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**Part 1            General**

**1.1                DESCRIPTION**

- .1        This section specifies the requirements for the removal of water from within the cofferdammed area and cleaning of the canal floor during the Contract.
- .2        Work included consists of the pumping out of sea water between the cofferdams, the continuous removal of leakage water from any source, cleaning of floor areas and the body of the gates.
- .3        Formation of sumps and cutting of channels in rock and concrete as may be required to permit efficient removal of water.

**1.2                RELATED REQUIREMENTS**

- .1        Section 01 11 00 – Summary of Work.
- .2        Section 01 29 00 – Payment Procedures.
- .3        Section 02 17 60 – Stop Log Cofferdams.
- .4        Section 02 17 80 – Sheet Piling Cofferdams.

**1.3                EXISTING CONDITIONS**

- .1        Reference to Appendix A for record drawings of gates.

**Part 2            Products**

**2.1                PUMPS**

- .1        At the start of operations to remove water from between cofferdams, or at any time following cofferdam flooding, the pump or pumps supplied shall have a capacity to lower the water surface at a rate of 1.5 metres per hour, minimum. Supply spare pumps in case of failures.
- .2        All pumps shall be capable of operating in an environment containing silt, sand and marine growth resulting from cleaning operations without being blocked or breaking down.
- .3        A source of standby diesel-electric power shall be on site at all times capable of being put into use immediately following the failure of the main power source for the main pump. The standby system shall be operated for 2 periods of 2 hours each on 2 separate days per week throughout the full dewatering period. Times of operation to be set by the Departmental Representative.
- .4        Personnel fully trained in the operation of the regular dewatering system and the standby system shall be on site at all times.

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**Part 3            Execution**

**3.1                PUMPING**

- .1        Dewater work areas immediately following completion of cofferdam construction and maintain in continuous operation until all work within cofferdam is complete.
- .2        Use existing sump for main pump inlet.

**3.2                ACCESS STAIRS**

- .1        Construct an access stairway to permit personnel to descent to work area floor. Stairway to meet provincial and Federal labour codes, but be not less than 1.2 m wide, contain at multiple landings and have strong railings on each side.
- .2        Take all steps necessary to prevent ice build-up on the stairway.

**3.3                CLEANING**

- .1        Remove snow and ice from all work areas.
- .2        Hose down structural members of the gate bodies to remove entrapped silt and to remove marine growth.
- .3        Clean the whole floor area within the cofferdammed area to remove all silt, sand, gravel, stones and debris and transport to disposal area on canal property in accordance with instructions of the Departmental Representative.
- .4        Clean out existing sumps and keep clean at all times.

**3.4                ACCIDENTAL FLOODING**

- .1        Flooding of the cofferdams due to inclement weather, failure of equipment, or misadventure will be the responsibility of the Contractor and all damage sustained by work in progress, canal machinery, or appurtenances shall be made good at Contractor's sole expense.

**3.5                INTENTIONAL FLOODING**

- .1        On completion of all work within the cofferdammed and on approval of the Departmental Representative, the cofferdammed area shall be flooded by stopping the pumps and allowing leakage to fill the area or alternatively if necessary or expedient the Contractor may speed up the process by pumping in water.
- .2        Before flooding inspect all areas to ascertain that all tools, equipment and debris has been removed to avoid possible

**END OF SECTION**

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**Part 1            General**

**1.1                DESCRIPTION**

- .1        This section specifies the requirements for the construction of one stop log cofferdam anchored to existing niches (gains) in the canal walls.

**1.2                RELATED REQUIREMENTS**

- .1        Section 01 11 00 – Summary of Work.
- .2        Section 01 29 00 – Payment Procedures.
- .3        Section 02 14 90 – Dewatering Work Areas.
- .4        Section 02 17 80 – Sheet Piling Cofferdams.

**1.3                MATERIALS FURNISHED BY CCG**

- .1        All stop logs, lifting slings and pick-up boom for erection to form the cofferdam are in storage on the site and will be turned over to the Contractor for use on the project free of charge.

**1.4                OTHER MATERIALS**

- .1        All other materials or facilities required to erect the cofferdams, to correct leakages, to dismantle, to clean, and to return the stop logs, lifting slings and pick-up boom to storage shall be furnished by the Contractor. Refer to Contract Drawings for immediate repairs to the stop logs required prior to the installation for dewatering of gates.

**1.5                GENERAL DESCRIPTION OF EQUIPMENT**

- .1        The steel stop logs are designed for installation, one above another, with the ends in vertical recesses (gains) in the sides of each end of the lock, to form watertight barriers which will permit dewatering the gate areas for inspection or repair. In order that the barrier will be watertight, a horizontal seal of 25 mm diameter neoprene rope is provided between individual stop logs while a “J” type seal is provided between the end of the stop log and the face of the recess.
- .2        The stop logs will be handled, one at a time, by pick-up boom equipped with a wire rope lifting sling and one latching mechanism for engaging or disengaging the stop log. The lifting, lowering and swinging of stop logs will be done by use of mobile cranes.
- .3        The latching mechanism for the pick-up boom consists of 2 vertically suspended lifting hooks joined together with a hollow shaft and free to swing in a plane transverse to the boom. Each lifting hook is normally maintained in its most forward position by a compression spring. The forward position is that which obtains when the hook is engaged with the pick-up lug on the stop log. The arm of one of the lifting hooks extends upward beyond the center of rotation and the upper end is provided with 3 ratchet teeth so placed that when engaged by a spring loaded pawl the hook will be held in a rotated position clear of its pick-up lug on the stop log. The operation of the pawl is controlled

through a series of bell cranks and levers by a manually operated lever located at one end of the pick-up boom. The manually operated lever has 2 setting positions:

- .1 One will restrain the motion of the pawl so that it cannot engage the ratchet teeth and will thus permit the hooks to rotate; the second will free the motion of the pawl so that it may engage and hold the lifting hooks in inclined or partially rotated positions clear of the pick-up lugs described hereunder.
- .4 Each stop log is fitted with 2 pick-up lugs which the lifting hooks may engage. Each lug presents 2 inclined surfaces to the lower end of the lifting hook, one above and the other below the lip or point of engagement of the hook. As described hereunder, the upper inclined surface functions primarily in engaging the lifting hook with the lip of the lug for raising stop logs, while the lower inclined surface functions in side engaging the hook.
- .5 The pick-up boom will be used for 2 distinct operations; the first is lowering the stop logs and placing them one on top of another in the lock across the channel, and the second is picking up the logs one by one, and placing them on flat bed trailers for transport to their storage area.

In the first operation to place the log in the canal, the hand lever will be set in the position which releases the pawl and permits its engagement in the ratchet teeth on the upper end of one of the lifting hooks. After the log has been lowered to such position that it rests on the lock still or on a previously placed log, further lowering of the pick-up boom will bring the hooks in contact with the lower inclined surfaces of the pick-up lugs and deflect the hooks to an angle where the pawls will engage the teeth and lock the hooks in inclined positions such that upon raising the boom they will clear the lips of the pick-up lugs. The boom may then be raised and be returned for another log. In the second operation, that is, in removing stop logs from the lock, the hand lever will be set in the position where the downward movement of the pawl is prevented and it cannot engage and restrict the rotation of the lifting hooks. After lowering of the pick-up boom in the stop log recesses in the lock wall, the lifting hooks will first be deflected and partially rotated by the upper inclined surfaces of the pick-up lugs. Further lowering, to clear the upper inclined surfaces, will result in the hooks being forced forward by the compressive action of the springs and so engage the lips of the pick-up lugs. The log may then be lifted out of the lock.

- .6 Two 2-part bridle slings are supplied as indicated which will serve to lift the logs when attached by shackles to fittings provided near the ends of each stop log. This auxiliary means of lifting will serve to allow the handling of the logs in the storage area using two cranes of suitable capacity for loading onto flatbed trailers for transportation to the gate areas or for maintenance purposes.

## **1.6 PROTECTION**

- .1 Prevent damage to the stop log, lifting slings and pick-up boom and to the existing gains set in the lock walls.

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**Part 2 Products**

**2.1 MATERIALS**

- .1 Details of materials supplied by Canadian Coast Guard (CCG) from stockpile are provided on Drawing No. S-29.
- .2 All steel stop logs, lifting slings and pick-up boom required to construct the cofferdams are located on Canal property.
- .3 Contractor to supply all bolting, welding and miscellaneous fastening devices required to assemble the cofferdams and to secure them safely in position.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Inspect and examine stock-piles and site for erection of stop log cofferdam materials at time of tendering.

**3.2 PREPARATION**

- .1 Under supervision of the Departmental Representative and assistance of canal staff, remove existing sacrificial anode string attached to each anchor pile. Hand over anode strings to canal staff.
- .2 Use divers to examine gains in the lock wall clean off all marine growth and accumulated calcareous deposits resulting from operations of cathodic protection anode.
- .3 Clean off all foreign materials and lubricate all brushings, rollers, latches and lifting slings before assembling the stop log cofferdam in the canal.

**3.3 INSTALLATION**

- .1 Schedule work on the lock gates to begin after the stop logs have been installed in the canal and so will provide protection from storm waves and currents.
- .2 Install stop log units into place making use of bearing areas (gains) provided in the lock walls and secure as indicated on drawings.
- .3 Place logs so that reaction rollers bear directly on the reaction roller track and with the transverse center line of the logs located at the center line of the canal.
- .4 Employ qualified and experienced diver to examine, as each log unit is placed, relative positioning of rubber seal on log and vertical seal angle in the gain as well as the area between the underside of the bottom log unit and the concrete floor sill to ascertain that all are correctly located.
- .5 Supply and place such means as thought advisable to reduce leakage through the cofferdam. This may take the form of sand bags, rubber or plastic sheeting, grease or mastic material. This is to be at the option of the Contractor who is fully responsible for dewatering the work areas and supplying pumping capacity to meet terms of Section 02 14 90 of these specifications.

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### **3.4 REMOVAL**

- .1 Obtain approval of Departmental Representative before removal operations.
- .2 When all work within the cofferdam area has been satisfactorily completed, the area will be flooded.
- .3 When water pressure on the stop logs is neutral or sufficiently low, remove all stop logs using the Pick-up Boom.
- .4 Flush all surfaces and mechanical parts with fresh water to remove any salt water that may remain with particular attention to the interior surfaces and corners.
- .5 Apply new grease to all mechanical parts of logs and boom sufficiently to expel old grease.
- .6 Stop logs and the pick-up boom must be returned to designated storage site.
- .7 Place logs and boom, carefully stacked into storage area with the first layer of logs elevated on preservative treated sleepers, as indicated.
- .8 Dismantle wire rope lifting slings from pick-up boom and remove the auxiliary lifting slings from the last placed log. Wash off all salt water, clean surfaces and apply preservative grease and place in storage building on canal site as directed by the Departmental Representative.
- .9 Remove any and all material from the floor of the lock that may have accumulated as a result of the use of sand bags, sheeting or other means used to reduce leakage.

### **3.5 CLEANING**

- .1 After completion of work all stop logs, lifting slings and pick-up boom, whether used on the Contract or not, shall be thoroughly cleaned of all foreign matter, including rust washed down with fresh water painted with zinc based primer in accordance with manufacturer's instructions and carefully stacked in designated storage site.

**END OF SECTION**

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**Part 1            General**

**1.1                DESCRIPTION**

- .1        This section specifies the requirements for the construction of one semicircular steel sheet piling (SSP) arc cofferdam anchored to existing inserts in the canal walls.

**1.2                RELATED REQUIREMENTS**

- .1        Section 01 11 00 – Summary of Work.
- .2        Section 01 29 00 – Payment Procedures.
- .3        Section 02 14 90 – Dewatering Work Areas.
- .4        Section 02 17 60 – Stop Log Cofferdams.

**1.3                MATERIALS FURNISHED BY CCG**

- .1        All structural steel for erection guide frames and sheet piling to form the cofferdam are in storage on the site and will be turned over to the Contractor for use on the project free of charge. Refer to Contract Drawings for immediate repairs to the SSP cofferdam required prior to the installation for dewatering of gates.

**1.4                OTHER MATERIALS**

- .1        All other materials or facilities required to erect the cofferdams, to correct leakages, to dismantle, to clean, and to return the guide frames and sheeting to storage shall be furnished by the Contractor.

**1.5                PROTECTION**

- .1        Prevent damage to the sheet piling and guide frames and to the existing anchorages set in the lock walls.

**Part 2            Products**

**2.1                MATERIALS**

- .1        Details of materials supplied by Canadian Coast Guard (CCG) from stockpile are provided on Drawings No. S-23 and S-24.
- .2        All main structural steel materials and steel sheet piling required to construct the arc cofferdams are located on Canal property.
- .3        Contractor to supply all bolting, welding and miscellaneous fastening devices required to assemble the cofferdams and to secure them safely in position.

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**Part 3            Execution**

**3.1                EXAMINATION**

- .1        Inspect and examine stockpiles and site for erection of cofferdam materials at time of tendering.

**3.2                PREPARATION**

- .1        Under supervision of the Departmental Representative and assistance of canal staff, remove existing sacrificial anode string attached to each anchor pile. Hand over anode strings to canal staff.
- .2        Use divers to examine interlock of anchor piles and clean off all marine growth and accumulated calcareous deposits resulting from operations of cathodic protection anode.
- .3        Before threading piles remove short pieces of round steel bars welded to the two interlocks at approximately 1.5 metre spaces where they exist. Take care to prevent distortion of the profile form of the interlock.

**3.3                INSTALLATION**

- .1        Schedule work on the SSP cofferdam and the lock gates to begin after the stop log cofferdam has been installed in the canal and so will provide protection from storm waves and currents.
- .2        Erect guide frame members into place making use of bearing areas (niches) provided in the lock walls and secure as indicated on drawings.
- .3        Thread sheet piles into place by interlocking with the anchor piles and complete the arc from wall to wall.
- .4        Secure sheet piles to guide frame to prevent collapse of the assembly when subjected to backward or negative water pressure due to tide changes and effects of wind pressure.
- .5        Employ qualified and experienced divers to examine the bottom ends of the sheet piles to ascertain that all are correctly located within the prepared groove in the bottom sill and that all piles are interlocked one with another and to the anchor piles in the walls.
- .6        Supply and place such means as thought advisable to reduce leakage through interlocks and between bottom ends of sheeting and concrete sill. This may take the form of sand bags, rubber or plastic sheeting, grease or mastic material. This is to be at the option of the Contractor who is fully responsible for dewatering the work areas and supplying pumping capacity to meet terms of Section 02 14 90 of these specifications.

**3.4                REMOVAL**

- .1        Obtain approval of Departmental Representative before removal operations.
- .2        When water pressure on the sheeting is neutral or sufficiently low, extract sheet piles with care to prevent damage and dismantle guide frame.
- .3        Return all material owned by CCG as well as that supplied to storage site and carefully stack in accordance with Departmental Representative's instructions.



- .4 Piling and/or guide frames must be returned to designated storage site.
- .5 Remove any and all material from floor of the lock that may have accumulated as a result of the use of sand bags, sheeting or other means used to reduce leakage.

### **3.5 CLEANING**

- .1 After completion of work all sheeting and guide frame members, whether used on the Contract or not, shall be thoroughly cleaned of all foreign matter, washed down with fresh water, painted with zinc-based primer in accordance with manufacturer's instructions

**END OF SECTION**

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**Part 1            General**

**1.1                DESCRIPTION**

**1.2                RELATED REQUIREMENTS**

- .1      Section 01 11 00 – Summary of Work.
- .2      Section 01 29 00 – Payment Procedures.
- .3      Section 01 33 00 – Submittal Procedures

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1      Methodology:
  - .1          When requested provide methodology for carrying out the work
- .2      Provide submission in accordance with Section 01 33 00.

**1.4                PROTECTION**

- .1      Prevent movement, settlement or damage of adjacent structures. Provide bracing and shoring as required. In event of damage, immediately replace such items or make repairs to approval of Departmental Representative and at no additional cost to Departmental Representative.
- .2      Prevent debris from going adrift and becoming a menace to navigation.
- .3      All damage to existing structures, roadways, pipelines, electrical systems not specified for removal to be repaired at the Contractor's cost to the satisfaction of the Departmental Representative.

**Part 2            Products**

**2.1                NOT USED**

- .1      Not Used.

**Part 3            Execution**

**3.1                PREPARATION**

- .1      Inspect site and verify with Departmental Representative items designated for removal and items to be preserved.
- .2      Locate and protect utility lines. Preserve in operating condition active utilities traversing site.
- .3      Provide temporary power and lighting or as required by the Departmental Representative.

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**3.2 REMOVAL**

- .1 Remove items indicated on Contract Drawings.
- .2 Do not disturb adjacent structures designated to remain in place.
- .3 At end of each day's work, leave work in safe condition so no part is in danger of toppling or falling.

**3.3 DISPOSAL OF MATERIAL**

- .1 Disposal of materials not designated for salvage or re-use in work, will be the contractor's responsibility, and must be disposed of off-site.
- .2 The material to be disposed is to be transported and disposed of in an environmentally acceptable manner to the satisfaction of the Departmental Representative, and in accordance with any local, Municipal, Provincial and Federal restrictions and regulations.

**3.4 RESTORATION**

- .1 Upon completion of work, remove debris, trim surfaces and leave work site clean.
- .2 Reinstall areas and existing works outside areas of demolition to conditions that existed prior to commencement of work. Match condition of adjacent, undisturbed areas.

**END OF SECTION**