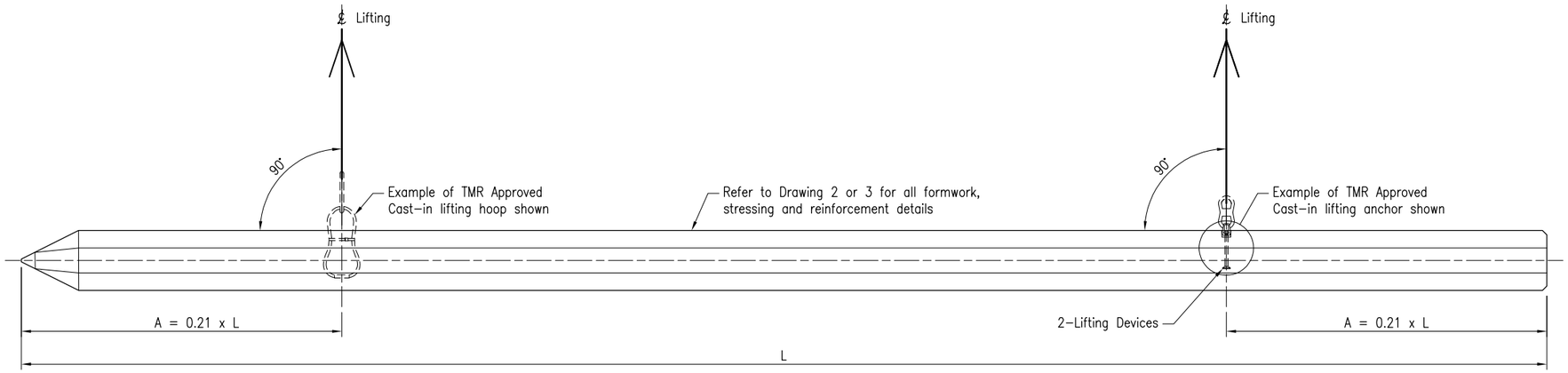
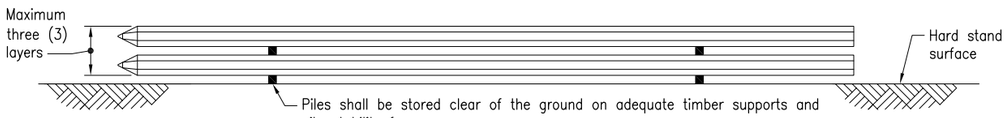


Pile Length L ≤ 28m PSC PILE

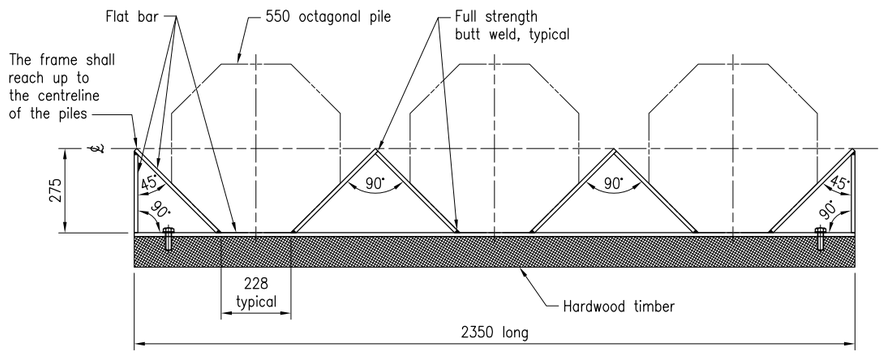
LIFTING DIAGRAM



Piles shall be stored clear of the ground on adequate timber supports and pile stability frame.
Timber supports shall be minimum 100 width x 100 height, and located under the lifting points, +/– 500.
Where piles are to be stacked in more than one layer, additional supports of same size shall be placed on the lower pile directly above the lower supports.
Timber supports shall be fitted with pile stability frames.

Pile Length L ≤ 28m PSC PILE

STORAGE AT CASTING YARD



TYPICAL PILE STABILITY FRAME

Refer Note 7

INDEX – 550 OCTAGONAL PSC PILE – EARTHQUAKE CLASSIFICATION BEDC–1 and EXPOSURE CLASSIFICATION B2

DESCRIPTION	DRAWING REFERENCE
General Notes; Design Criteria, Notes and Details for Lifting	2021 Drawing 1 of 3
Details for PSC Pile with 12.7 Diameter Strands	2021 Drawing 2 of 3
Details for PSC Pile with 15.2 Diameter Strands	2021 Drawing 3 of 3

Note: The above index shall be included on the project drawings, amended to suit the requirements of the specific Project

DESIGN CRITERIA FOR 550 OCTAGONAL PSC PILES

1. HELIX is valid for applications where the design is limited to less than or equal to half the axial ultimate capacity. For other design axial load, the fit for purpose requirements shall be included in the project drawings.

DESIGN CRITERIA FOR CAST–IN LIFTING ANCHORS AND HOOPS

C1. Details for cast–in lifting anchors and hoops shown in this standard drawing are indicative only. Lifting anchors and hoops shall be designed and RPEQ certified by project design engineer for project specific lifting arrangements for lifting at casting yard and site, as appropriate.
C2. The lifting arrangements shown in this standard drawing are for lifting at casting yard only. This is to meet the pile allowable concrete stress criteria in accordance with to MRTS65 for pile length up to 28m. For all other lifting situations, including lifting at site, the pile shall be designed to meet the project specific lifting arrangements and RPEQ certified.
C3. Site lifting with stationary crane on outriggers, maximum dynamic factor of 1.5, is acceptable for pile length up to 28m. Lifting points shall be the same as shown. For higher dynamic factors, pile shall be checked and RPEQ certified by project design engineer to meet the allowable concrete stress criteria specified in MRTS65.
C4. WORKING LOAD LIMIT (WLL): The WLL for each cast–in lifting anchor or hoop shall have an equivalent minimum Factor of Safety (FOS) = 4.0.
C5. APPLIED LOADS (W_A) calculated including an allowance for dynamic effects shall not exceed the Working Load Limit (WLL) of the cast–in lifting anchor or hoop.
C6. All cast–in anchors and lifting hoops shall be designed for the appropriate Dynamic Lifting Factors (DLF) specified in MRTS73.
C7. APPROVED CAST–IN ANCHORS AND HOOPS are published on the TMR Approved Product Index.
C8. Suppliers of proprietary cast–in anchors and lifting hoops have various Factors of Safety (FoS) specified in their product capacity tables. These tables shall be converted to achieve a minimum FoS = 4.0, for Dynamic Lifting Factors outlined in MRTS73.
C9. EMBEDMENT LENGTH of the cast–in anchor or lifting hoop shall be in accordance with manufacture's specifications. Minimum cover to bottom of cast–in anchor or lifting hoop shall be 50mm.

CAST–IN LIFTING ANCHOR NOTES:

A1. RECESS: Anchor recess shall be hemispherical. Recesses shall be sized to allow Proprietary Lifting Clutches to lock onto the Lifting Anchor, in accordance with manufacture's specifications.
A2. RECESS FINISH: After lifting anchor is no longer required, grout fill with approved epoxy resin grout. TMR approved epoxy resin grout shall be suitable for high impact loads.

CAST–IN LIFTING HOOP NOTES:

H1. LIFTING shall be with minimum pin diameter as per manufacturer's specifications.
H2. HOOP FINISH: After lifting hoop is no longer required, cut–off flush with top of precast pile, apply three coats of approved surface tolerant epoxy compound to provide a minimum film thickness of 0.3mm dry or 0.6mm wet.

CAST–IN ANCHOR/HOOP LIFTING DETAILS

Pile Length	L = †
Cast–in Anchor/Hoop	Part No †
Working Load Limit (FOS = 4)	†
LIFTING ASSUMPTIONS, refer DESIGN CRITERIA	
Dynamic Load Factor	1.2 †
Lift Angle	Vertical †
Crane Type	Gantry †

† The above details shall be included on the project drawings

The purpose of This Standard Drawing is to provide typical standard details. The fitness for purpose of these details for a specific project shall be designed and certified by an RPEQ.
The details specific to the project location shall be shown on the project specific drawings.

GENERAL NOTES:

1. PILES shall be manufactured to MRTS73.
2. EARTHQUAKE classification BEDC–1.
3. CONCRETE shall be in accordance with MRTS70.
   Concrete S50/20.
   Strength at transfer 35MPa minimum.
   Exposure classification B2.
   Minimum cover to reinforcement shall be 50 unless shown otherwise.
4. REINFORCEMENT PATTERN:
   Headbar Types shall alternate and be placed adjacent to strands while maintaining as uniform a spacing as possible.
   Refer to HEADBAR SCHEDULE on DRAWING 2 or 3, as appropriate, for headbar details.
5. REINFORCEMENT AND STRAND SUPPORT: Multiple spacers are permitted to be used in the following zones to maintain the correct strand pattern and headbar arrangement.
   ¥ Zone with headbars: Spacers Type 1 shall be used to maintain the correct headbar formation during casting.
   Spacer Type 1 shall be located at 4000 maximum centres to form headbar cage.
   Minimum 2 off Spacer Type 1 shall be used.
   Spacer Type 1 are permitted to be substituted with Type 2. Where substitutions are made headbars shall be tied to the inside of the Type 2 spacers.
   Strand and headbar bundle to be tied to main helix, and ties shall be at maximum 900 centres, typical.
   # Zone where there are no headbars: Spacers Type 2 shall be used to maintain the correct strand pattern formation during casting.
   Minimum 1 off Spacer Type 2 shall be used, located 4000 from the pile toe.
   Additional Spacers, where required, shall be placed at 4000 maximum centres.
6. STRANDS shall be to MRTS73 and to AS/NZS 4672.1, and testing requirements to AS/NZS 4672.2.
   Drawing 2: 7 wire ordinary–12.7–1870–Relax 2 pretensioning force at stressing = 147kN per strand.
   Drawing 3: 7 wire ordinary–15.2–1750–Relax 2 pretensioning force at stressing = 200kN per strand.
7. PILE STABILITY FRAME shown indicative only. Sizing of stability frame and its components shall be designed and RPEQ certified by the precaster's designer or contractor's designer.
8. REINFORCING STEEL shall be in accordance with MRTS71 and AS/NZS 4671.
   Deformed bar Grade D500N. Round bar Grade R250N.
   Deformed wire Grade D500L. Round wire Grade R500L.
   All carbon reinforcing steel shall be ACRS certified.
9. HELIX: RW7.6 dia deformed wire.
   The Helix may be spliced within its length. If splices are required, each segment shall be terminated with 1.5 flat turns, Lapped and tied.
   Helix splices are permitted to be located within a Lifting Hoop.
10. PILE CAST–IN LIFTING ANCHORS AND HOOPS shall be in accordance with the notes and details on this drawing.
    Cast–in lifting anchors shall be hot dip galvanised to AS 1214.
11. GREY IRON CASTING Grade H–187 to AS 1830.
12. STEELWORK shall be fabricated to MRTS78.
    Bolts Class 4.6 to AS 1111.1.
13. WELDING symbols shall be to AS 1101.3.
    Welding of bar splices and tack welding for location purposes shall be to AS/NZS 1554.3.
    Welding consumables shall be controlled hydrogen type G49X to AS/NZS ISO 14341 or T49X to AS/NZS ISO 17632.
14. DIMENSIONS are in millimetres unless noted otherwise.

ASSOCIATED DEPARTMENTAL DOCUMENT:
Design Criteria for Bridges and Other Structures

REFERENCED DOCUMENTS:
Departmental Specifications:
MRTS65 Precast Prestressed Concrete Piles
MRTS70 Concrete
MRTS71 Reinforcing Steel
MRTS73 Manufacture of Prestressed Concrete Members and Stressing Units
MRTS78 Fabrication of Structural Steelwork

Department of Transport and Main Roads

550 OCTAGONAL PSC PILES

EARTHQUAKE CLASSIFICATION BEDC–1
EXPOSURE CLASSIFICATION B2

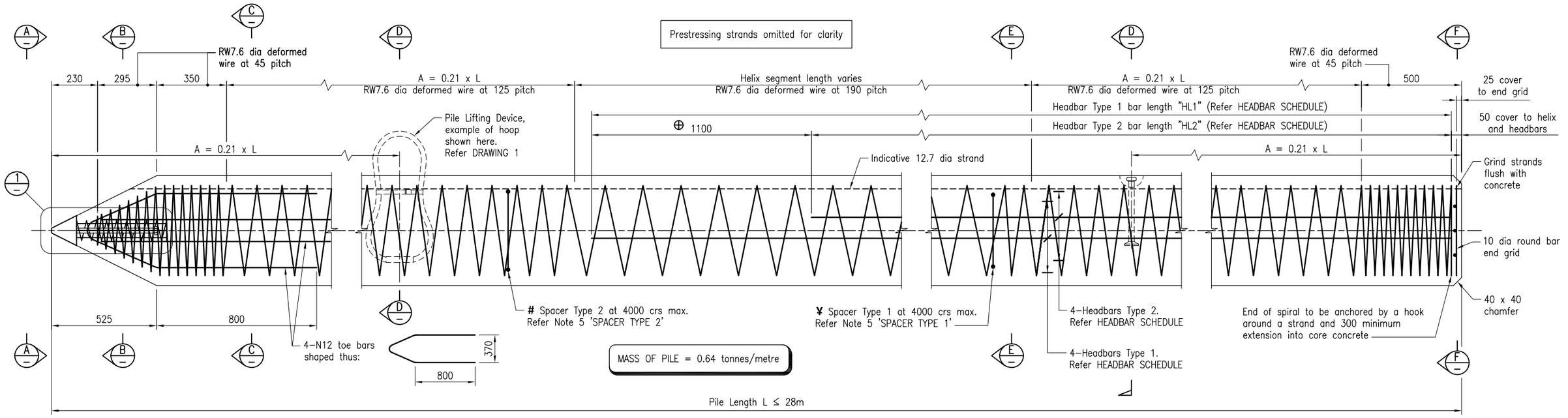
DRAWING 1 OF 3

Queensland Government

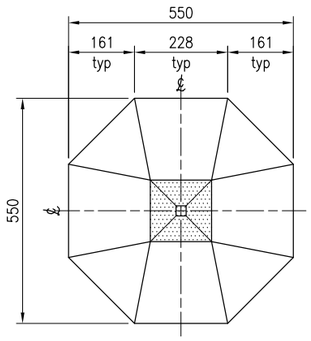
A3
Not to Scale

Standard Drawing No
2021
Date 3/2020

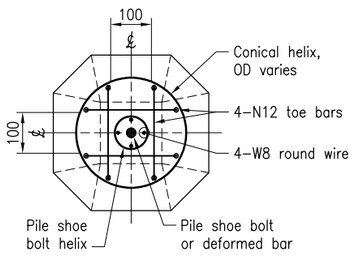
A | B | C



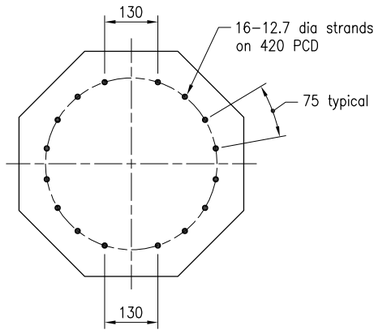
TYPICAL LONGITUDINAL ELEVATION
PSC PILE



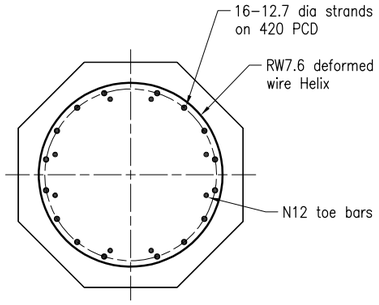
VIEW A



SECTION B



TOTAL 16–12.7 DIA STRANDS
TYPICAL STRAND LAYOUT



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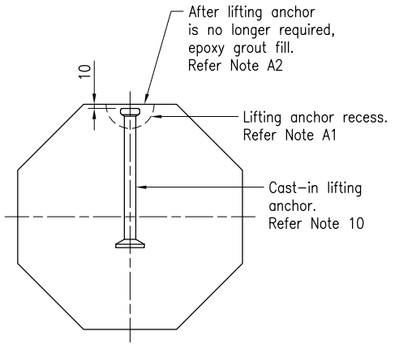
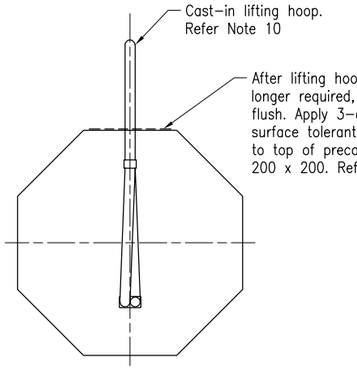
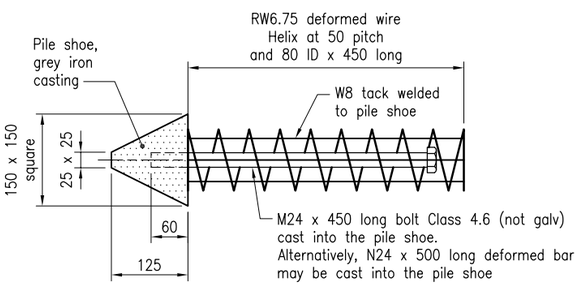


LIFTING ANCHOR

SECTION D

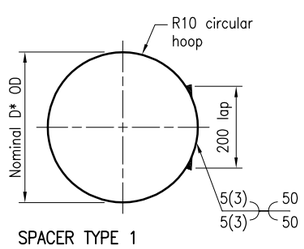


LIFTING HOOP

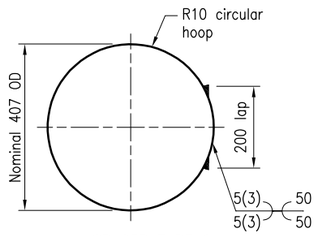


DETAIL 1 PILE SHOE

Headbar size	Diameter D*
N24	384
N28	376
N32	368

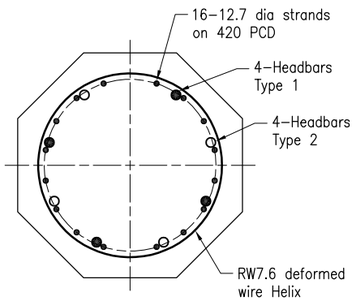


SPACER TYPE 1
For use with Headbars

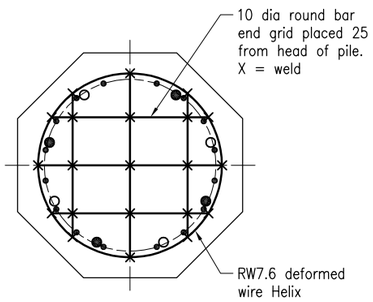


SPACER TYPE 2
For use where there are no Headbars

TYPICAL REINFORCEMENT AND STRAND SUPPORT
Refer Note 5 on Drawing 1



SECTION E



SECTION F

PILE SCHEDULE

PILE LOCATION	PILE LENGTH (m)	MASS (t)	No OFF	TOTAL MASS (t)
xx	xx	xx.x	xx	xxx.x
xx	xx	xx.x	xx	xxx.x
xx	xx	xx.x	xx	xxx.x

xx denotes information to be included in the project drawings

HEADBAR SCHEDULE

Headbars					
Type 1			Type 2		
No OFF	Size	Length	No OFF	Size	Length
4	Nxx	HL1	4	Nxx	HL2

HEADBAR NOTES:
Nxx denotes Bar size
HL2 = HL1 – 1100 ⊕
The headbar length and size shall be included on the project drawings

Department of Transport and Main Roads

550 OCTAGONAL PSC PILES

EARTHQUAKE CLASSIFICATION BEDC–1
EXPOSURE CLASSIFICATION B2
12.7 DIAMETER STRANDS LAYOUT

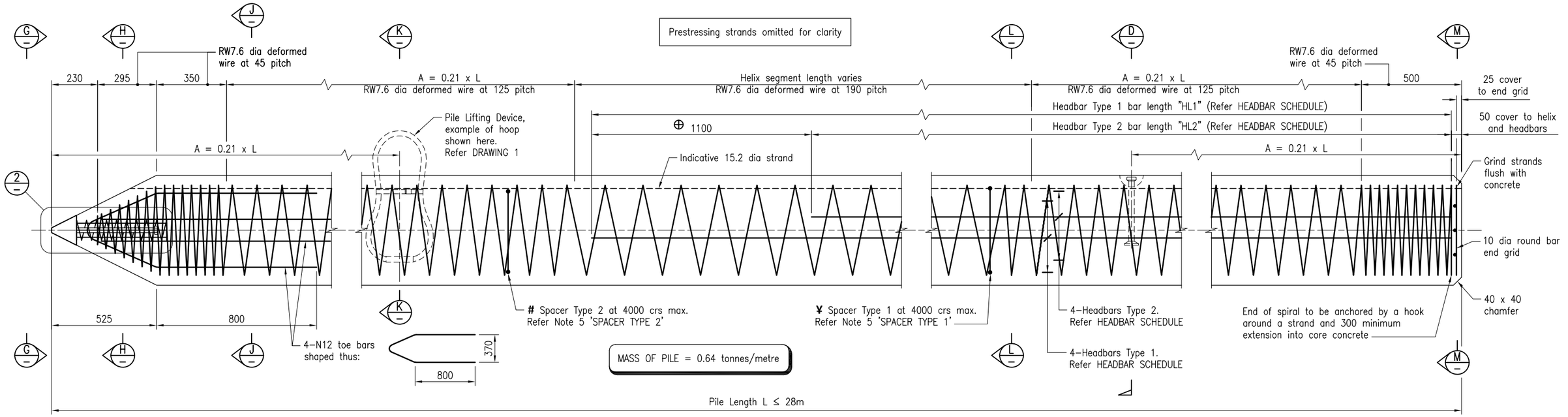
DRAWING 2 OF 3

Queensland Government

A3
Not to Scale

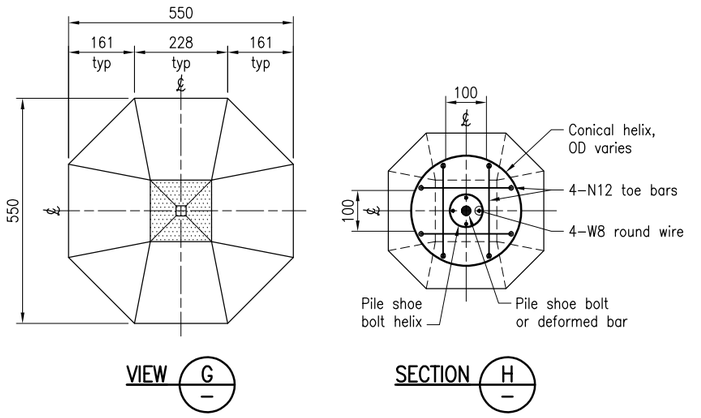
Standard Drawing No
2021
Date 3/2020

A | B | C



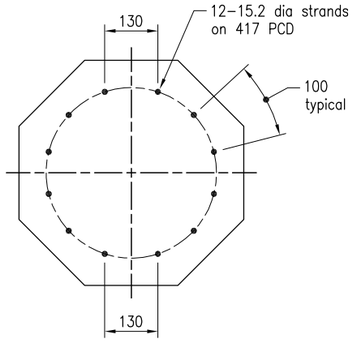
TYPICAL LONGITUDINAL ELEVATION

PSC PILE



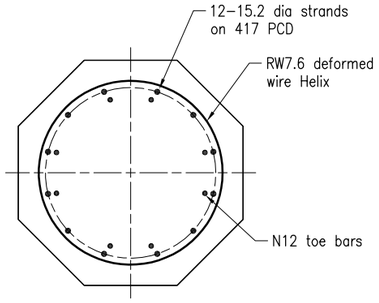
VIEW G

SECTION H

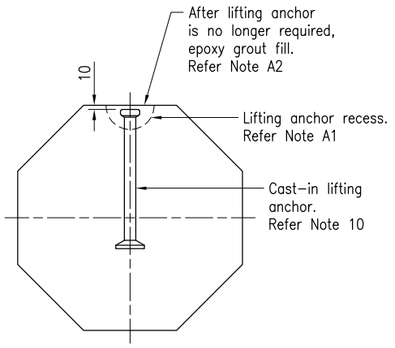


TOTAL 12–15.2 DIA STRANDS

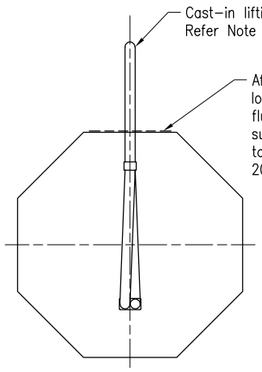
TYPICAL STRAND LAYOUT



SECTION J

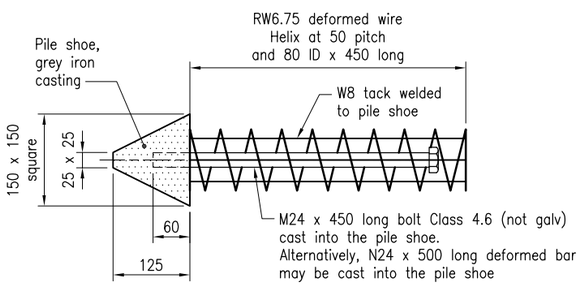


LIFTING ANCHOR



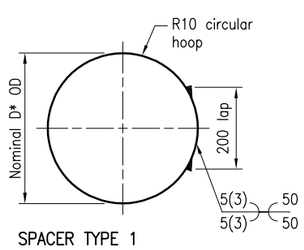
LIFTING HOOP

SECTION K

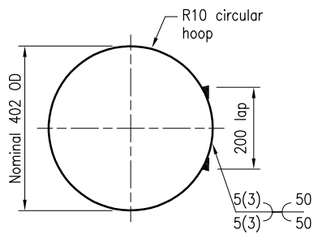


DETAIL 2 PILE SHOE

Headbar size	Diameter D*
N24	384
N28	376
N32	368



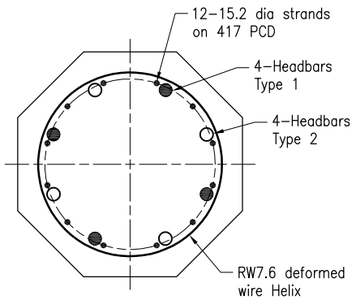
SPACER TYPE 1
For use with Headbars



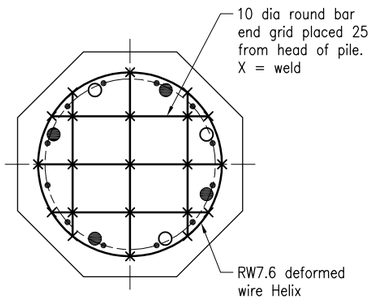
SPACER TYPE 2
For use where there are no Headbars

TYPICAL REINFORCEMENT AND STRAND SUPPORT

Refer Note 5 on Drawing 1



SECTION L



SECTION M

PILE SCHEDULE

PILE LOCATION	PILE LENGTH (m)	MASS (t)	No OFF	TOTAL MASS (t)
xx	xx	xx.x	xx	xxx.x
xx	xx	xx.x	xx	xxx.x
xx	xx	xx.x	xx	xxx.x

xx denotes information to be included in the project drawings

HEADBAR SCHEDULE

Headbars					
Type 1			Type 2		
No OFF	Size	Length	No OFF	Size	Length
4	Nxx	HL1	4	Nxx	HL2

HEADBAR NOTES:
Nxx denotes Bar size
HL2 = HL1 – 1100 ⊕
The headbar length and size shall be included on the project drawings

Department of Transport and Main Roads

550 OCTAGONAL PSC PILES

EARTHQUAKE CLASSIFICATION BEDC–1
EXPOSURE CLASSIFICATION B2
15.2 DIAMETER STRANDS LAYOUT

DRAWING 3 OF 3

Queensland Government

A3
Not to Scale

Standard Drawing No
2021
Date 3/2020

A | B | C