

Specification (Measurement)

**Transport and Main Roads
MRS63A Piles for Ancillary Structures**

November 2020

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1 Introduction

This Specification applies to the construction of cast-in-place, reinforced concrete piles contained in open-ended liners left permanently in place extending to competent strata, for high moment and low axial loads (for example, sign gantries).

This Specification shall be read in conjunction with MRS01 *Introduction to Specifications* and other Specifications as appropriate.

This Specification forms part of the Transport and Main Roads Specifications Manual.

2 Measurement of work

2.1 Standard Work Items

In accordance with the provisions of Clause 2.1.3 of MRS01 *Introduction to Specifications* the Standard Work Items covered by this Specification are listed in Table 2.1.

Table 2.1 – Standard Work Items

Standard Item No	Description	Unit of Measurement
Cast-In-Place Piles for Non-Bridge Applications		
70501	Supply and fixing of stiffening bands	each
70502	Handling and pitching of steel liners	each
70503	Driving steel liners	m
70504P	Extension of steel liners (Provisional Quantity, as directed)	each
70508	Excavation of liners	m ³
70509	Excavation below toes of liners	m ³
70510	Excavation for bored piles	m ³
70511	Steel reinforcing bar in lined and bored piles	tonne
70512	Concrete Class [<i>compressive strength</i>] MPa/20 in lined pile	m ³
70513	Concrete Class [<i>compressive strength</i>] MPa/20 in bored pile	m ³
70514	Steel pipe liners, supply on Site [<i>diameter</i>]	m
70515	Certification of pile capacity including provision of As Constructed survey information	each
70516	Pile Integrity Testing	each

2.2 Work Operations

Item 70501 Supply and fixing of stiffening bands

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of stiffening bands, and
- c) fixing stiffening bands to liner.

Item 70502 Handling and pitching of steel liners

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) transferring liner from on Site storage to its aligned position in the driving rig
- c) provision and use of driving rig, and
- d) retention of liner on line for driving.

Item 70503 Driving steel liners

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) driving the liner
- c) field splices made during driving
- d) trimming the liner to level on completion
- e) setting up to re-drive liners, where liners are driven in increments with progressive excavation, and
- f) re-driving of liners to achieve a seal.

Item 70504P Extension of steel liners (Provisional Quantity, as directed)

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) preparation for welding, and
- c) full penetration butt welding of liners.

Item 70508 Excavation of liners

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) excavation of material
- c) disposal of excavated material
- d) de-watering
- e) sealing the base of liners against entry of water or material
- f) interruptions where liners are driven in increments with progressive excavation, and
- g) backfill to liners placed in pre-bored holes, if required.

Item 70509 Excavation below toes of liners

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) excavation of material

- c) disposal of excavated material
- d) de-watering
- e) provision of safety shield, if required, and
- f) inspection by contractor's geotechnical engineer.

Item 70510 Excavation for bored piles

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) excavation of material
- c) disposal of excavated material, and
- d) provision of temporary liners.

Item 70511 Steel reinforcing bar in lined and bored piles

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of all materials, and
- c) fixing reinforcing steel in place.

Item 70512 Concrete Class [*compressive strength*] MPa/20 in lined pile

Work Operations incorporated in the above items include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of concrete
- c) transport of concrete
- d) placing and compacting concrete including the provision of a tremie and all necessary equipment for placing concrete underwater, if the hole is not dry
- e) finishing and curing concrete, and
- f) removal of any nonconforming concrete at the top of the pile and replacement if necessary.

Item 70513 Concrete Class [*compressive strength*] MPa/20 in bored pile

Work Operations incorporated in the above items include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of concrete
- c) transport of concrete
- d) placing and compacting concrete including the provision of a tremie and all necessary equipment for placing concrete underwater, if the hole is not dry
- e) finishing and curing concrete, and
- f) removal of any nonconforming concrete at the top of the pile and replacement if necessary.

Item 70514 Steel liners, supply on Site [diameter]

Work Operations incorporated in the above items include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of liners, including any additional length to suit construction methods
- c) transport of liners to Site
- d) preparation of Site storage area
- e) storage of liners at Site, and
- f) additional length, if any, required to suit the Contractor's proposed construction method.

Item 70515 Certification of pile capacity including provision of As Constructed survey information

Work Operations incorporated in the above items include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) assessment of information including information available to tenderers
- c) undertaking additional investigations and reporting of investigations
- d) provision of safe access for inspection, including safety shield, if required
- e) inspection and logging of the foundation by the Contractor's Geotechnical Assessor
- f) geotechnical certification of foundation capacity and provision of As Constructed survey information, and
- g) provision of As Constructed records.

Item 70516 Pile Integrity Testing

Work Operations incorporated in the above items include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) preparation of pile for testing
- c) conduct Pile Integrity Testing, and
- d) compilation of Pile Integrity Testing Reports.

2.3 Calculation of quantities

2.3.1 Natural ground surface level

The natural ground surface level shall be taken as the level determined from the contours shown on the Standard Drawings unless agreed otherwise, in writing, between the Contractor and the Administrator, prior to commencing excavation.

2.3.2 Supply of liners

Supply of liners of the nominated thickness shall be the length of liner shown on the Standard Drawings which include an allowance for possible variations in foundation levels.

2.3.3 Sinking or driving of liners

Sinking or driving of liners shall be the length of liner, in place, measured along the pile axis from the bottom of the liner to the approved top cut-off level, or to the natural ground surface level, whichever is the lower.

2.4 Excavation

2.4.1 General

In the schedule of rates, where any item for excavation is inclusive of work from a number of discrete areas, the aggregate quantity shown for that item encompasses a range of constituent materials having similar physical properties and similar overall relative proportions of the different components as could be expected from information provided in accordance with Clause 5 of *MRTS63A Piles for Ancillary Structures*. The actual disposition and volumes of the various constituent materials within any individual pile may vary somewhat from those indicated by adjacent boreholes, but no additional compensation shall be paid where the aggregate quantities of the various components for all locations scheduled under the item are compatible with those indicated in accordance with Clause 5 of *MRTS63A Piles for Ancillary Structures*.

Over excavation shall not be measured under any Work Item.

2.4.2 Excavation of liners

Excavation of liners shall be measured as the volume calculated from the approved terminal level of the liner to the natural ground surface level, or to the underside of the pile cap or headstock if that is lower, using the nominal internal diameter of liner shown on the Standard Drawings.

2.4.3 Excavation below toe of liner

Excavation below the toe (i.e. terminal level) of the liner shall be measured as the volume of the cylinder of material whose diameter is equal to the inside diameter of the liner and whose length is measured from the base of the excavation up to the terminal level of the liner.

2.5 Concrete

For lined piles, the quantity of concrete shall be calculated as the sum of:

- a) the volume calculated from the approved terminal level of the liner to the underside of the pile cap or headstock using the nominal internal diameter of liner shown on the Standard Drawings, and
- b) the quantities determined in accordance with Clause 2.4.3.

For bored piles, the quantity of concrete shall be calculated as the volume calculated from the approved base level of the pile to the approved top level of the pile using the diameter of pile shown on the Standard Drawings.

Deductions shall not be made for the volume occupied by reinforcing steel.

No measurement shall be made for concrete required to fill over-break in excavation.

2.6 Steel reinforcing bars

The quantity of steel reinforcing bars shall be calculated in accordance with Clause 2.3 of *MRS71 Reinforcing Steel*, or Clause 2.3 of *MRTS71A Stainless Steel Reinforcing*. The quantity shall

be increased where appropriate to include additional steel reinforcing bars required by extensions to the length of piles from those shown on the Standard Drawings.

