

# DOCUMENTATION OF COASTAL PROTECTION WORKS

AT 1190 TO 1196 & 1204 PITTWATER ROAD, NARRABEEN, NSW

# HORTON COASTAL ENGINEERING PTY LTD

**18 Reynolds Cres. Beacon Hill NSW 2100**

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# JAMES TAYLOR AND ASSOCIATES

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| DRAWING LIST |                                                             |
|--------------|-------------------------------------------------------------|
| Sheet Number | Sheet Title                                                 |
| S01          | GENERAL NOTES                                               |
| S02          | COASTAL PROTECTION WORKS PLAN                               |
| S03          | LANDSCAPING PLAN                                            |
| S04          | EROSION AND SEDIMENT CONTROL PLAN AND WASTE MANAGEMENT PLAN |
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| S16          | DEADMAN ANCHOR ALTERNATIVE                                  |
| S20          | ACCESS STAIRS                                               |
| S30          | EASTERN WALL ELEVATION                                      |

## REFERENCE DOCUMENTS

1. SURVEY DRAWING PREPARED BY:  
DETAILED SURVEYS  
Ph. (02) 9913 9525  
REF No. 077/17  
DATED: 24 OCT 2017
2. PRE-2016 STORM PROFILES  
DERIVED FROM NSW DEPARTMENT OF PLANNING,  
INDUSTRY AND ENVIRONMENT DATA  
DATED 5 APRIL 2016
3. POST-2016 STORM PROFILES  
DERIVED FROM NSW DEPARTMENT OF PLANNING,  
INDUSTRY AND ENVIRONMENT, AND WATER  
RESEARCH LABORATORY DATA  
DATED 7 JUNE 2016
4. APRIL 2021 PROFILES DERIVED FROM NSW  
DEPARTMENT OF PLANNING, INDUSTRY AND  
ENVIRONMENT DATA  
DATED 14 APRIL 2021

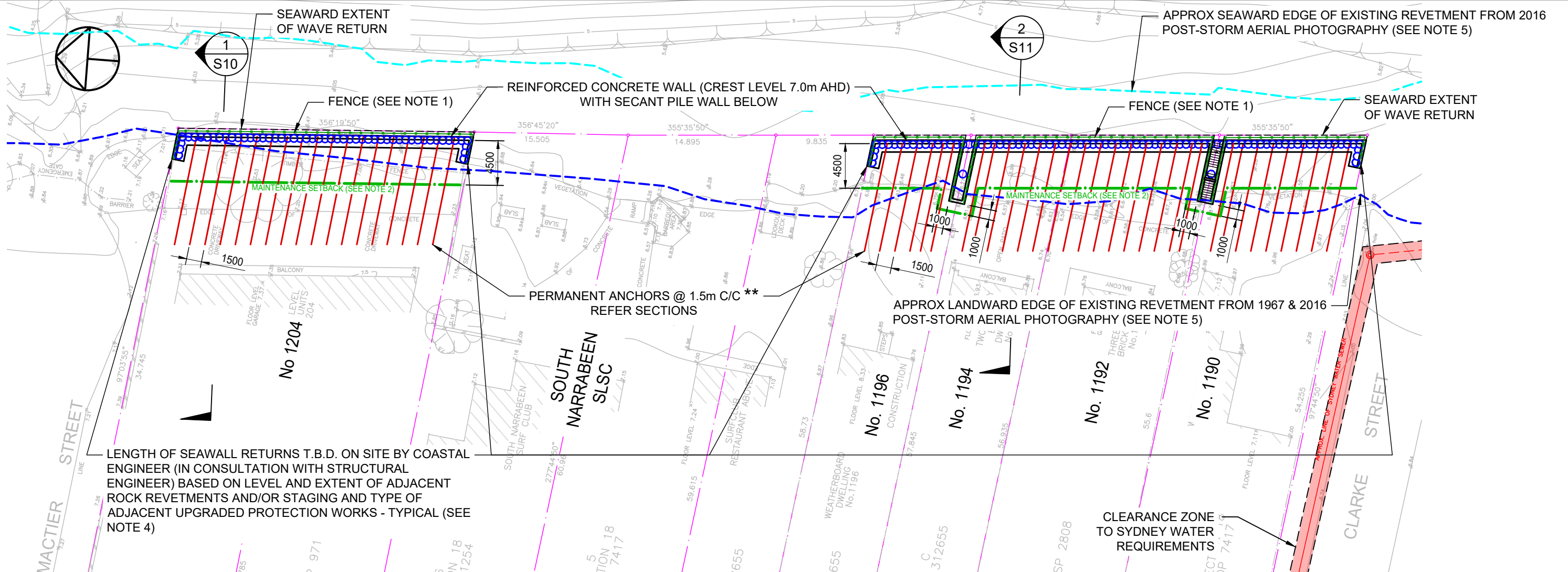
## GENERAL NOTES

- N1. ALL LEVELS ARE IN METRES RELATIVE TO AUSTRALIAN HEIGHT DATUM (AHD), UNLESS NOTED OTHERWISE
- N2. FGL REFERS TO FINISHED GROUND LEVEL

# STRUCTURAL

- S1. ALL STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH AS4100
- S2. ALL TIMBER STRUCTURES SHALL BE IN ACCORDANCE WITH AS 1720, AS1684 AS REQUIRED
- S3. ALL PILING AND CONCRETE STRUCTURES SHALL BE IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS

|                      |      |                |          |     |                                                                                                            |                                                                                                                                                                                                                |                                                                                                                                                                                                                                               |        |                                                                                                                                                                              |       |      |                                       |                                      |                            |
|----------------------|------|----------------|----------|-----|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|---------------------------------------|--------------------------------------|----------------------------|
| PP                   | RY   | REVISED FOR DA | 16/12/21 | H   | <b>COASTAL PROTECTION WORKS</b><br><b>AT 1190 TO 1196 &amp; 1204 PITTWATER RD</b><br><b>NARRABEEN, NSW</b> | <b>COASTAL ENGINEERING DESIGN:</b><br><b>HORTON COASTAL ENGINEERING PTY LTD</b><br>18 Reynolds Cres. Beacon Hill NSW 2100<br>TEL: +61 (0)407 012 538<br>peter@hortoncoastal.com.au<br>www.hortoncoastal.com.au | <b>STRUCTURAL ENGINEERING DESIGN:</b><br><b>James Taylor &amp; Associates</b><br>Civil & Structural Consulting Engineers<br>SUITE 301, 115 MILITARY ROAD NEUTRAL BAY NSW 2090<br>TEL: 02 99691999<br>EMAIL: mail@jamestaylorassociates.com.au | DESIGN | P.H.                                                                                                                                                                         | DRAWN | P.P. | <b>PROJECT NO.</b><br><br><b>6355</b> | <b>DRAWING NO.</b><br><br><b>S01</b> | <b>REV</b><br><br><b>H</b> |
| PP                   | RY   | REVISED FOR DA | 23/07/21 | G   |                                                                                                            |                                                                                                                                                                                                                |                                                                                                                                                                                                                                               | CHKD.  | R.Y.                                                                                                                                                                         |       |      |                                       |                                      |                            |
| PP                   | RY   | REVISED FOR DA | 30/06/21 | F   |                                                                                                            |                                                                                                                                                                                                                |                                                                                                                                                                                                                                               | APPRD. | P.H.                                                                                                                                                                         |       |      |                                       |                                      |                            |
| HL                   | RY   | REVISED FOR DA | 28/05/21 | E   |                                                                                                            |                                                                                                                                                                                                                |                                                                                                                                                                                                                                               |        |                                                                                                                                                                              |       |      |                                       |                                      |                            |
| PP                   | RY   | ISSUED FOR DA  | 24/05/21 | D   |                                                                                                            |                                                                                                                                                                                                                |                                                                                                                                                                                                                                               |        |                                                                                                                                                                              |       |      |                                       |                                      |                            |
| PP                   | RY   | FOR REVIEW     | 14/05/21 | C   |                                                                                                            |                                                                                                                                                                                                                |                                                                                                                                                                                                                                               |        |                                                                                                                                                                              |       |      |                                       |                                      |                            |
| PP                   | RY   | FOR REVIEW     | 10/05/21 | B   |                                                                                                            |                                                                                                                                                                                                                |                                                                                                                                                                                                                                               |        |                                                                                                                                                                              |       |      |                                       |                                      |                            |
| PP                   | RY   | WIP ISSUE      | 03/05/21 | A   |                                                                                                            |                                                                                                                                                                                                                |                                                                                                                                                                                                                                               |        |                                                                                                                                                                              |       |      |                                       |                                      |                            |
| RY                   | CHKD | DESCRIPTION    | DATE     | REV |                                                                                                            |                                                                                                                                                                                                                |                                                                                                                                                                                                                                               |        |                                                                                                                                                                              |       |      |                                       |                                      |                            |
| <b>GENERAL NOTES</b> |      |                |          |     |                                                                                                            |                                                                                                                                                                                                                |                                                                                                                                                                                                                                               |        | COPYRIGHT: THIS DESIGN AND PLANS ARE NOT TO BE USED OR REPRODUCED WHOLLY OR IN PART WITHOUT WRITTEN PERMISSION FROM HORTON COASTAL ENGINEERING AND JAMES TAYLOR & ASSOCIATES | SCALE | DATE |                                       |                                      |                            |



\*\* A HOLLOW BAR ANCHORING SCHEME HAS BEEN INDICATED ON THESE DRAWINGS. ALTERNATIVE ANCHOR SETOUTS AND/OR TYPES MAY BE SUBMITTED FOR APPROVAL. DEADMAN ANCHOR SYSTEM IS DESCRIBED ON DRAWING S16 AS AN ALTERNATIVE TO THE HOLLOW BAR ANCHORING SCHEME. THE ANCHORING SCHEME SHALL BE AGREED WITH CONTRACTOR SUBJECT TO CONFIRMATION OF STRUCTURAL & GEOTECHNICAL ENGINEERS

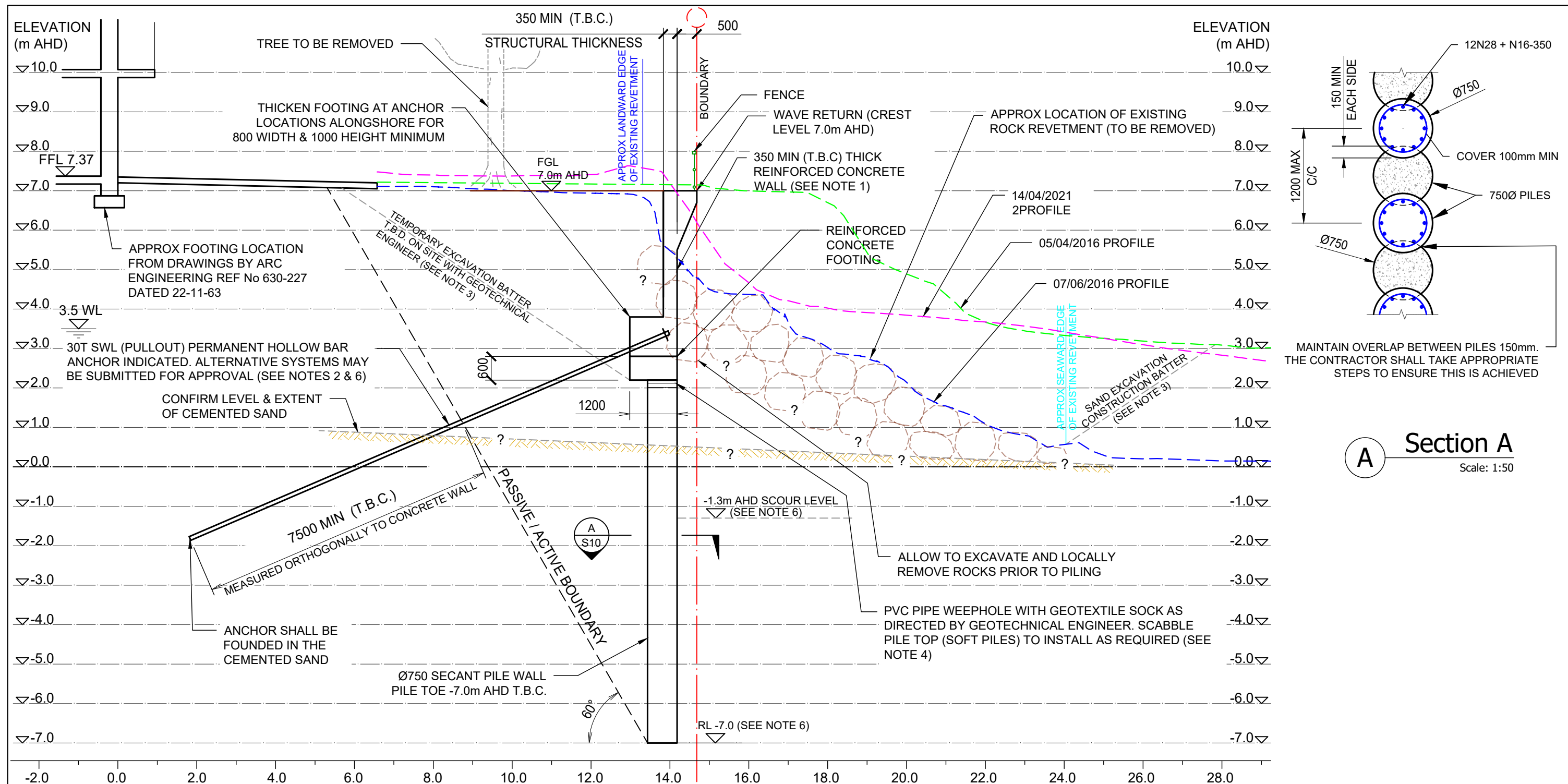
1. ALL FENCING SHALL COMPLY WITH STATE ENVIRONMENTAL PLANNING POLICY (EXEMPT AND COMPLYING DEVELOPMENT CODES) 2008 AND BUILDING CODE OF AUSTRALIA (BCA)
2. NO FUTURE STRUCTURES, EXCEPT READILY RELOCATABLE OR REMOVABLE STRUCTURES THAT DO NOT INTERRUPT VIEWS, ARE TO BE CONSTRUCTED SEAWARD OF THIS MAINTENANCE SETBACK LINE, TO ENABLE 4.5m OF CLEAR PASSAGE FOR CONSTRUCTION PLANT AS REQUIRED FOR FUTURE PROTECTION WORKS MAINTENANCE. THIS LINE IS THE RECOMMENDED MOST SEAWARD SETBACK FOR FUTURE DWELLINGS (SEE NOTE 3).
3. FUTURE SETBACKS AND DEVELOPMENT TYPES ADOPTED ARE SUBJECT TO MERIT ASSESSMENT AGAINST OTHER PLANNING CONSIDERATIONS (INCLUDING VIEWS AND OVERSHADOWING) AND SPECIFIC ENGINEERING (COASTAL, STRUCTURAL AND GEOTECHNICAL) ADVICE (INCLUDING POTENTIAL IMPACTS ON THE PROTECTION WORKS)
4. TEMPORARILY REMOVE PORTION OF ROCK REVETMENT AND OTHER MATERIALS (SOIL, GRASS AND THE LIKE) AS REQUIRED AT ADJACENT COUNCIL LAND (MACTIER STREET, SOUTH NARRABEEN SLSC AND CLARKE STREET AS APPLICABLE), AS DIRECTED BY COASTAL ENGINEER, TO ALLOW CONSTRUCTION OF PROPOSED WORKS. REINSTATE ROCK REVETMENT AND LAND IN THESE AREAS TO PRE-WORKS CONDITION AS SOON AS POSSIBLE AFTER CONSTRUCTION OF SEAWALL AT NO. 1190-1196 & 1204, AS DIRECTED BY COASTAL ENGINEER (ALSO SEE DWG S03), UNLESS STAGING AND TYPE OF COUNCIL SEAWALL WORKS MAKES THIS UNNECESSARY AND AS AGREED WITH COUNCIL.
5. LANDWARD AND SEAWARD EXTENTS OF EXISTING ROCK TO BE CONFIRMED IN FUTURE GEOTECHNICAL INVESTIGATION, IF REQUIRED. 2020 AERIAL PHOTOGRAPHY WAS ALSO USED TO ESTIMATE SEAWARD EXTENT OF ROCK AT CLARKE STREET.

|    |      |                |          |     |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |        |      |             |      |             |  |
|----|------|----------------|----------|-----|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------------|------|-------------|--|
| PP | RY   | REVISED FOR DA | 16/12/21 | H   | COASTAL PROTECTION WORKS<br>AT 1190 TO 1196 & 1204 PITTWATER RD<br>NARRABEEN, NSW | COASTAL ENGINEERING DESIGN:<br><b>HORTON COASTAL ENGINEERING PTY LTD</b><br>18 Reynolds Cres. Beacon Hill NSW 2100<br>TEL: +61 (0)407 012 538<br>peter@hortoncoastal.com.au<br>www.hortoncoastal.com.au | STRUCTURAL ENGINEERING DESIGN:<br><b>James Taylor &amp; Associates</b><br>Civil & Structural Consulting Engineers<br>SUITE 301, 115 MILITARY ROAD NEUTRAL BAY NSW 2090<br>TEL: 02 99691999<br>EMAIL: mail@jamestaylorassociates.com.au | DESIGN | P.H. | DRAWN       | P.P. | PROJECT NO. |  |
| PP | RY   | REVISED FOR DA | 23/07/21 | G   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | CHKD.  | R.Y. | 6355        |      |             |  |
| PP | RY   | REVISED FOR DA | 30/06/21 | F   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | APPRD. | P.H. | DRAWING NO. |      | REV         |  |
| HL | RY   | REVISED FOR DA | 28/05/21 | E   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | SCALE  | DATE | S02         | H    |             |  |
| PP | RY   | ISSUED FOR DA  | 24/05/21 | D   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |        |      |             |      |             |  |
| PP | RY   | FOR REVIEW     | 14/05/21 | C   | <b>COASTAL PROTECTION WORKS<br/>PLAN</b>                                          | COPYRIGHT: THIS DESIGN AND PLANS ARE NOT TO BE USED OR REPRODUCED WHOLLY OR IN PART WITHOUT WRITTEN PERMISSION FROM HORTON COASTAL ENGINEERING AND JAMES TAYLOR & ASSOCIATES                            |                                                                                                                                                                                                                                        |        |      | A3          |      |             |  |
| PP | RY   | FOR REVIEW     | 10/05/21 | B   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |        |      |             |      |             |  |
| PP | RY   | WIP ISSUE      | 03/05/21 | A   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |        |      |             |      |             |  |
| BY | CHKD | DESCRIPTION    | DATE     | REV |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |        |      |             |      |             |  |







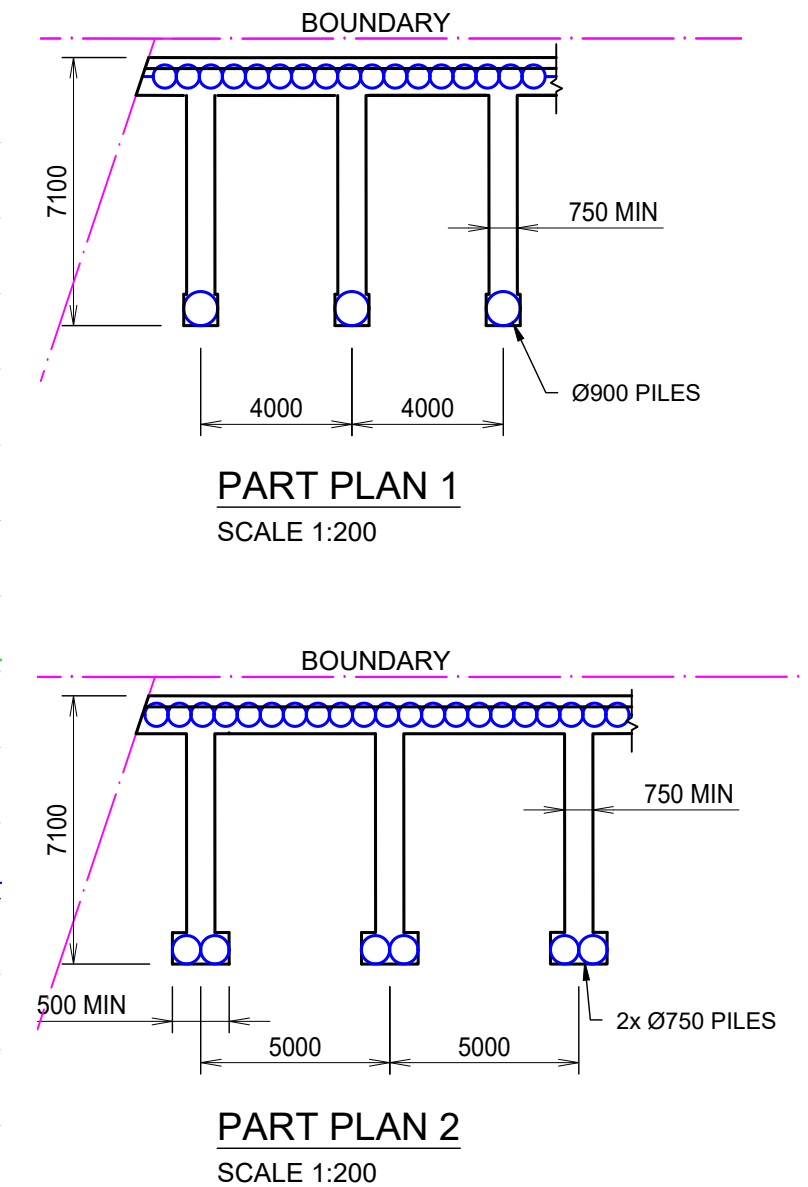


1. ACHIEVE MINIMUM OF CLASS 3 FINISH ON CONCRETE WALL AS PER AS 3610, WITH CONSISTENT SAND-MATCHING COLOUR AS AGREED PRIOR TO THE WORKS COMMENCING. ALTERNATIVE COLOURS, PATTERNS AND TEXTURES MAY BE CONSIDERED WITH AGREEMENT OF COUNCIL
2. EMBED ANCHOR WITHIN CEMENTED SANDS, DESIGN LIFE MIN 100 YEARS. DETAILED ANCHOR DESIGN & CERTIFICATION BY ANCHORING CONTRACTOR, SUBJECT TO APPROVAL OF STRUCTURAL AND GEOTECHNICAL ENGINEERS. ALTERNATIVE PERMANENT ANCHOR SYSTEMS MAY BE CONSIDERED SUBJECT TO APPROVAL OF STRUCTURAL AND GEOTECHNICAL ENGINEERS.
3. SLOPE OF BATTER TO BE 1V:1.5H OR FLATTER. IT WOULD BE DIFFICULT TO MAINTAIN A TEMPORARY EXCAVATION BATTER AT 1V:1.5H IN SAND BELOW THE GROUNDWATER LEVEL. THEREFORE, TEMPORARY SUPPORT OF THE EXCAVATION (SUCH AS WITH SAND BAGS) AND/OR USE OF SUITABLE ROCK TO FORM A BATTER OF APPROXIMATELY 1V:2.5H MAY BE REQUIRED BELOW THE GROUNDWATER LEVEL (BAGS AND ROCK TO BE REMOVED OFF BEACH AT COMPLETION OF EXCAVATION WORKS. ALSO SEE NOTE 6 ON DWG S04)
4. ENSURE ADEQUATE COVER IS MAINTAINED TO REINFORCEMENT IN PILES AFTER SCABBLING, AS DIRECTED BY STRUCTURAL ENGINEER. PVC PIPE WEEPHOLES COULD ALTERNATIVELY BE TIED TO BASE OF CONCRETE FOOTING (PILE CAPPING BEAM) REINFORCEMENT IF AGREED BY CONTRACTOR AND STRUCTURAL ENGINEER
5. BOULDERS MAY BE RETAINED INSITU LANDWARD OF THE VERTICAL WALL IF AGREED WITH ANCHORING CONTRACTOR AND GEOTECHNICAL ENGINEER. OPTIONS FOR RETENTION WILL BE CONSIDERED ON-SITE BETWEEN THE PRINCIPAL'S GEOTECHNICAL, STRUCTURAL AND COASTAL ENGINEERS AND THE CONTRACTOR, BASED ON FACTORS SUCH AS THE EXTENT OF REQUIRED EXCAVATION AND POTENTIAL FOR UNDERMINING STRUCTURES AND NEED FOR TEMPORARY SHORING, COMPACTION OF BACKFILL THAT CAN BE ACHIEVED WITH BOULDERS IN PLACE, HOW MUCH CONSTRAINT THE BOULDERS IN PLACE WOULD BE TO FUTURE DEVELOPMENT, POTENTIAL IMPACT OF BOULDERS ON ANCHORING, AND POTENTIAL USES OF EXCAVATED BOULDERS
6. SCOUR LEVEL, PILE DEPTH AND ANCHOR CAPACITIES SUBJECT TO REVIEW TO DETERMINE THE REQUIRED MINIMUM FACTOR OF SAFETY OF 1.5 FOR GLOBAL STABILITY AND STRUCTURAL STABILITY (CONSIDERING DISTURBING AND BALANCING FORCES AND MOMENTS) SUBJECT TO GEOTECHNICAL ENGINEER'S MODELLING & CONFIRMATION AS PART OF DETAILED DESIGN

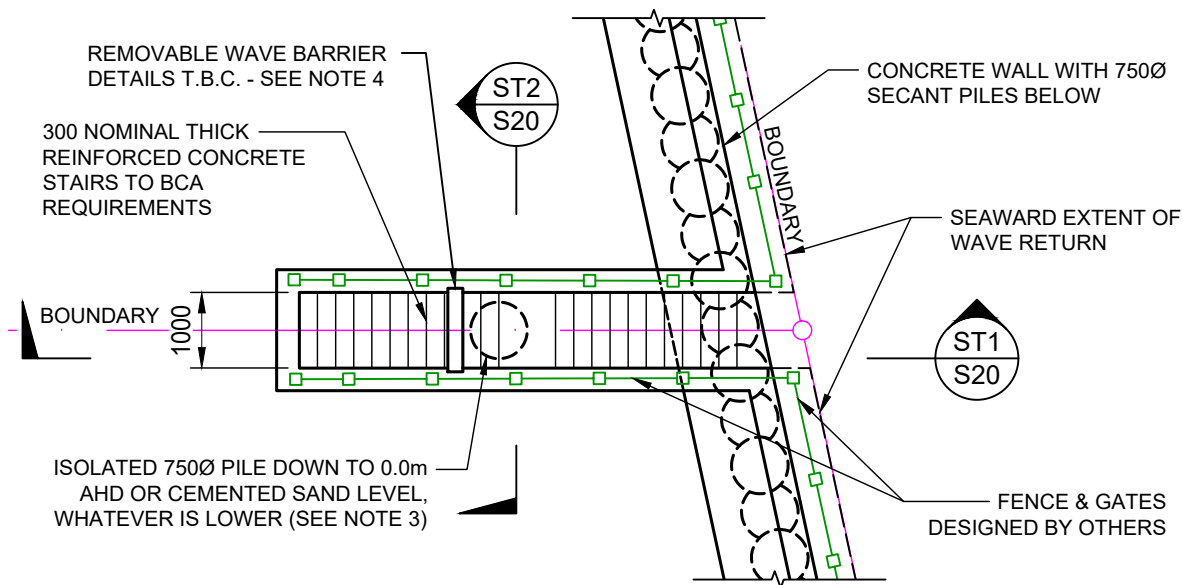
|    |      |                |          |     |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |        |         |       |      |                            |          |
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| PP | RY   | REVISED FOR DA | 23/07/21 | G   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | CHKD.  | R.Y.    |       |      |                            |          |
| PP | RY   | REVISED FOR DA | 30/06/21 | F   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | APPRD. | P.H.    |       |      | DRAWING NO.                | REV      |
| HL | RY   | REVISED FOR DA | 28/05/21 | E   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | SCALE  | 1 : 100 | DATE  |      | <b>S10</b>                 | <b>H</b> |
| PP | RY   | ISSUED FOR DA  | 24/05/21 | D   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |        |         |       |      |                            |          |
| PP | RY   | FOR REVIEW     | 14/05/21 | C   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |        |         |       |      |                            |          |
| PP | RY   | FOR REVIEW     | 10/05/21 | B   | SECTION 1 (AT 1204)                                                               | COPYRIGHT: THIS DESIGN AND PLANS ARE NOT TO BE USED OR REPRODUCED WHOLLY OR IN PART WITHOUT WRITTEN PERMISSION FROM HORTON COASTAL ENGINEERING AND JAMES TAYLOR & ASSOCIATES                            |                                                                                                                                                                                                                                        |        |         |       |      |                            |          |
| PP | RY   | WIP ISSUE      | 03/05/21 | A   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |        |         |       |      |                            |          |
| BY | CHKD | DESCRIPTION    | DATE     | REV |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |        |         |       |      |                            |          |





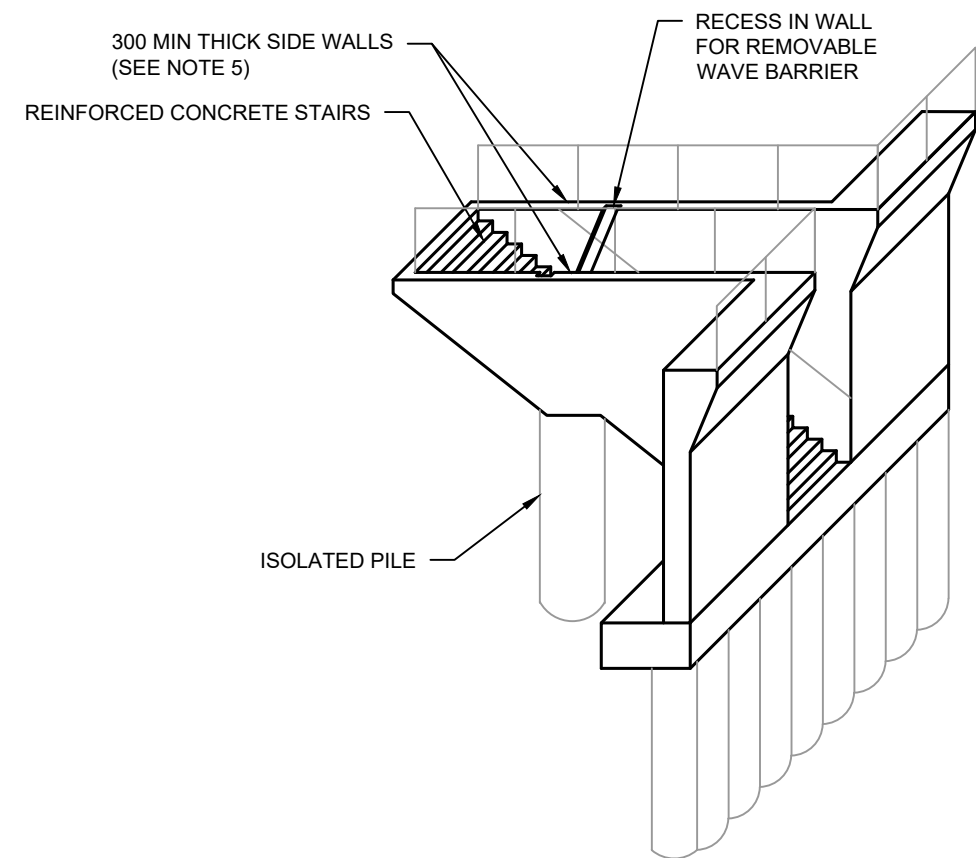


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|----|------|----------------|----------|-----|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------|--------------------------------|-------------------------------|---------------------|--|
| PP | RY   | REVISED FOR DA | 16/12/21 | H   | COASTAL PROTECTION WORKS<br>AT 1190 TO 1196 & 1204 PITTWATER RD<br>NARRABEEN, NSW | COASTAL ENGINEERING DESIGN:<br><b>HORTON COASTAL ENGINEERING PTY LTD</b><br>18 Reynolds Cres. Beacon Hill NSW 2100<br>TEL: +61 (0)407 012 538<br>peter@hortoncoastal.com.au<br>www.hortoncoastal.com.au | STRUCTURAL ENGINEERING DESIGN:<br><b>James Taylor &amp; Associates</b><br>Civil & Structural Consulting Engineers<br>SUITE 301, 115 MILITARY ROAD NEUTRAL BAY NSW 2090<br>TEL: 02 99691999<br>EMAIL: mail@jamestaylorassociates.com.au | DESIGN                     | P.H.                                                                                                                                                                         | DRAWN | P.P.    | PROJECT NO.<br><br><b>6355</b> | DRAWING NO.<br><br><b>S16</b> | REV<br><br><b>H</b> |  |
| PP | RY   | REVISED FOR DA | 23/07/21 | G   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | CHKD.                      | R.Y.                                                                                                                                                                         |       |         |                                |                               |                     |  |
| PP | RY   | REVISED FOR DA | 30/06/21 | F   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | APPRD.                     | P.H.                                                                                                                                                                         |       |         |                                |                               |                     |  |
| HL | RY   | REVISED FOR DA | 28/05/21 | E   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | DEADMAN ANCHOR ALTERNATIVE | COPYRIGHT: THIS DESIGN AND PLANS ARE NOT TO BE USED OR REPRODUCED WHOLLY OR IN PART WITHOUT WRITTEN PERMISSION FROM HORTON COASTAL ENGINEERING AND JAMES TAYLOR & ASSOCIATES | SCALE | 1 : 100 | DATE                           |                               |                     |  |
| PP | RY   | ISSUED FOR DA  | 24/05/21 | D   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                            |                                                                                                                                                                              |       |         |                                |                               |                     |  |
| PP | RY   | FOR REVIEW     | 14/05/21 | C   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                            |                                                                                                                                                                              |       |         |                                |                               |                     |  |
| PP | RY   | FOR REVIEW     | 10/05/21 | B   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                            |                                                                                                                                                                              |       |         |                                |                               |                     |  |
| PP | RY   | WIP ISSUE      | 03/05/21 | A   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                            |                                                                                                                                                                              |       |         |                                |                               |                     |  |
| BY | CHKD | DESCRIPTION    | DATE     | REV |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                            |                                                                                                                                                                              |       |         |                                |                               |                     |  |

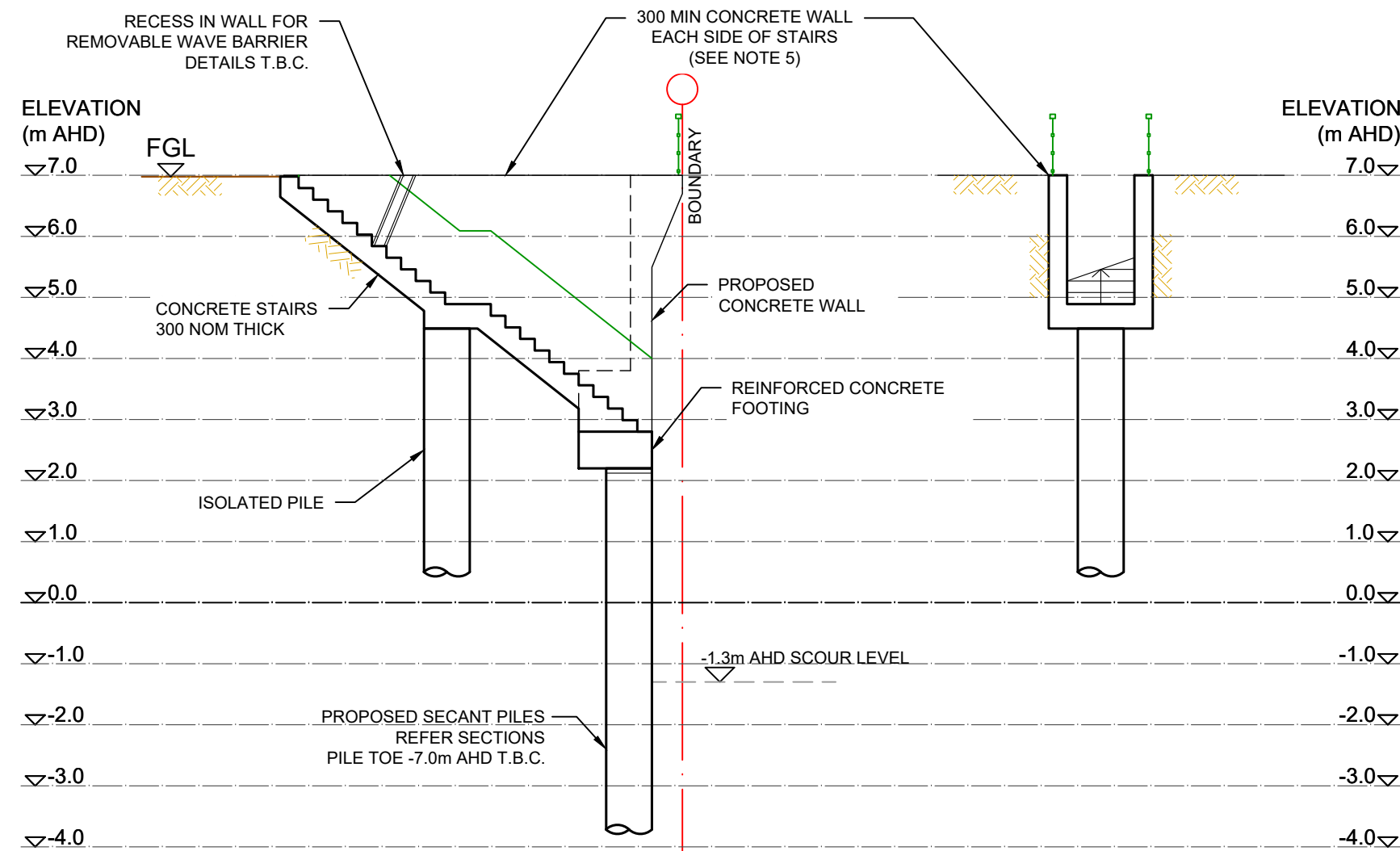


# TYPICAL ACCESS STAIRS

SCALE 1:100



# TYPICAL 3D VIEW OF STAIRS



ST1  
S20  
Section ST1  
1 : 100

ST2  
S20  
Section ST2  
1 : 100

1. BALUSTRADES TO STAIRS AND FENCING TO BE INCLUDED AS PER BCA REQUIREMENTS
2. FORM STAIRS TO BE COMPLIANT WITH BCA
3. CEMENTED SAND LEVEL TO BE CONFIRMED BY COASTAL OR GEOTECHNICAL ENGINEER
4. REMOVABLE WAVE BARRIER SHALL BE DESIGNED TO WITHSTAND WAVE FORCES AS NOMINATED BY THE COASTAL ENGINEER
5. FOR MAINTENANCE PURPOSES, MACHINES UP TO 45T ARE PERMITTED TO TRAVERSE OVER STAIR INDENTS AT ANY POINT. ROAD PLATES OR OTHER SAFE ACCESS MEASURES MAY BE REQUIRED, SUBJECT TO THE OPERATOR'S REQUIREMENTS.

|    |      |                |          |     |
|----|------|----------------|----------|-----|
| PP | RY   | REVISED FOR DA | 16/12/21 | H   |
| PP | RY   | REVISED FOR DA | 23/07/21 | G   |
| PP | RY   | REVISED FOR DA | 30/06/21 | F   |
| HL | RY   | REVISED FOR DA | 28/05/21 | E   |
| PP | RY   | ISSUED FOR DA  | 24/05/21 | D   |
| PP | RY   | FOR REVIEW     | 14/05/21 | C   |
| PP | RY   | FOR REVIEW     | 10/05/21 | B   |
| PP | RY   | WIP ISSUE      | 03/05/21 | A   |
| BY | CHKD | DESCRIPTION    | DATE     | REV |

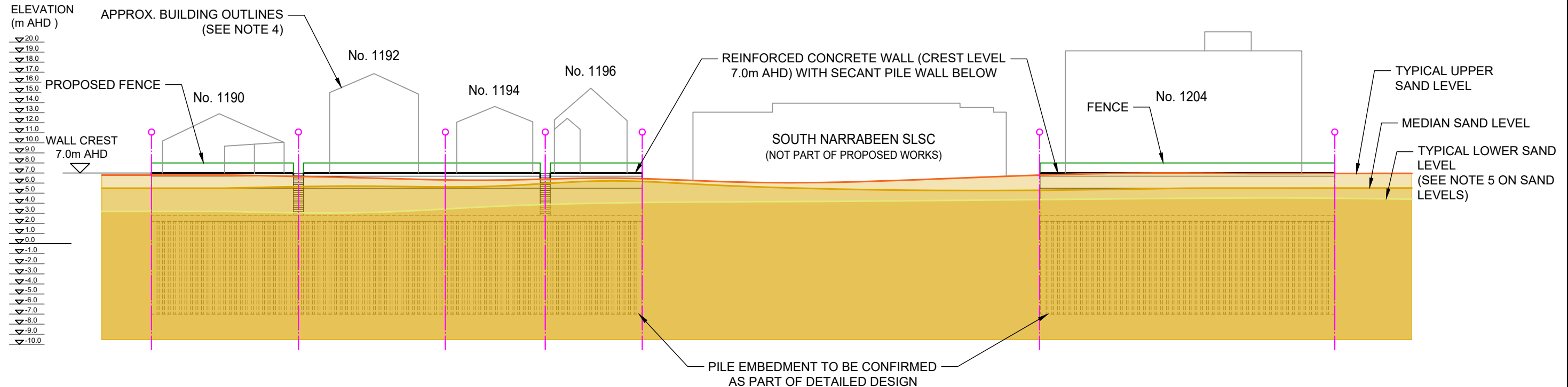
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|-----------------------------------------------------------------------------------|
| COASTAL PROTECTION WORKS<br>AT 1190 TO 1196 & 1204 PITTWATER RD<br>NARRABEEN, NSW |
| ACCESS STAIRS                                                                     |

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| COASTAL ENGINEERING DESIGN:<br><b>HORTON COASTAL ENGINEERING PTY LTD</b><br>18 Reynolds Cres. Beacon Hill NSW 2100<br>TEL: +61 (0)407 012 538<br>peter@hortoncoastal.com.au<br>www.hortoncoastal.com.au |
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|                                                                                                                                                                                                                                        |

|               |            |             |
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| DESIGN P.H.   | DRAWN P.P. | PROJECT NO. |
| CHKD. R.Y.    |            | 6355        |
| APPRD. P.H.   |            | DRAWING NO. |
| SCALE 1 : 100 | DATE       | S20         |
|               |            | REV H       |





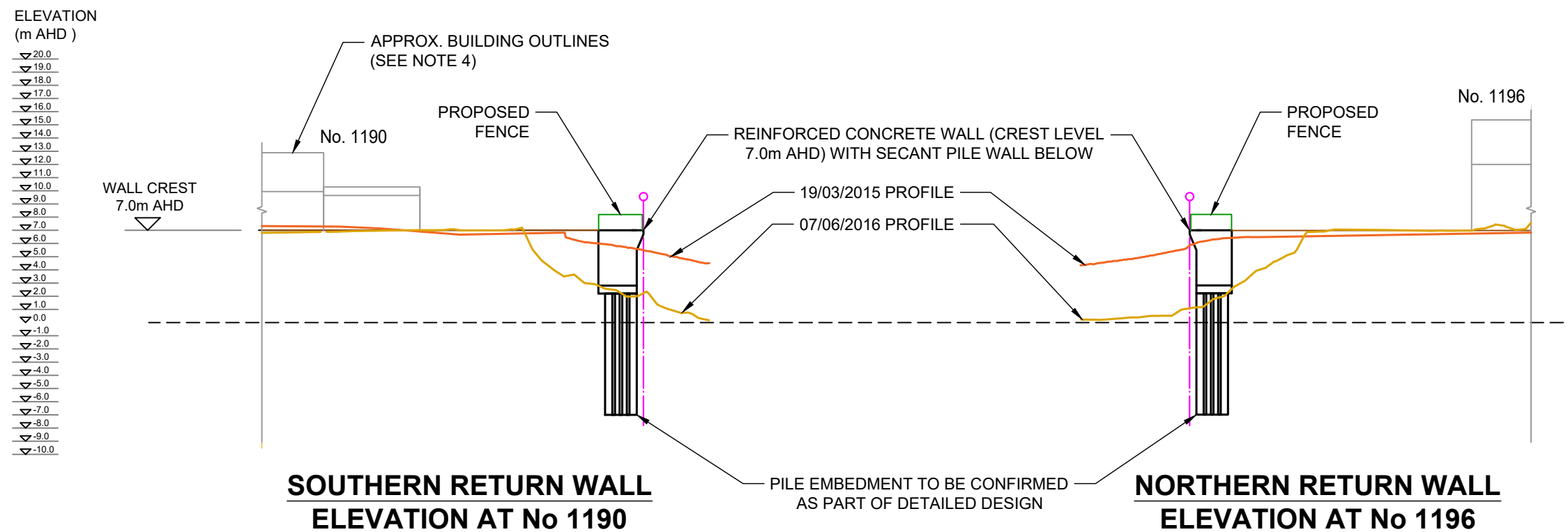
## EASTERN WALL ELEVATION

SCALE 1:400



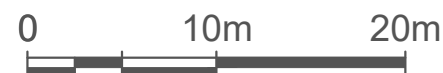
- ELEVATION IS A PROJECTION ON THE PLANE ORTHOGONAL TO THE PROPERTY SIDE BOUNDARIES
- EXISTING FENCES, ANCILLARY BUILDINGS AND TREES ARE NOT SHOWN
- PORTIONS OF THE SEAWALL BELOW THE SAND LEVEL AT THAT TIME WOULD NOT BE VISIBLE
- BUILDING OUTLINES ARE APPROXIMATE AND DERIVED FROM LIDAR DATA CAPTURED ON 15 JUNE 2020 BY SPATIAL SERVICES, NSW DEPARTMENT OF CUSTOMER SERVICE AND FROM SURVEY DRAWING (REF.1 ON DWG S01)
- SAND LEVELS DERIVED FROM ANALYSIS OF 24 PROFILES CAPTURED FROM 1941 TO 2021 IN THE NSW BEACH PROFILE DATABASE. THE TYPICAL UPPER SAND LEVEL HAS BEEN EXCEEDED FOR ABOUT 10% OF THE TIME IN THE HISTORICAL RECORD. THE TYPICAL LOWER SAND LEVEL HAS BEEN EXCEEDED FOR ABOUT 90% OF THE TIME IN THE HISTORICAL RECORD

|    |      |                |          |     |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                               |                                                                                                                                                                              |       |      |                            |                           |                 |
|----|------|----------------|----------|-----|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|----------------------------|---------------------------|-----------------|
| PP | RY   | REVISED FOR DA | 16/12/21 | H   | COASTAL PROTECTION WORKS<br>AT 1190 TO 1196 & 1204 PITTWATER RD<br>NARRABEEN, NSW | COASTAL ENGINEERING DESIGN:<br><b>HORTON COASTAL ENGINEERING PTY LTD</b><br>18 Reynolds Cres. Beacon Hill NSW 2100<br>TEL: +61 (0)407 012 538<br>peter@hortoncoastal.com.au<br>www.hortoncoastal.com.au | STRUCTURAL ENGINEERING DESIGN:<br><b>James Taylor &amp; Associates</b><br>Civil & Structural Consulting Engineers<br>SUITE 301, 115 MILITARY ROAD NEUTRAL BAY NSW 2090<br>TEL: 02 99691999<br>EMAIL: mail@jamestaylorassociates.com.au | DESIGN                        | P.H.                                                                                                                                                                         | DRAWN | P.P. | PROJECT NO.<br><b>6355</b> | DRAWING NO.<br><b>S30</b> | REV<br><b>H</b> |
| PP | RY   | REVISED FOR DA | 23/07/21 | G   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | CHKD.                         | R.Y.                                                                                                                                                                         |       |      |                            |                           |                 |
| PP | RY   | REVISED FOR DA | 30/06/21 | F   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | APPRD.                        | P.H.                                                                                                                                                                         |       |      |                            |                           |                 |
| HL | RY   | REVISED FOR DA | 28/05/21 | E   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | <b>EASTERN WALL ELEVATION</b> | COPYRIGHT: THIS DESIGN AND PLANS ARE NOT TO BE USED OR REPRODUCED WHOLLY OR IN PART WITHOUT WRITTEN PERMISSION FROM HORTON COASTAL ENGINEERING AND JAMES TAYLOR & ASSOCIATES | SCALE | DATE |                            |                           |                 |
| PP | RY   | ISSUED FOR DA  | 24/05/21 | D   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                               |                                                                                                                                                                              | A3    |      |                            |                           |                 |
| PP | RY   | FOR REVIEW     | 14/05/21 | C   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                               |                                                                                                                                                                              |       |      |                            |                           |                 |
| PP | RY   | FOR REVIEW     | 10/05/21 | B   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                               |                                                                                                                                                                              |       |      |                            |                           |                 |
| PP | RY   | WIP ISSUE      | 03/05/21 | A   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                               |                                                                                                                                                                              |       |      |                            |                           |                 |
| BY | CHKD | DESCRIPTION    | DATE     | REV |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                               |                                                                                                                                                                              |       |      |                            |                           |                 |



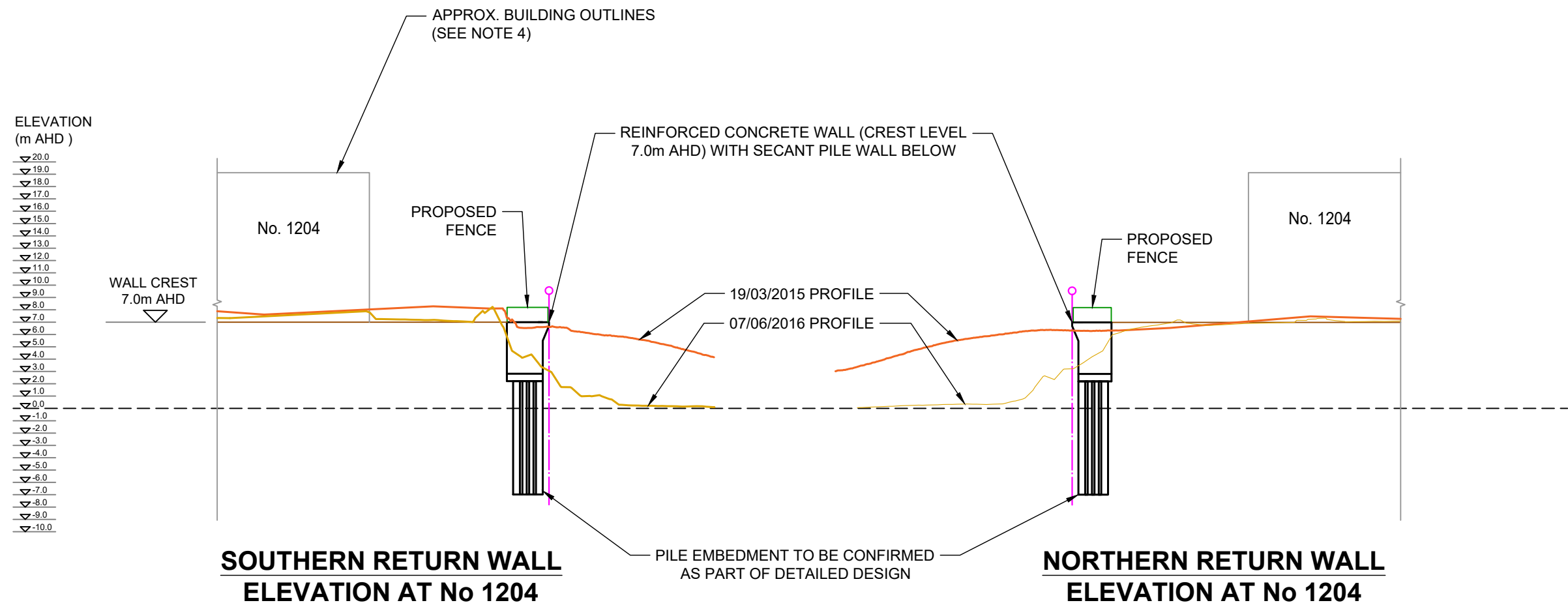
## RETURN WALLS ELEVATIONS

SCALE 1:400



- ELEVATION IS A PROJECTION ON THE PLANE ORTHOGONAL TO THE PROPERTY SIDE BOUNDARIES
- EXISTING FENCES, ANCILLARY BUILDINGS AND TREES ARE NOT SHOWN
- PORTIONS OF THE SEAWALL BELOW THE SAND LEVEL AT THAT TIME WOULD NOT BE VISIBLE
- BUILDING OUTLINES ARE APPROXIMATE AND DERIVED FROM LIDAR DATA CAPTURED ON 15 JUNE 2020 BY SPATIAL SERVICES, NSW DEPARTMENT OF CUSTOMER SERVICE AND FROM SURVEY DRAWING (REF.1 ON DWG S01)
- FUTURE GROUND LEVELS AT COUNCIL PROPERTY ADJACENT TO RETURNS WILL DEPEND ON FORM OF COASTAL PROTECTION WORKS CONSTRUCTED BY COUNCIL AT THESE LOCATIONS. THE ELEVATIONS DEPICTED ARE BASED ON HISTORICAL BEACH PROFILES AT THE ADJACENT PROPERTIES. THE 07/06/2016 PROFILE IS THE MOST ERODED IN THE HISTORICAL RECORD OF 25 PROFILES IN THE NSW BEACH PROFILE DATABASE FROM 1941 TO 2021 AT ALL SECTIONS SHOWN. THE 19/03/2015 PROFILE IS A TYPICAL AVERAGE BEACH-FULL PROFILE IN THIS RECORD, HAVING AN ACTIVE PROFILE VOLUME EXCEEDED ABOUT 30% OF THE TIME

|    |      |                |          |     |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                                                                                                                                                                              |      |       |      |                            |          |  |  |  |  |  |  |  |
|----|------|----------------|----------|-----|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|------|----------------------------|----------|--|--|--|--|--|--|--|
| PP | RY   | REVISED FOR DA | 16/12/21 | H   | COASTAL PROTECTION WORKS<br>AT 1190 TO 1196 & 1204 PITTWATER RD<br>NARRABEEN, NSW | COASTAL ENGINEERING DESIGN:<br><b>HORTON COASTAL ENGINEERING PTY LTD</b><br>18 Reynolds Cres. Beacon Hill NSW 2100<br>TEL: +61 (0)407 012 538<br>peter@hortoncoastal.com.au<br>www.hortoncoastal.com.au | STRUCTURAL ENGINEERING DESIGN:<br><b>James Taylor &amp; Associates</b><br>Civil & Structural Consulting Engineers<br>SUITE 301, 115 MILITARY ROAD NEUTRAL BAY NSW 2090<br>TEL: 02 99691999<br>EMAIL: mail@jamestaylorassociates.com.au | DESIGN                                                                                                                                                                       | P.H. | DRAWN | P.P. | PROJECT NO.<br><b>6355</b> |          |  |  |  |  |  |  |  |
| PP | RY   | REVISED FOR DA | 23/07/21 | G   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | CHKD.                                                                                                                                                                        | R.Y. |       |      |                            |          |  |  |  |  |  |  |  |
| PP | RY   | REVISED FOR DA | 30/06/21 | F   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | APPRD.                                                                                                                                                                       | P.H. |       |      | DRAWING NO.                | REV      |  |  |  |  |  |  |  |
| HL | RY   | REVISED FOR DA | 28/05/21 | E   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | SCALE                                                                                                                                                                        |      | DATE  |      | <b>S31</b>                 | <b>H</b> |  |  |  |  |  |  |  |
| PP | RY   | ISSUED FOR DA  | 24/05/21 | D   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | COPYRIGHT: THIS DESIGN AND PLANS ARE NOT TO BE USED OR REPRODUCED WHOLLY OR IN PART WITHOUT WRITTEN PERMISSION FROM HORTON COASTAL ENGINEERING AND JAMES TAYLOR & ASSOCIATES |      |       |      |                            |          |  |  |  |  |  |  |  |
| PP | RY   | FOR REVIEW     | 14/05/21 | C   | RETURN WALLS ELEVATIONS<br>SHEET 1                                                |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                                                                                                                                                                              |      |       |      |                            |          |  |  |  |  |  |  |  |
| PP | RY   | FOR REVIEW     | 10/05/21 | B   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                                                                                                                                                                              |      |       |      |                            |          |  |  |  |  |  |  |  |
| PP | RY   | WIP ISSUE      | 03/05/21 | A   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                                                                                                                                                                              |      |       |      |                            |          |  |  |  |  |  |  |  |
| BY | CHKD | DESCRIPTION    | DATE     | REV |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                                                                                                                                                                              |      |       |      |                            |          |  |  |  |  |  |  |  |



## RETURN WALLS ELEVATIONS

SCALE 1:400



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|    |      |                |          |     |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                                                  |                                                                                                                                                                              |       |      |                            |          |
|----|------|----------------|----------|-----|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|----------------------------|----------|
| PP | RY   | REVISED FOR DA | 16/12/21 | H   | COASTAL PROTECTION WORKS<br>AT 1190 TO 1196 & 1204 PITTWATER RD<br>NARRABEEN, NSW | COASTAL ENGINEERING DESIGN:<br><b>HORTON COASTAL ENGINEERING PTY LTD</b><br>18 Reynolds Cres. Beacon Hill NSW 2100<br>TEL: +61 (0)407 012 538<br>peter@hortoncoastal.com.au<br>www.hortoncoastal.com.au | STRUCTURAL ENGINEERING DESIGN:<br><b>James Taylor &amp; Associates</b><br>Civil & Structural Consulting Engineers<br>SUITE 301, 115 MILITARY ROAD NEUTRAL BAY NSW 2090<br>TEL: 02 99691999<br>EMAIL: mail@jamestaylorassociates.com.au | DESIGN                                           | P.H.                                                                                                                                                                         | DRAWN | P.P. | PROJECT NO.<br><b>6355</b> |          |
| PP | RY   | REVISED FOR DA | 23/07/21 | G   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | CHKD.                                            | R.Y.                                                                                                                                                                         |       |      |                            |          |
| PP | RY   | REVISED FOR DA | 30/06/21 | F   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | APPRD.                                           | P.H.                                                                                                                                                                         |       |      | DRAWING NO.                | REV      |
| HL | RY   | REVISED FOR DA | 28/05/21 | E   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        | <b>RETURN WALLS ELEVATIONS</b><br><b>SHEET 2</b> | COPYRIGHT: THIS DESIGN AND PLANS ARE NOT TO BE USED OR REPRODUCED WHOLLY OR IN PART WITHOUT WRITTEN PERMISSION FROM HORTON COASTAL ENGINEERING AND JAMES TAYLOR & ASSOCIATES | SCALE | DATE | <b>S32</b>                 | <b>H</b> |
| PP | RY   | ISSUED FOR DA  | 24/05/21 | D   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                                                  |                                                                                                                                                                              |       |      |                            |          |
| PP | RY   | FOR REVIEW     | 14/05/21 | C   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                                                  |                                                                                                                                                                              |       |      |                            |          |
| PP | RY   | FOR REVIEW     | 10/05/21 | B   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                                                  |                                                                                                                                                                              |       |      |                            |          |
| PP | RY   | WIP ISSUE      | 03/05/21 | A   |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                                                  |                                                                                                                                                                              |       |      |                            |          |
| BY | CHKD | DESCRIPTION    | DATE     | REV |                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                                                  |                                                                                                                                                                              |       |      |                            |          |