safety	F _S	1.50 *
	E _A	405 kNm 41.2 t-m

APPENDIX D

Ketchikan Berth III – Berthing Analysis

(con't)



BERTHING ENERGY CALCULATIONS

(in accordance with BS6349: Part 4)

PROJECT INFORMATION

Project Title	Ketchikan Berth III Berthing Analysis - Original Design Vessel
Country	United States
Project Reference	184046
Prepared By	BKP

SHIP DATA

Ship Category		Cruise Liner
Select Dimensions By		Displacement
Deadweight	dwt	100,000 t*
Displacement	Mo	65,000 t*
Overall Length	LoA	305.0 m*
Length Between Perpendiculars	LBP	277.0 m*
Beam	B	41.15 m*
Laden Draft	D	8.50 m*
Freeboard	F	16.60 m*
Block Coefficient	Cb	0.655

BERTHING DATA

Berthing Mode		Dolphin Berthing
Structure Type		Open Structure
Eccentricity Calculation Method		Full Calculation
Under Keel Clearance	Kd	30.00 m
Impact from Bow	x	25.00 %
		69.25 m
Radius of Gyration	K	64.94 m
Impact to Centre of Mass	R	72.24 m
Berthing Angle	α	10.00 deg
Velocity Vector Angle	ϕ	63.45 deg
Added Mass Coefficient	Cm	1.500
Eccentricity Coefficient	Ce	0.500 *
Berth Configuration Coefficient	Cc	1.000
Softness Coefficient	Cs	1.000

PIANC (2002)

BERTHING ENERGY

Berthing Velocity	Vb	107 mm/s*
Normal Energy	EN	279 kNm 28.4 t-m
Factor of Safety	Fc	1.50 *
	EA	419 kNm 42.7 t-m

APPENDIX D

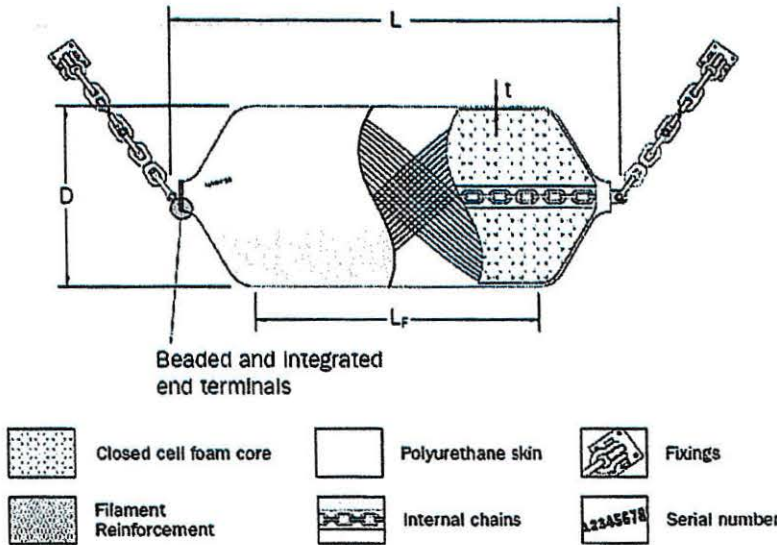


Figure 9. Foam Filled fender details. 6x16 Standard Foam filled fenders are used at Berth III.

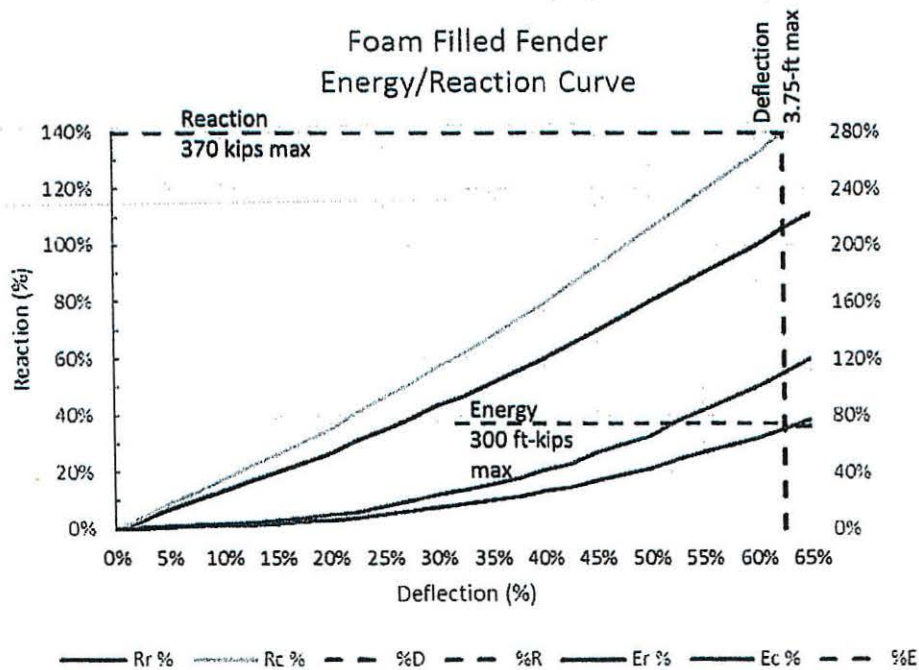


Figure 10. Corrected Energy/Reaction Curves for 6x16 Standard Foam Filled Fender.

APPENDIX D

Ketchikan Berth III – Berthing Analysis

(con't)

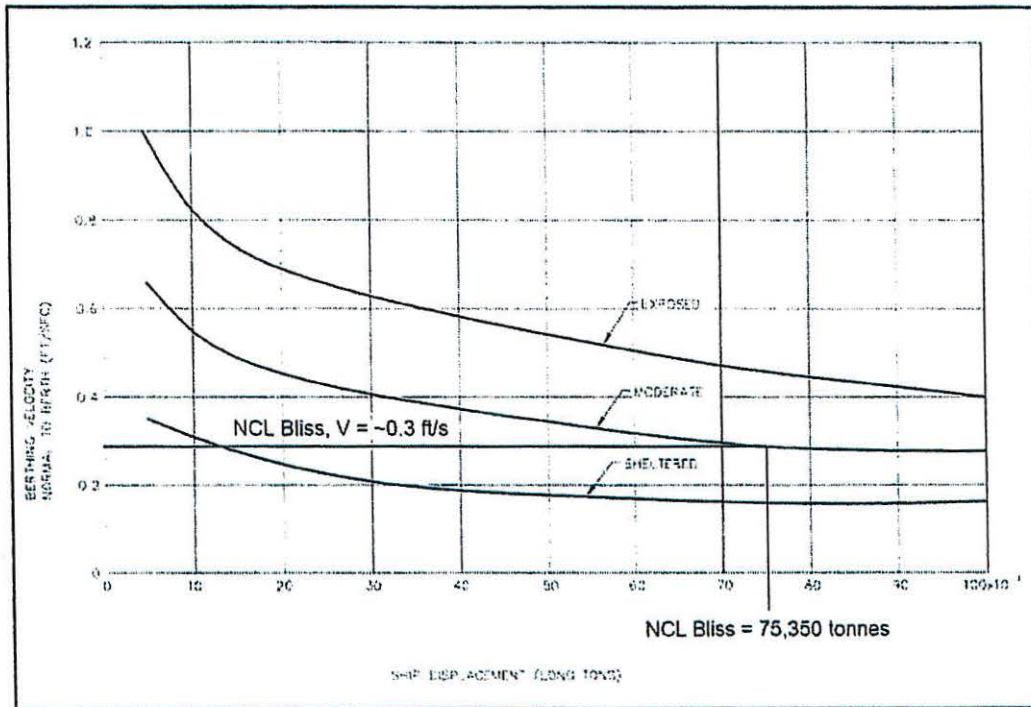


Figure 11: Berthing velocity for large ships (UFC 4-152-01)