

Marine Department.

Additional Car Ferry for the Intercolonial Railway's Strait of Canso Service.

The Intercolonial Ry. has invited tenders for a new car ferry steamboat for transporting trains across the Strait of Canso from the mainland of Nova Scotia to Cape Breton Island on the Truro-Sydney line. The new ferry is to be similar to the present ferry Scotia as far as practicable, the principal point of difference being an additional length of 18 ft. The principal dimensions will be as follows:—Length overall, 300 ft.; length between perpendiculars, 276 ft.; breadth over fenders, 48 ft.; moulded breadth on deck, 46 ft.; breadth at load water line, 43½ ft.; moulded depth, 19 ft.; draught when laden with 1,400 tons of car load and 150 tons of coal, water and stores, 14 ft.; and i.h.p., 3,000.

The vessel is to be flushed decked with 3 lines of car rails, and is to have one screw propeller at each end, with rudder in stern and ram in front of bow propeller to break ice. The hull is to be specially formed and strengthened at the water line fore and aft for working amongst ice. It is to have close bulwarks on the sides and a small pilot bridge carrying a pilot house. The hull is to be divided into 8 water tight compartments, the two compartments amidships being occupied by the engines and boilers. Mess room accommodation is to be provided below decks for the officers and crew. Each propeller is to have an independent triple expansion engine, the two engines together to be capable of indicating about 3,000 h.p. The vessel is to be built under Lloyd's special survey, and classed in its register as 100 A1 single deck, and to comply with the British Board of Trade requirements. Special framing and plating is to be fitted in way of the water line to protect the vessel when working amongst ice. The deck is to be specially framed to support the weight of locomotives of class "special heavy" of the Dominion Government specification on the centre track, and a live load of 38,500 lbs. per axle on the side tracks.

The keel will be formed of flat steel plates, connected to the propeller posts at each end. The propeller and rudder posts will be of cast steel, shaped for working in ice, the post being curved up the face of the counter line, and having a deep web to protect the rudder, the necessary gudgeons for the latter to be cast in the post. The rudder will be cast steel or forged scrap iron with single steel plate blade with portable steel pintles. The stock is to be stopped short of the main deck beams to allow of a double tiller and quadrant being fitted. The rudder will also have a locking arrangement. The main and intermediate frames will be formed of steel bulb angles spaced 12 ins. apart at the water line, the main frames being 24 ins. apart and in one piece from the keel to the deck. The bottom framing is to be of the open floor type, with the intermediate frames at the ends of the vessel over the stern post to have floor plates the same as fitted to the main frames.

There will be 7 transverse bulkheads carried from the keel to the deck, with no watertight doors to be fitted except a 4 by 6 ft. one in the bulkhead between the engine and boiler compartments. The beams on the main deck will be spaced not over 2 ft. apart, connected at the outer ends to the top of the main frames by rivetted plate knees. There will be 2 lattice girders formed of steel angles and plates extending as far forward and aft as possible. These

girders will be connected at the bottom to the side keelsons, and the top to intercostal plates running fore and aft and connected to the beams and deck plating. The main deck is to be formed of steel plates, sheathed with 2½ in. pitch pine overall. The under side of the deck over the engine and living rooms is to be insulated by providing air spaces and insulating materials, to eliminate all condensation with a maximum outside temperature of 20 degrees below zero.

The coal bunkers are to be arranged to carry 75 tons or more if practicable, to be loaded by chutes from the centre track. Four coaling doors are called for in the bunker sides to suit the boiler firing.

A close steel bulwark, 8½ ft. high, is to extend along both sides and stern, with portable wrought iron stanchions in the bow. The bulwark is to have a steel bulb angle stiffening rail along the top, and is to be stayed every 6 ft. with a bulb plate. 80 lb. rails will be used at the standard 4 ft. 8½ in. gauge, supported on elm runners on a steel girder formed of two steel angles. Scupper holes will be cut in the girders for drainage. Oak fenders, 10 by 12 ins., will be fitted all around the vessel, between steel angles, and protected on the outside by thick plate of steel, 10 ins. deep.

There is to be a steel pilot house 7½ ft. high, arranged for the steering standard and a wheel for the steam steering gear, and other pilot house fittings. The pilot bridge, of 2½ in. pitch pine, carried on a steel frame from the sides of the vessel, is to be placed forward on the vessel. It is to be of sufficient width to afford a passageway in front of the pilot house, and will be reached by two steel ladders. A combined hand and steam steering gear is to be connected to the rudder, working directly on the quadrant, and fitted with all necessary fittings, to be controlled from the pilot house by geared rods.

There will be four steam warping capstans for working the anchor cables and mooring ropes, all but the capstan heads to be placed below the deck, and to be operated by levers on the deck. Wooden chain lockers will be conveniently located as regards the capstans. Two anchor davits, complete with blocks and falls, etc., will be fitted on deck at each end near the cable capstans. There will also be six pairs of mooring bitts with necessary mooring pipes, with hawse pipes for the cables formed of heavy castings securely fastened to the deck.

Four rooms will be provided for the officers and engineers, arranged with separate rooms for the day and night captains, and two for the chief engineers. There will also be a mess room, pantry and provision room. All these rooms are to be completely fitted in a comfortable manner. The crew's space will be an open compartment below the main deck, fittingly furnished. All these rooms will be sheathed in white wood, and the roofs will be cork painted and wood and insulation lined against any possible condensation. The galley will be conveniently located to officers' and crew's quarters, and to have all the necessary fittings. Skylights will be fitted to all rooms, and deck lights where necessary. Ample provision will be made for lavatories, water closets, and urinals for officers, crew and passengers. All rooms will be steam heated. A 1,000 gallon drinking water tank will be

conveniently located, with necessary fittings, and a connection to the galley.

The vessel will be equipped with two 24 ft. life boats and an ice boat. The inside and outside of the vessel will receive 3 coats of oil paint, finished in appropriate colors. The officers' quarters will be painted in colors and varnished, and the crew's quarters painted only. The bottom of the vessel will be coated with Portland cement. The floors of the crew's lavatory will be cemented, and the lavatories of officers and passengers will be finished in tile.

The engines will be of the triple expansion, inverted, direct acting, surface condensing type, working on three cranks, each set of engines being a duplicate one of the other in the working parts. They are to be designed so that they will stand, without injury, the sudden stoppages of the screws when working amongst ice. One surface condenser will be fitted to both sets of engines. The machinery will be so placed that by the introduction of a short length of shafting between the two engines, one can be arranged to work both propellers, and the other can be disconnected from the shafting when desired. A starting valve is to be fitted, working from the starting platform. The reversing gear will be of the latest direct acting hydro steam type, with hand gear and handles conveniently arranged, with the weight shaft supported on long bearings.

The general purpose pump will be connected to the condenser for use when required. The circulating pump will be of the twin centrifugal type, driven by a single cylinder engine, taking steam from the auxiliary steam pipe and exhausting directly to the condenser. It will be arranged to draw from the ice box and bilges, and to discharge through the condenser overboard. The air pump will be of the twin independent vertical type, having single acting air pumps worked from either end of a beam actuated by a single steam cylinder, the working barrel of brass to draw from the bottom of the condenser and deliver to the feed pump control tank. The main feed pump is to be of the independent duplex direct acting type, fitted with tank having a float and automatic control gear, the pump to be capable of dealing with the water from both engines when working at full speed. It will draw from the control tank, and also from the sea and fresh water tanks, and discharge to the boilers. There will also be a general purpose pump, capable of discharging 90 tons of water an hour, to draw from the bilges and from the sea, and discharge overboard and into wash deck and service pipes. An auxiliary feed pump of the duplex type will draw from the sea, from the fresh water tank and from the control tank, and discharge into the boilers, on deck and overboard, and also arranged to circulate water in the boilers when getting up steam and to discharge through the condenser.

The electrical equipment will comprise a complete installation of electric lights, with two separate 25 k.w. 80 volt multipolar generators, direct connected to 35 h.p. vertical cross compound Belliss and Morcom engines, approximating 350 to 400 r.p.m. There will be a separate switchboard for each generator, containing the necessary control and recording apparatus. There will also be a feeder panel for the searchlight, arc lamp and incandescent lamp circuits. The search-