

- 3. CONCRETE**
- (a) CEMENT TO BE OF CM 1 - 42.5 TO KES EAS 1 AND MS EAS 18-3
  - (b) WATER IN CONCRETE TO B.S. 3148
  - (c) CONCRETE CLASS TO BE AS FOLLOWS - MASS CONCRETE F11 AND BUILDING MIX CLASS 25/20
  - (d) MINIMUM COVER TO ALL REINFORCEMENT TO BE 40mm UNLESS AS SPECIFIED BELOW
- FOR BUILDINGS -**
- MEMBERS OF BUILDINGS TO BE CAST IN PLACE
  - FORMWORK TO BE REMOVED AS SOON AS POSSIBLE AFTER THE BASE HAS BEEN CONCRETED (2 TO 3 DAYS)
- 4. REINFORCEMENT:**
- (a) REINFORCEMENT TO BE HIGH YIELD SQUARE TENSILE BARS TO B.S. 4488
  - (b) BENDING DIMENSIONS TO B.S. 4488
  - (d) EXAMPLE: 18 T12 -07-150 SIGNIFICATION. H AT 150mm CENTRE TO CENTRE SPACING
- 5. JOINTS**
- (a) THE POSITION AND NUMBER OF INTERMEDIATE JOINTS TO BE SHOWN IN THE DRAWINGS BEFORE PLACING FRESH CONCRETE THE OLD SURFACE SHALL BE RUGHENED AND ALL LOOSE MATERIAL REMOVED SURFACE DRY CONDITION SHALL BE MAINTAINED UNLESS OTHERWISE SPECIFIED
  - (c) THE UPVC WATER STOP SHALL BE 200mm W UNLESS OTHERWISE SPECIFIED
  - (d) JOINT FILLER TO B.S. 5292 AND TO BE APPROVED BY THE ENGINEER
- 6. ABBREVIATIONS**
- T - TOP
  - B - E
  - N.F. - NEAR FACE
  - F.F. - FAR FACE
  - E.F. - EACH FACE
  - E.W. - EACH WAY

- LEGEND**
- BF - BLANK FLANGE
  - PF - PUDDLE FLANGE
  - DN - NOMINAL DIAMETER
  - C/C - CENTRE TO CENTRE
  - PCC - PRECAST CONCRETE
  - RC - REINFORCED CONCRETE
  - MS - MILD STEEL
  - FC - FLEXIBLE COUPLING
  - TWL - TOP WATER LEVEL
  - PCC/STEEL - PRE-CAST CONCRETE/STEEL PIPE COUPLING

**FOR CONSTRUCTION**

REV	REVISIONS	SIGN	DATE	AP
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			

**CLIENT**

TANA WATER WORKS DEVELOPMENT AGENCY  
P. O. BOX 1292-10100 NYERI

**PROJECT**

IHWAGI INTAKE WORKS PROJECT

Civil/Structural Engineers

TANA WATER WORKS DEVELOPMENT AGENCY  
P. O. BOX 1292-10100 NYERI

Drawing Title

INTAKE  
INTAKE DETAIL (SHEET 1 OF 2)

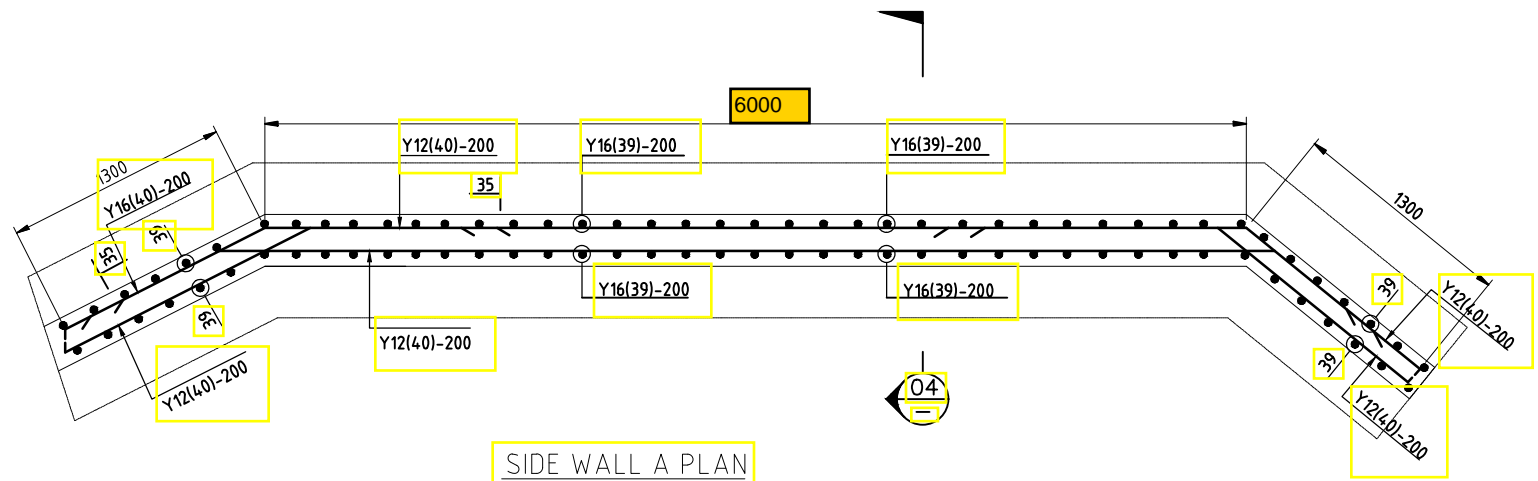
Designed by DWN Drawn by EWN

Checked by JMM Approved by

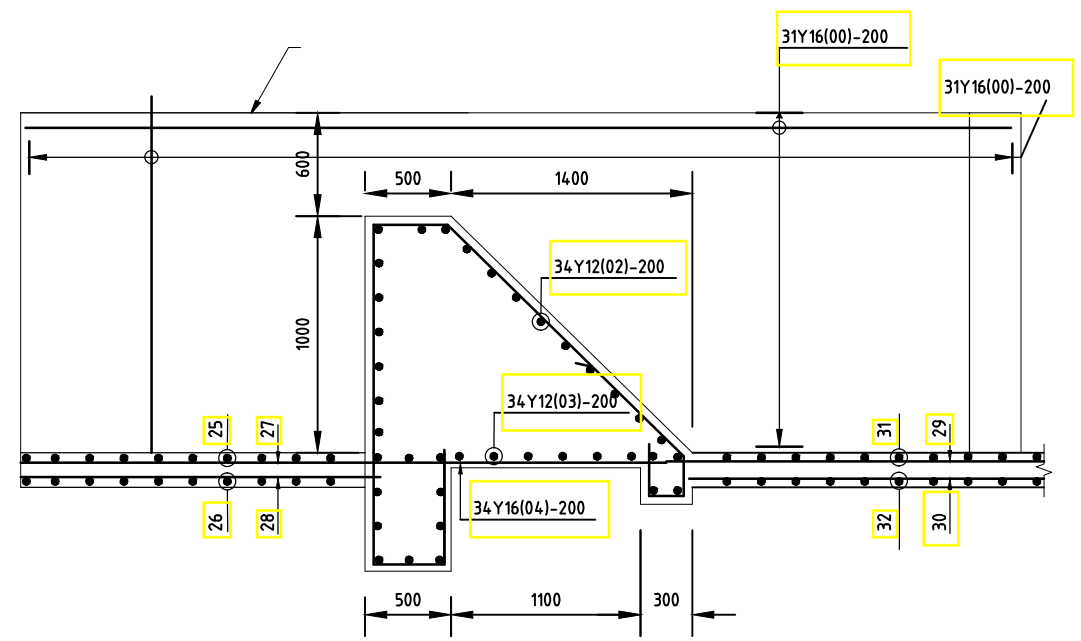
Scale AS SHOWN (A1) Date MAY, 2022

Job No. 1 ACAD File:

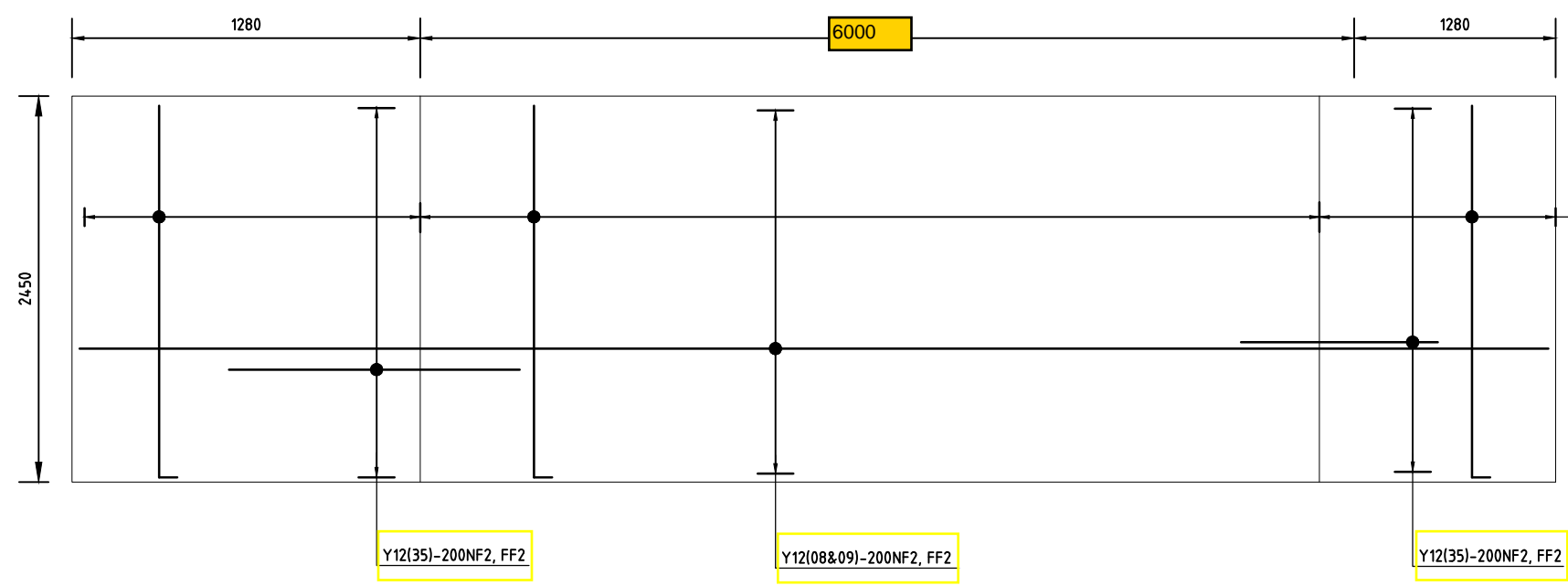
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SIDE WALL A PLAN  
SCALE 1:25

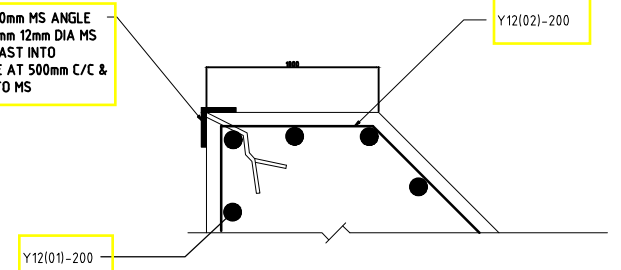


SECTION 02  
SCALE 25

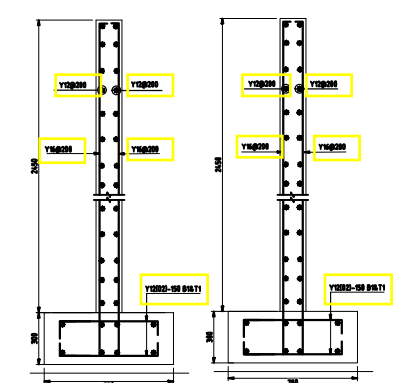


SIDE WALL  
SCALE 1:25

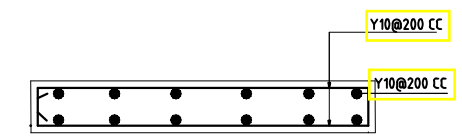
100x100x10mm MS ANGLE WITH 300mm 12mm DIA MS TANGS CAST INTO CONCRETE AT 500mm C/C & WELDED TO MS



DETAIL SCALE 1:10



SIDE WALL TYPICAL SECTION FOR WALL A AND B  
SCALE 25



SECTION 05  
SCALE 25

SLAB (F)

NOTES

- PROGRAMME, METHOD OF CONSTRUCTION AND SETTING OUT OF WORK TO BE APPROVED BY THE ENGINEER BEFORE COMMENCEMENT OF WORK
- DESIGN CRITERIA
  - DESIGN CODES B.S. 8007 & B.S. 8110
  - UNIFORM AND COMPRESSIBLE FOUNDATION WITH MINIMUM BEARING CAPACITY 0.05kN/m<sup>2</sup>
- CONCRETE
  - CEMENT TO BE CEM 1 - 42.5 TO KES EAS 18-1 AND KS 425-15-3
  - WATER IN CONCRETE TO B.S. 3148
  - CONCRETE CLASS TO BE AS PER FORMS - MAXIMUM PERMISSIBLE FILL AND DRAINING LAYERS AS PER 4.2.2
  - REINFORCING CONCRETE CLASS 25/28 TO BE 40mm UNLESS AS SPECIFIED BELOW
- REINFORCEMENT
  - REINFORCEMENT TO BE HIGH YIELD SQUARE TWISTED BARS TO B.S. 4461
  - BENDING DIMENSIONS TO B.S. 4466
  - EXAMPLE: 16 T12 -07-150 SIGNIFIES NO. HIGH AT 150mm CENTRE TO CENTRE SPACING
- JOINTS
  - THE POSITION AND NUMBER OF INTERMEDIATE JOINTS TO BE SHOWN IN THE DRAWINGS BEFORE PLACING FRESH CONCRETE THE OLD SURFACE SHALL BE ROUGHENED AND ALL LANTANCE AND LOOSE MATERIAL REMOVED SURFACE DRY CONDITION HAVE 100mm KICKER UNLESS OTHERWISE SPECIFIED
  - THE UPVC WATER STOP SHALL BE 200mm WIDE UNLESS OTHERWISE SPECIFIED
  - JOINT FILLER TO B.S. 5292 AND TO BE APPROVED BY THE ENGINEER
- ABBREVIATIONS
 

T - TOP	B - BOTTOM
N.F. - NEAR FACE	F.F. - FAR FACE
E.F. - EACH FACE	E.W. - EACH WAY

LEGEND

- BF - BLANK FLANGE
- PF - PUDDLE FLANGE
- DN - NOMINAL DIAMETER
- C/C - CENTRE TO CENTRE
- PCC - PRECAST CONCRETE
- RC - REINFORCED CONCRETE
- MS - MILD STEEL
- FC - FLEXIBLE COUPLING
- TWL - TOP WATER LEVEL
- PCC/STEEL - PRE-CAST CONCRETE/STEEL PIPE COUPLING

FOR CONSTRUCTION

REV	REVISIONS	SIGN	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			

CLIENT

TANA WATER WORKS DEVELOPMENT AGENCY  
P. O. BOX 1292-10100  
NYERI

PROJECT

IHWAGI INTAKE WORKS PROJECT

Civil/Structural Engineers

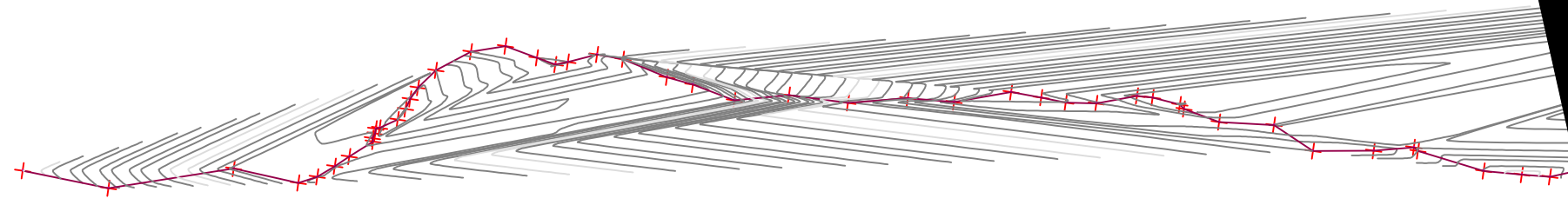
TANA WATER WORKS DEVELOPMENT AGENCY  
P. O. BOX 1292-10100  
NYERI

Drawing Title

INTAKE

Sheet 2 of 2

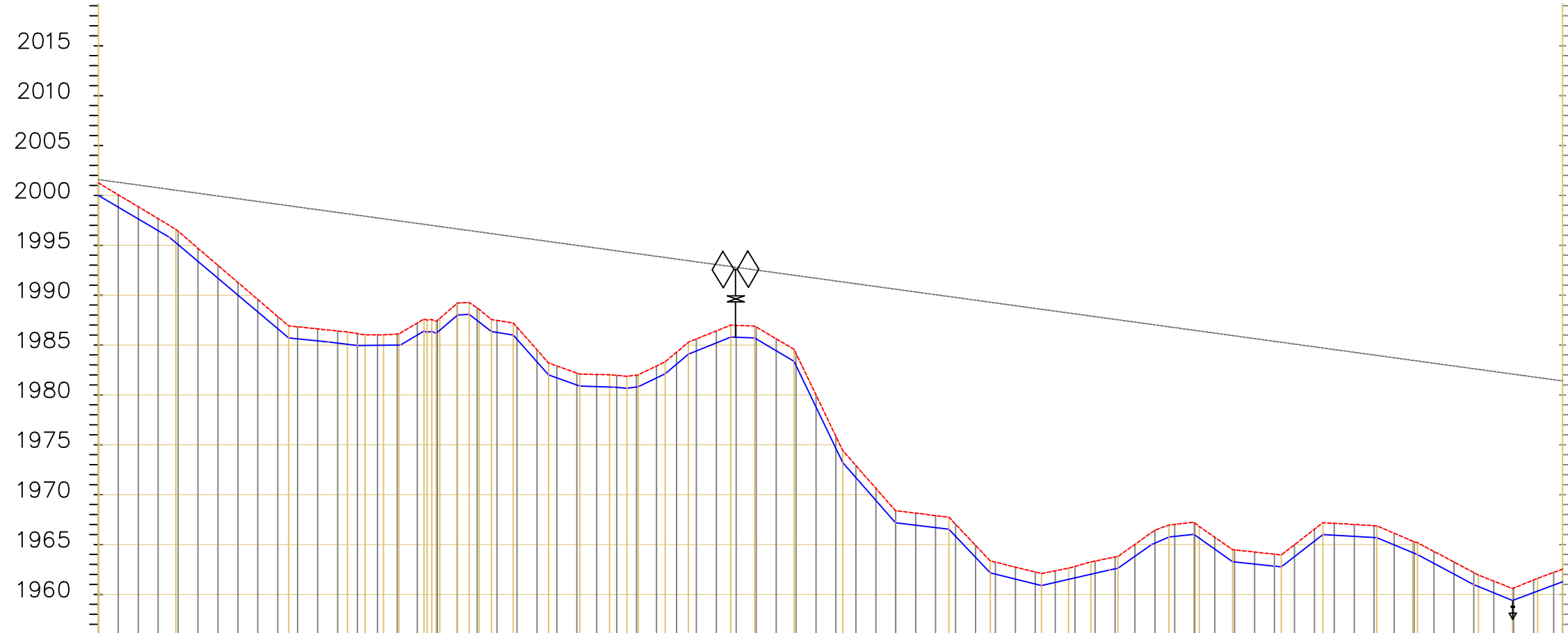
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Checked by JMM	Approved by
Scale AS SHOWN (A1)	Date MAY, 2022
Job No. 1	ACAD File:
STATUS DRAWING NO. TWDA/NNWP/INT-002	



MATCH LINE - 1  
AT STATION - +449.00  
NEXT SHEET NUMBER: 2

- NOTES**
1. ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
  2. COORDINATES ARE BASED ON UTM.
  3. LOCATION OF AIR VALVES, WASHOUTS, BENDS AND OTHER FITTINGS AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER ON SITE.
  4. GROUND AND INVERT LEVEL SHOWN ARE AS SHOWN ON DRAWING UNLESS OTHERWISE INDICATED ON SITE BY THE ENGINEER.
  5. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM COVER OF 1.0M. WHERE COVER IS LESS THAN THIS, PIPE TO BE SURROUNDED WITH CONCRETE.
  6. ALL BENDS ARE HORIZONTAL UNLESS OTHERWISE STATED.
  7. IN WATER LOGGED AREAS, PIPES TO BE BEDDED WITH SINGLE SIZED OR GRADED AGGREGATES AS PER CLAUSE 4.30.1 AND 216 OF TECHNICAL SPECIFICATIONS AND/OR ANCHOR BLOCKS AS MAY BE DIRECTED ON SITE BY THE ENGINEER.

- LEGEND:**
- PROPOSED PIPELINE
  - EXISTING GROUND PROFILE
  - PIPE INVERT PROFILE
  - EXISTING ROAD
  - AIR VALVE
  - DOUBLE AIR VALVE
  - WASHOUT
  - WASHOUT TYPE 1
  - WASHOUT TYPE 2
  - NOMINAL DIAMETER
  - NOMINAL PRESSURE
  - VERTICAL BEND
  - HORIZONTAL BEND
  - EXISTING STRUCTURE
  - EARTH ROAD
  - GRAVEL ROAD
  - CUT



DISTANCE DATUM (m)	GROUND LEVELS (m)	INVERT LEVELS(m)	HGL(m)	FLOW DATA	TYPE OF PIPE AND SIZE
2001.31	1998.82	2000.06	0+020.00	0.03m <sup>3</sup> /s	PN10 DN 250MM PIPE
2001.04	1997.63	1998.86	0+040.00		
2000.76	1996.45	1997.66	0+060.00		
2000.49	1995.05	1996.41	0+080.00		
2000.21	1993.37	1994.79	0+100.00		
1999.94	1991.68	1992.98	0+120.00		
1999.66	1990.00	1991.27	0+140.00		
1999.39	1988.32	1989.56	0+160.00		
1999.11	1986.63	1987.85	0+180.00		
1998.84	1985.62	1986.82	0+200.00		
1998.56	1985.42	1986.62	0+220.00		
1998.28	1985.19	1986.41	0+240.00		
1998.01	1986.14	1986.14	0+260.00		
1997.74	1984.97	1986.02	0+280.00		
1997.46	1985.00	1986.10	0+300.00		
1997.19	1986.00	1987.20	0+320.00		
1996.91	1986.27	1987.46	0+340.00		
1996.64	1987.88	1989.18	0+360.00		
1996.36	1987.46	1988.71	0+380.00		
1996.08	1986.27	1987.47	0+400.00		
1995.82	1985.58	1986.78	0+420.00		
1995.54	1983.32	1984.52	0+440.00		
1995.27	1981.70	1982.90	0+460.00		
1994.99	1980.89	1982.19	0+480.00		
1994.72	1980.83	1982.05	0+500.00		
1994.44	1980.75	1981.95	0+520.00		
1994.17	1980.79	1981.99	0+540.00		
1993.89	1981.69	1982.89	0+560.00		
1993.62	1983.07	1984.27	0+580.00		
1993.34	1984.49	1985.69	0+600.00		
1993.07	1985.21	1986.41	0+620.00		
1992.79	1985.77	1986.97	0+640.00		
1992.52	1985.60	1986.80	0+660.00		
1992.24	1984.43	1985.63	0+680.00		
1991.97	1982.95	1984.15	0+700.00		
1991.69	1978.79	1979.99	0+720.00		
1991.42	1974.64	1975.84	0+740.00		
1991.14	1971.72	1972.92	0+760.00		
1990.87	1969.44	1970.64	0+780.00		
1990.59	1967.18	1968.38	0+800.00		
1990.32	1966.94	1968.14	0+820.00		
1990.04	1966.70	1967.90	0+840.00		
1989.77	1965.83	1967.03	0+860.00		
1989.49	1963.77	1964.92	0+880.00		
1989.22	1962.03	1963.23	0+900.00		
1988.94	1961.54	1962.74	0+920.00		
1988.67	1961.04	1962.24	0+940.00		
1988.39	1961.20	1962.36	0+960.00		
1988.12	1961.66	1962.81	0+980.00		
1987.84	1962.11	1963.34	1+000.00		
1987.57	1962.58	1963.75	1+020.00		
1987.29	1963.82	1965.02	1+040.00		
1987.02	1965.14	1966.43	1+060.00		
1986.74	1965.82	1967.02	1+080.00		
1986.47	1965.96	1967.15	1+100.00		
1986.19	1964.55	1965.72	1+120.00		
1985.92	1963.26	1964.46	1+140.00		
1985.64	1963.04	1964.24	1+160.00		
1985.37	1964.03	1964.03	1+180.00		
1985.09	1963.78	1964.98	1+200.00		
1984.82	1965.33	1966.53	1+220.00		
1984.54	1965.92	1967.12	1+240.00		
1984.27	1965.80	1967.00	1+260.00		
1983.98	1965.68	1966.88	1+280.00		
1983.72	1964.95	1966.13	1+300.00		
1983.44	1964.12	1965.29	1+320.00		
1983.17	1963.10	1964.30	1+340.00		
1982.90	1962.04	1963.24	1+360.00		
1982.62	1962.18	1962.18	1+380.00		
1982.35	1960.16	1961.33	1+400.00		
1982.07	1959.43	1960.84	1+420.00		
1981.80	1960.18	1961.45	1+440.00		
1981.52	1960.92	1962.20	1+460.00		

**FOR CONSTRUCTION**

signed CMTS

REV	REVISIONS	SIGN	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			
CO	ISSUED FOR CONSTRUCTION	BY		
		CHECKED		

**CLIENT**

TANA WATER WORKS DEVELOPMENT AGENCY  
P. O. BOX 1292-10100  
NYERI

**PROJECT**

DESIGN FOR PROPOSED IHWAGI RAW GRAVITY MAIN

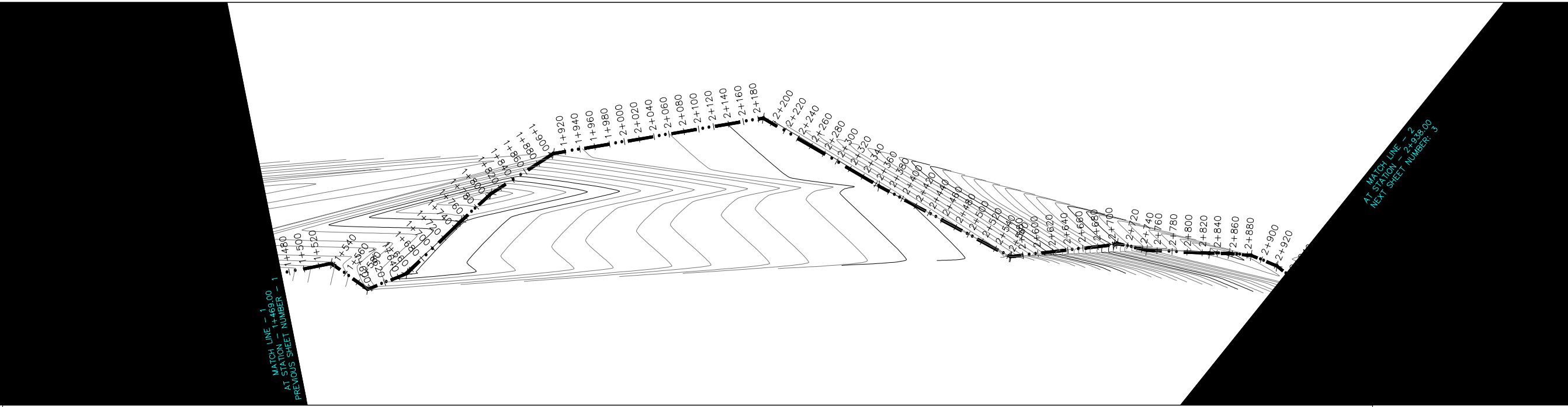
**Civil/Structural Engineers**

TANA WATER WORKS DEVELOPMENT AGENCY  
P. O. BOX 1292-10100  
NYERI

**Drawing Title**

PROPOSED IHWAGI RAW GRAVITY MAIN  
RAW GRAVITY MAIN  
PLAN AND PROFILE (SHEET 1 OF 7)

Designed by **DWN** Drawn by **JNM**  
 Checked by **JMM** Approved by  
 Scale **AS SHOWN (A1)** Date **AUG 2022**  
 Job No. **1** ACAD File:  
 PD STATUS DRAWING No. **TWDA/PRGM/RGM-1** 10 REV



- NOTES**
- ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
  - COORDINATES ARE BASED ON UTM.
  - LOCATION OF AIR VALVES, WASHOUTS, BENDS AND OTHER FITTINGS AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER ON SITE.
  - GROUND AND INVERT LEVEL SHOWN ARE AS SHOWN ON DRAWING UNLESS OTHERWISE INDICATED ON SITE BY THE ENGINEER.
  - PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM COVER OF 1.0M. WHERE COVER IS LESS THAN THIS, PIPE TO BE SURROUNDED WITH CONCRETE.
  - ALL BENDS ARE HORIZONTAL UNLESS OTHERWISE STATED.
  - IN WATER LOGGED AREAS, PIPES TO BE BEDDED WITH SINGLE SIZED OR GRADED AGGREGATES AS PER CLAUSE 430.1 AND 216 OF TECHNICAL SPECIFICATIONS AND/OR ANCHOR BLOCKS AS MAY BE DIRECTED ON SITE BY THE ENGINEER.

**LEGEND:**

- PROPOSED PIPELINE
- - - EXISTING GROUND PROFILE
- PIPE INVERT PROFILE
- EXISTING ROAD
- ⊕ AIR VALVE
- DAV DOUBLE AIR VALVE
- ▽ WASHOUT
- WO1 WASHOUT TYPE 1
- WO2 WASHOUT TYPE 2
- DN NOMINAL DIAMETER
- PN NOMINAL PRESSURE
- VB VERTICAL BEND
- HB HORIZONTAL BEND
- EXISTING STRUCTURE
- ER EARTH ROAD
- GR GRAVEL ROAD
- CUT

**FOR CONSTRUCTION**  
signed CMTS

REV	REVISIONS	SIGN	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			
CO	ISSUED FOR CONSTRUCTION	BY		
		CHECKED		

**CLIENT**

TANA WATER WORKS DEVELOPMENT AGENCY  
P. O. BOX 1292-10100  
NYERI

**PROJECT**

DESIGN FOR PROPOSED IHWAGI RAW GRAVITY MAIN

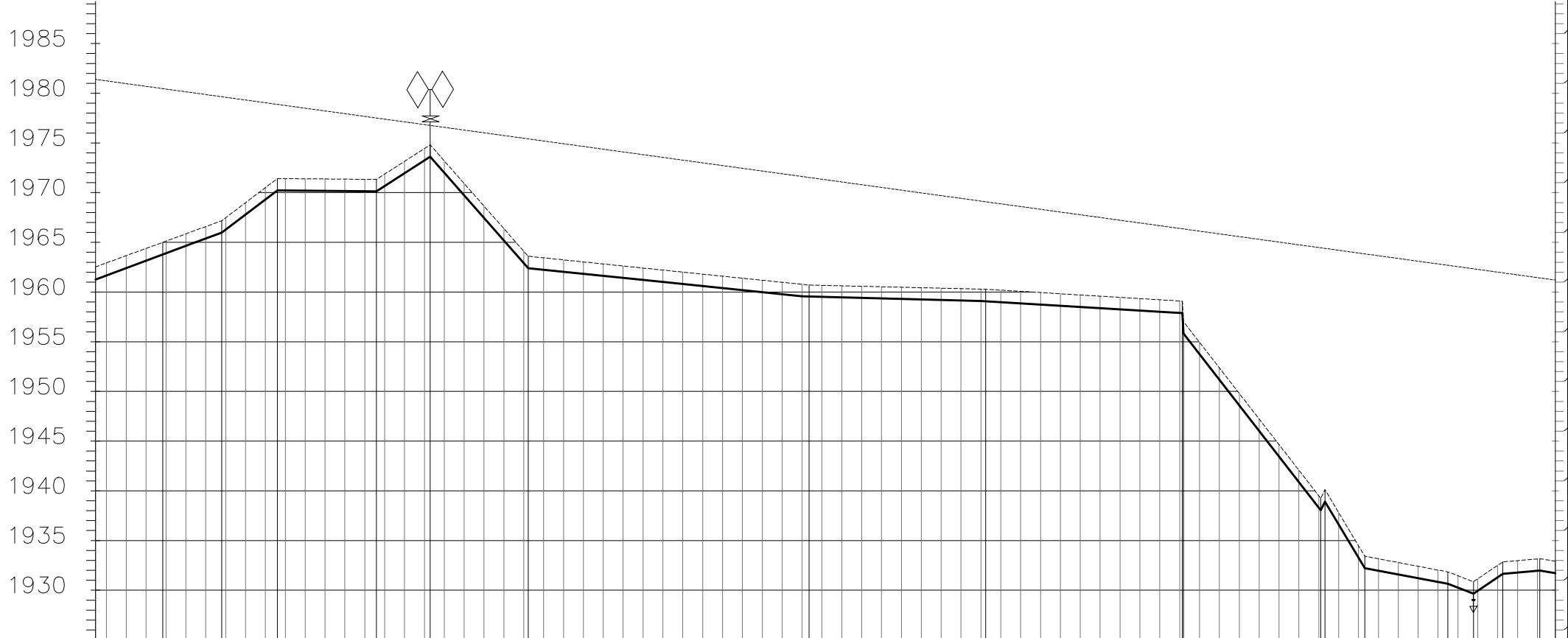
**Civil/Structural Engineers**

TANA WATER WORKS DEVELOPMENT AGENCY  
P. O. BOX 1292-10100  
NYERI

**Drawing Title**

PROPOSED IHWAGI RAW GRAVITY MAIN  
RAW GRAVITY MAIN  
PLAN AND PROFILE (SHEET 2 OF 7)

Designed by	DWN	Drawn by	JNM
Checked by	JMM	Approved by	
Scale	AS SHOWN (A1)	Date	AUG 2022
Job No.	1	ACAD File:	
PD STATUS	DRAWING No. TWWDA/PRWGM/RWG/	CC	REV



DISTANCE DATUM (m)	GROUND LEVELS (m)	INVERT LEVELS (m)	HGL (m)	FLOW DATA	TYPE OF PIPE AND SIZE
1+480.00	1961.67	1962.93			
1+500.00	1963.66	1964.92			
1+520.00	1964.39	1965.38			
1+540.00	1965.12	1965.84			
1+560.00	1965.86	1966.30			
1+580.00	1966.59	1966.76			
1+600.00	1967.32	1967.22			
1+620.00	1968.05	1967.68			
1+640.00	1968.78	1968.14			
1+660.00	1969.51	1968.60			
1+680.00	1970.24	1969.06			
1+700.00	1970.97	1969.52			
1+720.00	1971.70	1969.98			
1+740.00	1972.43	1970.44			
1+760.00	1973.16	1970.90			
1+780.00	1973.89	1971.36			
1+800.00	1974.62	1971.82			
1+820.00	1975.35	1972.28			
1+840.00	1976.08	1972.74			
1+860.00	1976.81	1973.20			
1+880.00	1977.54	1973.66			
1+900.00	1978.27	1974.12			
1+920.00	1979.00	1974.58			
1+940.00	1979.73	1975.04			
1+960.00	1980.46	1975.50			
1+980.00	1981.19	1975.96			
2+000.00	1981.92	1976.42			
2+020.00	1982.65	1976.88			
2+040.00	1983.38	1977.34			
2+060.00	1984.11	1977.80			
2+080.00	1984.84	1978.26			
2+100.00	1985.57	1978.72			
2+120.00	1986.30	1979.18			
2+140.00	1987.03	1979.64			
2+160.00	1987.76	1980.10			
2+180.00	1988.49	1980.56			
2+200.00	1989.22	1981.02			
2+220.00	1989.95	1981.48			
2+240.00	1990.68	1981.94			
2+260.00	1991.41	1982.40			
2+280.00	1992.14	1982.86			
2+300.00	1992.87	1983.32			
2+320.00	1993.60	1983.78			
2+340.00	1994.33	1984.24			
2+360.00	1995.06	1984.70			
2+380.00	1995.79	1985.16			
2+400.00	1996.52	1985.62			
2+420.00	1997.25	1986.08			
2+440.00	1997.98	1986.54			
2+460.00	1998.71	1987.00			
2+480.00	1999.44	1987.46			
2+500.00	2000.17	1987.92			
2+520.00	2000.90	1988.38			
2+540.00	2001.63	1988.84			
2+560.00	2002.36	1989.30			
2+580.00	2003.09	1989.76			
2+600.00	2003.82	1990.22			
2+620.00	2004.55	1990.68			
2+640.00	2005.28	1991.14			
2+660.00	2006.01	1991.60			
2+680.00	2006.74	1992.06			
2+700.00	2007.47	1992.52			
2+720.00	2008.20	1992.98			
2+740.00	2008.93	1993.44			
2+760.00	2009.66	1993.90			
2+780.00	2010.39	1994.36			
2+800.00	2011.12	1994.82			
2+820.00	2011.85	1995.28			
2+840.00	2012.58	1995.74			
2+860.00	2013.31	1996.20			
2+880.00	2014.04	1996.66			
2+900.00	2014.77	1997.12			
2+920.00	2015.50	1997.58			

AV

0.03m<sup>3</sup>/s

W.O

PN10 DN 250MM PIPE



- NOTES**
1. ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
  2. COORDINATES ARE BASED ON UTM.
  3. LOCATION OF AIR VALVES, WASHOUTS, BENDS AND OTHER FITTINGS AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER ON SITE.
  4. GROUND AND INVERT LEVEL SHOWN ARE AS SHOWN ON DRAWING UNLESS OTHERWISE INDICATED ON SITE BY THE ENGINEER.
  5. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM COVER OF 1.0M. WHERE COVER IS LESS THAN THIS, PIPE TO BE SURROUNDED WITH CONCRETE.
  6. ALL BENDS ARE HORIZONTAL UNLESS OTHERWISE STATED.
  7. IN WATER LOGGED AREAS, PIPES TO BE BEDDED WITH SINGLE SIZED OR GRADED AGGREGATES AS PER CLAUSE 430.1 AND 216 OF TECHNICAL SPECIFICATIONS AND/OR ANCHOR BLOCKS AS MAY BE DIRECTED ON SITE BY THE ENGINEER.

- LEGEND:**
- - - - - PROPOSED PIPELINE
  - - - - - EXISTING GROUND PROFILE
  - - - - - PIPE INVERT PROFILE
  - - - - - EXISTING ROAD
  - ⊕ AIR VALVE
  - DAV DOUBLE AIR VALVE
  - ▽ WASHOUT
  - WO1 WASHOUT TYPE 1
  - WO2 WASHOUT TYPE 2
  - DN NOMINAL DIAMETER
  - PN NOMINAL PRESSURE
  - VB VERTICAL BEND
  - HB HORIZONTAL BEND
  - ▨ EXISTING STRUCTURE
  - ER EARTH ROAD
  - GR GRAVEL ROAD
  - ≡ CUT

**FOR CONSTRUCTION**  
signed CMTS

REV	REVISIONS	SIGN	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			
CO	ISSUED FOR CONSTRUCTION BY			
	CHECKED			

**CLIENT**

TANA WATER WORKS DEVELOPMENT AGENCY  
P. O. BOX 1292-10100  
NYERI

**PROJECT**

DESIGN FOR PROPOSED IHWAGI  
RAW GRAVITY MAIN

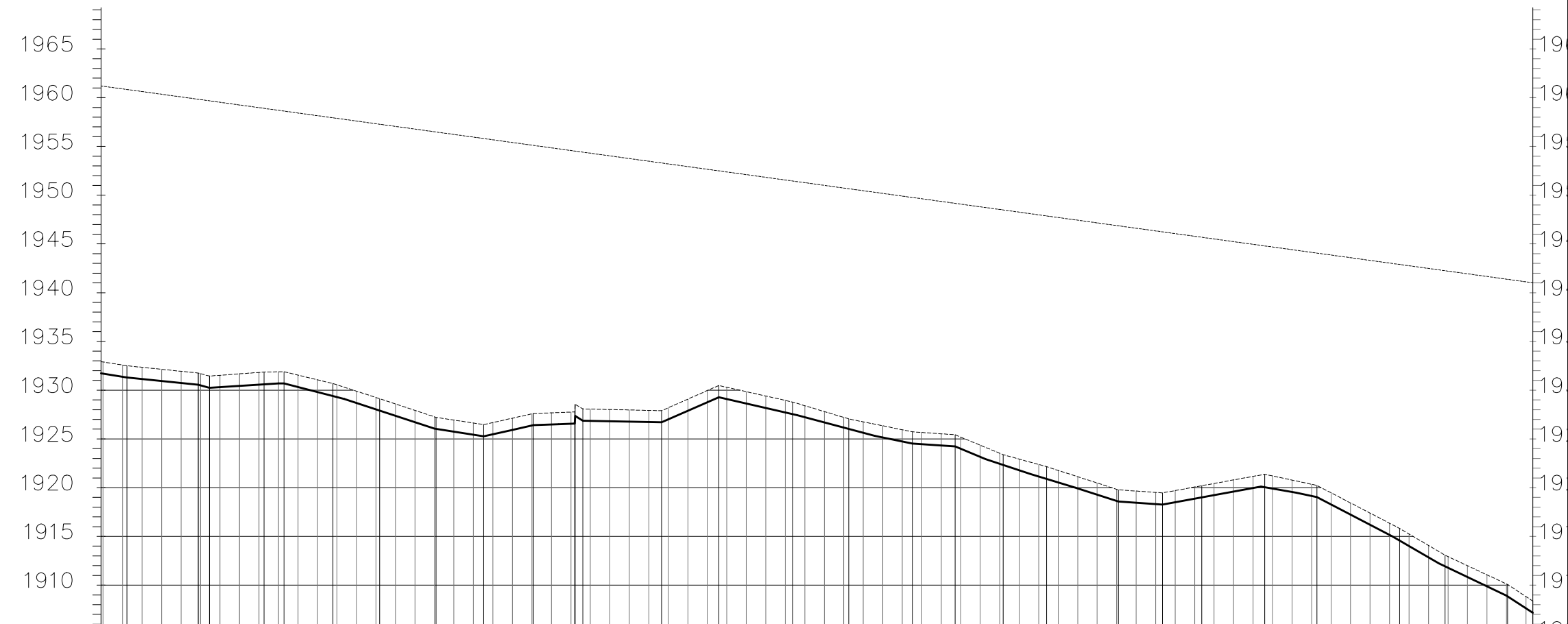
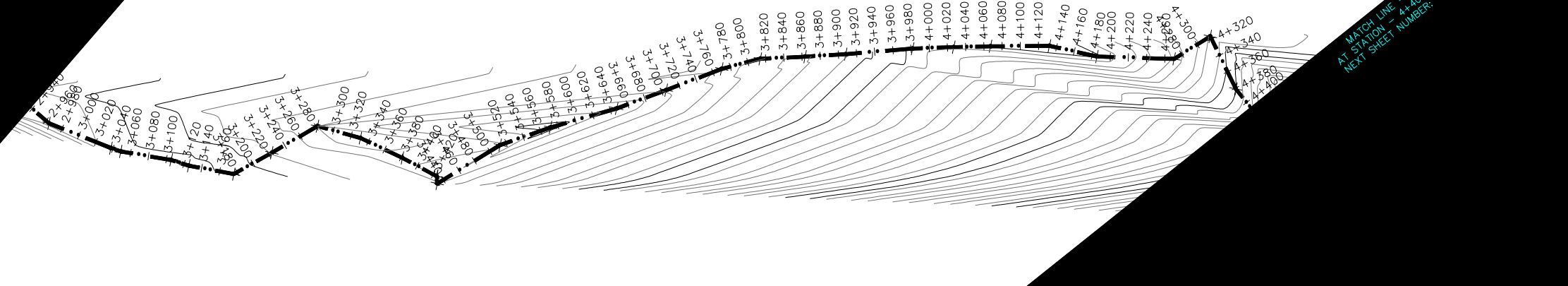
**Civil/Structural Engineers**

TANA WATER WORKS DEVELOPMENT AGENCY  
P. O. BOX 1292-10100  
NYERI

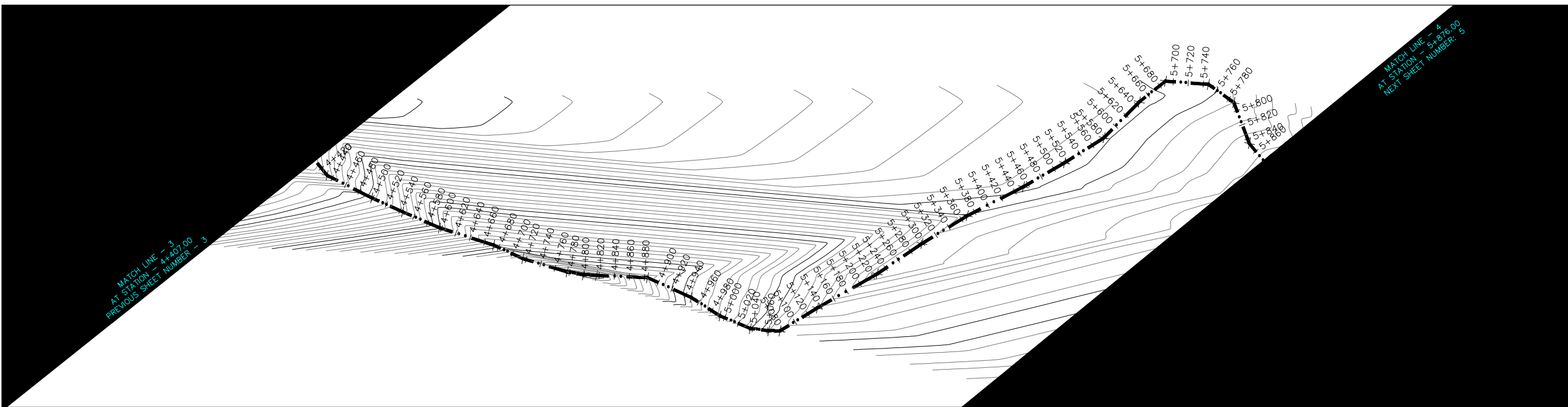
**Drawing Title**

PROPOSED RAW GRAVITY MAIN  
RAW GRAVITY MAIN  
PLAN AND PROFILE (SHEET 3 OF 7)

Designed by **DWN** Drawn by **JNM**  
 Checked by **JMM** Approved by  
 Scale **AS SHOWN (A1)** Date **AUG 2022**  
 Job No. **1** ACAD File:  
 PD STATUS DRAWING No. **TWWD/RWGM/RGM-1** CO REV



DISTANCE DATUM (m)	GROUND LEVELS (m)	INVERT LEVELS(m)	HGL(m)	FLOW DATA	TYPE OF PIPE AND SIZE
1960.90	1931.38	1932.58	1932.58	0.03m <sup>3</sup> /s	G.I 1927.767 - 1928.568
1960.63	1931.15	1932.35	1932.35		
1960.35	1930.94	1932.14	1932.14	PNT10 DN 250MM PIPE	
1960.08	1930.74	1931.94	1931.94		
1959.80	1930.50	1931.70	1931.70		
1959.53	1930.31	1931.53	1931.53		
1959.25	1930.44	1931.67	1931.67		
1958.98	1930.56	1931.82	1931.82		
1958.70	1931.88	1931.20	1931.20		
1958.43	1930.32	1931.55	1931.55		
1958.15	1929.81	1931.07	1931.07		
1957.88	1929.30	1930.55	1930.55		
1957.60	1928.70	1929.90	1929.90		
1957.33	1928.04	1929.25	1929.25		
1957.06	1927.38	1928.59	1928.59		
1956.78	1926.72	1927.92	1927.92		
1956.51	1927.26	1927.26	1927.26		
1956.23	1925.75	1926.93	1926.93		
1955.96	1925.44	1926.63	1926.63		
1955.68	1925.48	1926.68	1926.68		
1955.41	1927.12	1927.36	1927.36		
1955.13	1926.37	1927.57	1927.57		
1954.86	1926.47	1927.67	1927.67		
1954.58	1926.55	1927.75	1927.75		
1954.31	1926.86	1928.06	1928.06		
1954.03	1926.81	1928.01	1928.01		
1953.76	1926.77	1927.97	1927.97		
1953.48	1926.73	1927.93	1927.93		
1953.21	1927.00	1928.20	1928.20		
1952.93	1927.88	1929.08	1929.08		
1952.66	1928.76	1929.96	1929.96		
1952.38	1929.09	1930.30	1930.30		
1952.11	1928.63	1929.85	1929.85		
1951.83	1928.18	1929.40	1929.40		
1951.56	1927.72	1928.95	1928.95		
1951.28	1927.23	1928.41	1928.41		
1951.01	1926.70	1927.81	1927.81		
1950.73	1926.16	1927.21	1927.21		
1950.46	1925.63	1926.75	1926.75		
1950.18	1925.15	1926.35	1926.35		
1949.91	1924.74	1925.94	1925.94		
1949.63	1924.47	1925.67	1925.67		
1949.36	1924.32	1925.52	1925.52		
1949.08	1923.98	1925.18	1925.18		
1948.81	1923.16	1924.36	1924.36		
1948.53	1922.45	1923.53	1923.53		
1948.26	1921.15	1922.38	1922.38		
1947.98	1921.15	1922.38	1922.38		
1947.71	1920.54	1921.77	1921.77		
1947.43	1919.92	1921.12	1921.12		
1947.16	1919.28	1920.48	1920.48		
1946.88	1918.63	1919.83	1919.83		
1946.61	1918.45	1919.65	1919.65		
1946.33	1918.31	1919.51	1919.51		
1946.06	1918.50	1919.70	1919.70		
1945.78	1918.87	1920.06	1920.06		
1945.51	1920.43	1920.43	1920.43		
1945.23	1919.59	1920.79	1920.79		
1944.96	1919.96	1921.16	1921.16		
1944.68	1919.90	1921.21	1921.21		
1944.41	1919.56	1920.78	1920.78		
1944.14	1919.15	1920.35	1920.35		
1943.86	1918.27	1919.47	1919.47		
1943.59	1917.23	1918.43	1918.43		
1943.31	1916.19	1917.39	1917.39		
1943.04	1915.15	1916.35	1916.35		
1942.76	1914.01	1915.25	1915.25		
1942.49	1912.86	1914.07	1914.07		
1942.21	1911.79	1912.93	1912.93		
1941.94	1910.84	1911.99	1911.99		
1941.66	1909.88	1911.06	1911.06		
1941.39	1910.12	1910.12	1910.12		
1941.11	1907.62	1908.83	1908.83		

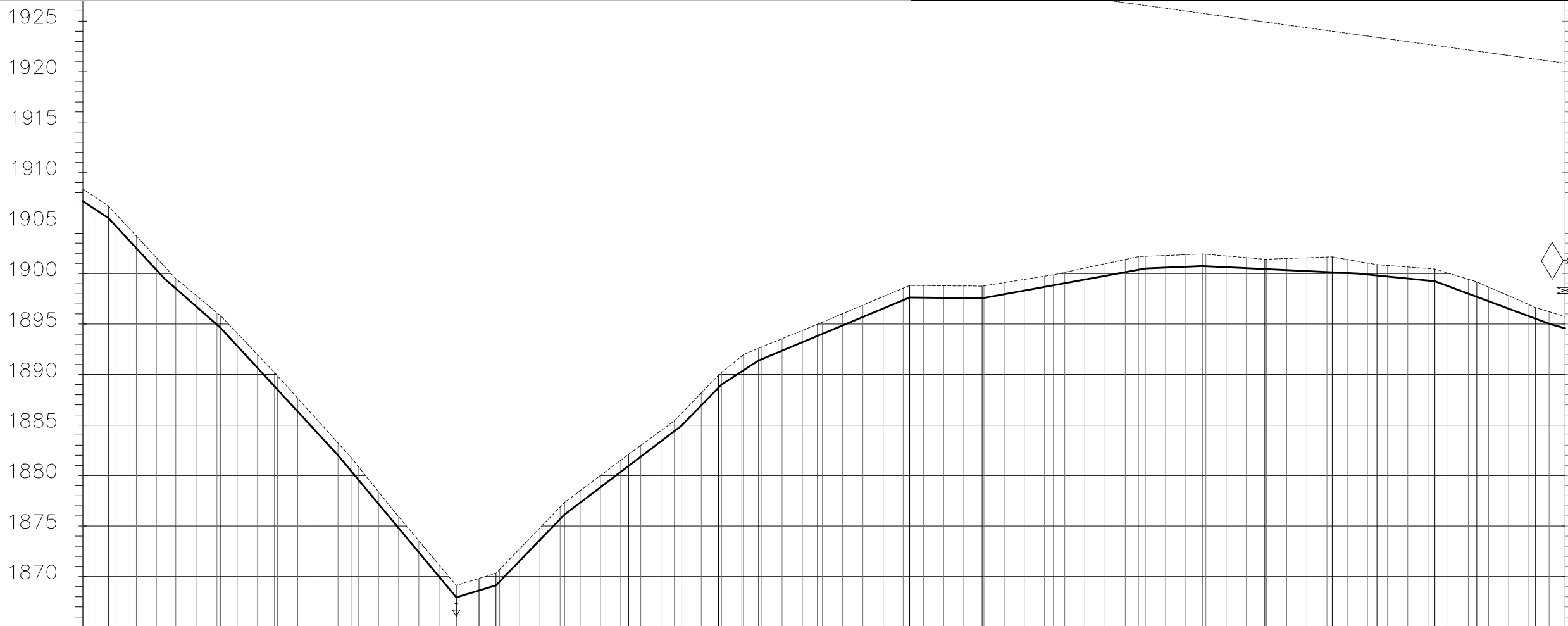


MATCH LINE - 3  
AT STATION - 4+407.00  
PREVIOUS SHEET NUMBER - 3

MATCH LINE - 4  
AT STATION - 5+876.00  
NEXT SHEET NUMBER - 5

- NOTES**
1. ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
  2. COORDINATES ARE BASED ON UTM.
  3. LOCATION OF AIR VALVES, WASHOUTS, BENDS AND OTHER FITTINGS AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER ON SITE.
  4. GROUND AND INVERT LEVEL SHOWN ARE AS SHOWN ON DRAWING UNLESS OTHERWISE INDICATED ON SITE BY THE ENGINEER.
  5. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM COVER OF 1.0M. WHERE COVER IS LESS THAN THIS, PIPE TO BE SURROUNDED WITH CONCRETE.
  6. ALL BENDS ARE HORIZONTAL UNLESS OTHERWISE STATED.
  7. IN WATER LOGGED AREAS, PIPES TO BE BEDDED WITH SINGLE SIZED OR GRADED AGGREGATES AS PER CLAUSE 430.1 AND 216 OF TECHNICAL SPECIFICATIONS AND/OR ANCHOR BLOCKS AS MAY BE DIRECTED ON SITE BY THE ENGINEER.

- LEGEND:**
- - - - - PROPOSED PIPELINE
  - --- EXISTING GROUND PROFILE
  - — — PIPE INVERT PROFILE
  - — — EXISTING ROAD
  - ◇ AIR VALVE
  - DAV DOUBLE AIR VALVE
  - ▽ WASHOUT
  - W01 WASHOUT TYPE 1
  - W02 WASHOUT TYPE 2
  - DN NOMINAL DIAMETER
  - PN NOMINAL PRESSURE
  - VB VERTICAL BEND
  - HB HORIZONTAL BEND
  - EXISTING STRUCTURE
  - ER EARTH ROAD
  - GR GRAVEL ROAD
  - CUT



DISTANCE DATUM (m)	GROUND LEVELS (m)	INVERT LEVELS(m)	HGL(m)	FLOW DATA	TYPE OF PIPE AND SIZE
1940.84	1906.31	1907.51	1907.51	←	PN10 DN 200MM PIPE
1940.56	1904.67	1905.87	1905.87		
1940.29	1902.52	1903.72	1903.72	←	PN10 DN 200MM PIPE
1940.01	1900.36	1901.56	1901.56		
1939.74	1898.44	1899.44	1899.44	←	PN10 DN 200MM PIPE
1939.46	1896.69	1897.77	1897.77		
1939.19	1894.93	1896.11	1896.11	←	PN10 DN 200MM PIPE
1938.91	1892.84	1894.09	1894.09		
1938.64	1890.67	1891.99	1891.99	←	PN10 DN 200MM PIPE
1938.36	1888.51	1889.87	1889.87		
1938.09	1886.34	1887.65	1887.65	←	PN10 DN 200MM PIPE
1937.81	1884.18	1885.43	1885.43		
1937.54		1883.21	1883.21	←	PN10 DN 200MM PIPE
1937.26	1879.61	1880.89	1880.89		
1936.99	1877.20	1878.40	1878.40	←	PN10 DN 200MM PIPE
1936.71	1874.79	1875.93	1875.93		
1936.44	1872.39	1873.54	1873.54	←	PN10 DN 200MM PIPE
1936.16	1869.98	1871.16	1871.16		
1935.89	1868.02	1869.22	1869.22	←	PN10 DN 200MM PIPE
1935.61	1866.62	1869.82	1869.82		
1935.34	1869.50	1870.70	1870.70	←	PN10 DN 200MM PIPE
1935.06	1871.56	1872.76	1872.76		
1934.79	1873.62	1874.82	1874.82	←	PN10 DN 200MM PIPE
1934.51	1875.68	1876.88	1876.88		
1934.24	1877.32	1878.50	1878.50	←	PN10 DN 200MM PIPE
1933.96	1878.84	1880.01	1880.01		
1933.69	1880.35	1881.51	1881.51	←	PN10 DN 200MM PIPE
1933.41	1881.87	1882.99	1882.99		
1933.14	1883.39	1884.45	1884.45	←	PN10 DN 200MM PIPE
1932.86		1886.11	1886.11		
1932.59	1886.96	1888.19	1888.19	←	PN10 DN 200MM PIPE
1932.31		1890.20	1890.20		
1932.04	1890.31	1891.83	1891.83	←	PN10 DN 200MM PIPE
1931.76	1891.54	1892.74	1892.74		
1931.49	1892.37	1893.55	1893.55	←	PN10 DN 200MM PIPE
1931.22	1893.20	1894.37	1894.37		
1930.94	1894.03	1895.19	1895.19	←	PN10 DN 200MM PIPE
1930.67	1894.86	1896.03	1896.03		
1930.39	1895.69	1896.87	1896.87	←	PN10 DN 200MM PIPE
1930.12	1896.52	1897.71	1897.71		
1929.84	1897.35	1898.55	1898.55	←	PN10 DN 200MM PIPE
1929.57	1897.61	1898.81	1898.81		
1929.29	1897.59	1898.79	1898.79	←	PN10 DN 200MM PIPE
1929.02	1897.57	1898.77	1898.77		
1928.74	1897.59	1898.79	1898.79	←	PN10 DN 200MM PIPE
1928.47	1897.95	1899.10	1899.10		
1928.19	1898.32	1899.42	1899.42	←	PN10 DN 200MM PIPE
1927.92	1898.68	1899.74	1899.74		
1927.64	1899.05	1900.12	1900.12	←	PN10 DN 200MM PIPE
1927.37	1899.41	1900.54	1900.54		
1927.09	1899.77	1900.97	1900.97	←	PN10 DN 200MM PIPE
1926.82	1900.14	1901.40	1901.40		
1926.54		1901.70	1901.70	←	PN10 DN 200MM PIPE
1926.27	1900.59	1901.79	1901.79		
1925.99	1900.67	1901.87	1901.87	←	PN10 DN 200MM PIPE
1925.72	1900.73	1901.91	1901.91		
1925.44	1900.63	1901.74	1901.74	←	PN10 DN 200MM PIPE
1925.17	1900.53	1901.57	1901.57		
1924.89	1900.44	1901.42	1901.42	←	PN10 DN 200MM PIPE
1924.62	1900.34	1901.49	1901.49		
1924.34	1900.24	1901.56	1901.56	←	PN10 DN 200MM PIPE
1924.07	1900.15	1901.63	1901.63		
1923.79	1900.05	1901.39	1901.39	←	PN10 DN 200MM PIPE
1923.52	1899.91	1901.04	1901.04		
1923.24	1899.71	1900.80	1900.80	←	PN10 DN 200MM PIPE
1922.97	1899.51	1900.65	1900.65		
1922.69	1899.31	1900.50	1900.50	←	PN10 DN 200MM PIPE
1922.42	1899.16	1900.05	1900.05		
1922.14	1898.01	1899.44	1899.44	←	PN10 DN 200MM PIPE
1921.87	1897.27	1898.67	1898.67		
1921.59	1896.52	1897.80	1897.80	←	PN10 DN 200MM PIPE
1921.32	1895.78	1896.93	1896.93		
1921.04	1895.03	1896.23	1896.23	←	PN10 DN 200MM PIPE

**FOR CONSTRUCTION**

signed CMTS

REV	REVISIONS	SIGN	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			
CO	ISSUED FOR CONSTRUCTION	BY		
		CHECKED		

**CLIENT**

TANA WATER WORKS DEVELOPMENT AGENCY  
P. O. BOX 1292-10100  
NYERI

**PROJECT**

DESIGN FOR PROPOSED IHWAGI  
RAW GRAVITY MAIN

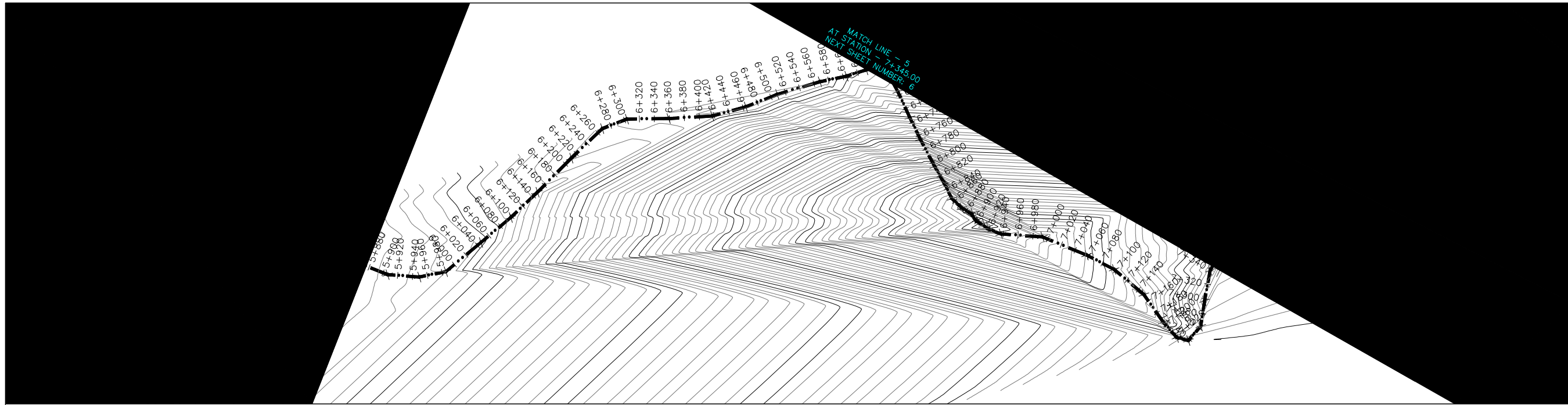
**Civil/Structural Engineers**

TANA WATER WORKS DEVELOPMENT AGENCY  
P. O. BOX 1292-10100  
NYERI

**Drawing Title**

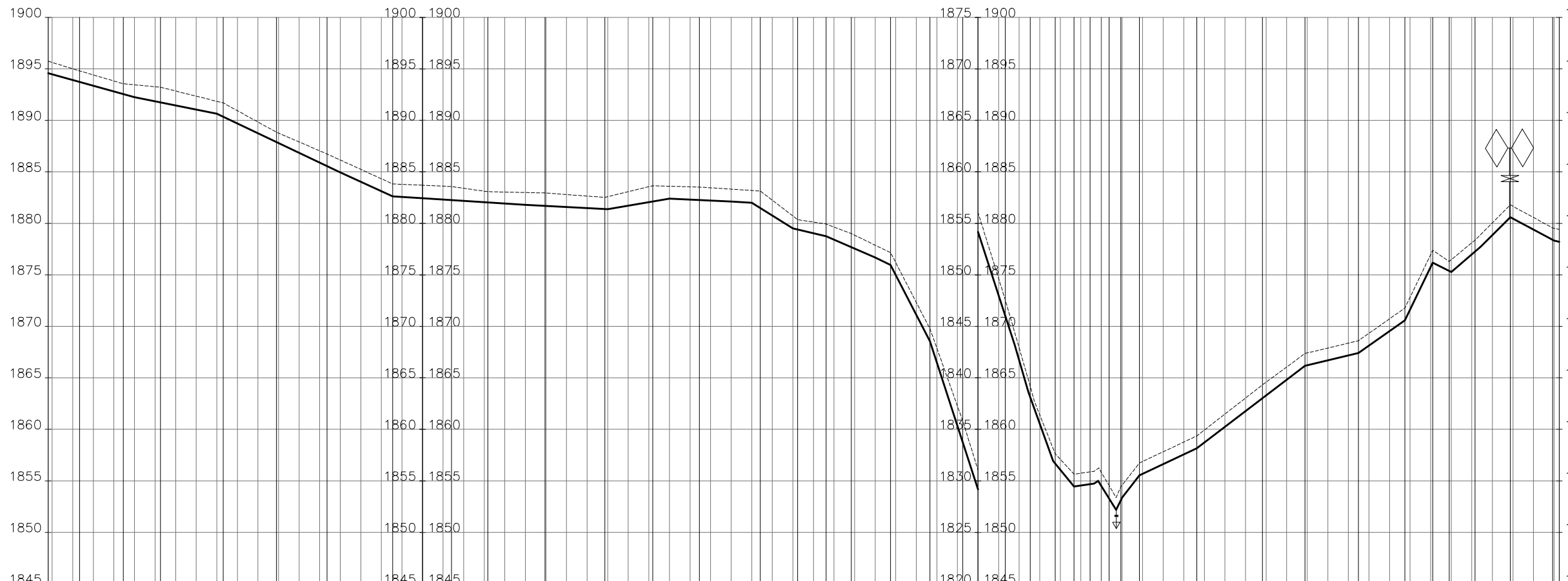
PROPOSED RAW GRAVITY MAIN  
RAW GRAVITY MAIN  
PLAN AND PROFILE (SHEET 4 OF 7)

Designed by	DWN	Drawn by	JNM
Checked by	JMM	Approved by	
Scale	AS SHOWN (A1)	Date	AUG 2022
Job No.	1	ACAD File:	
STATUS	DRAWING No.	TWDA/PRGM/RGM-	CO-REV



- NOTES**
- ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
  - COORDINATES ARE BASED ON UTM.
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  - GROUND AND INVERT LEVEL SHOWN ARE AS SHOWN ON DRAWING UNLESS OTHERWISE INDICATED ON SITE BY THE ENGINEER.
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  - ALL BENDS ARE HORIZONTAL UNLESS OTHERWISE STATED.
  - IN WATER LOGGED AREAS, PIPES TO BE BEDDED WITH SINGLE SIZED OR GRADED AGGREGATES AS PER CLAUSE 430.1 AND 216 OF TECHNICAL SPECIFICATIONS AND/OR ANCHOR BLOCKS AS MAY BE DIRECTED ON SITE BY THE ENGINEER.

- LEGEND:**
- PROPOSED PIPELINE
  - EXISTING GROUND PROFILE
  - PIPE INVERT PROFILE
  - EXISTING ROAD
  - ◇ AIR VALVE
  - DAV DOUBLE AIR VALVE
  - ▽ WASHOUT
  - WO1 WASHOUT TYPE 1
  - WO2 WASHOUT TYPE 2
  - DN NOMINAL DIAMETER
  - PN NOMINAL PRESSURE
  - VB VERTICAL BEND
  - HB HORIZONTAL BEND
  - EXISTING STRUCTURE
  - ER EARTH ROAD
  - GR GRAVEL ROAD
  - CUT



DISTANCE DATUM (m)	GROUND LEVELS (m)	INVERT LEVELS (m)	HGL (m)	FLOW DATA	TYPE OF PIPE AND SIZE
1920.77	1894.47	1895.62	1889.00		
1920.49	1893.92	1895.01	1890.00		
1920.22	1893.36	1894.41	1890.00		
1919.94	1892.81	1893.82	1890.00		
1919.67	1893.45	1893.45	1890.00		
1919.39	1891.85	1893.26	1890.00		
1919.12	1891.45	1892.85	1890.00		
1918.84	1891.05	1892.35	1890.00		
1918.57	1891.85	1891.85	1890.00		
1918.30	1889.70	1890.94	1890.00		
1918.02	1888.75	1889.84	1890.00		
1917.75	1887.80	1888.76	1890.00		
1917.47	1886.85	1887.90	1890.00		
1917.20	1885.90	1887.04	1890.00		
1916.92	1886.15	1886.15	1890.00		
1916.65	1884.04	1885.24	1890.00		
1916.37	1883.13	1884.33	1890.00		
1916.10	1882.57	1883.79	1890.00		
1915.82	1882.44	1883.70	1890.00		
1915.55	1882.31	1883.61	1890.00		
1915.27	1882.18	1883.41	1890.00		
1915.00	1882.05	1883.12	1890.00		
1914.72	1881.92	1883.04	1890.00		
1914.45	1882.99	1882.99	1890.00		
1914.17	1881.69	1882.94	1890.00		
1913.90	1881.59	1882.80	1890.00		
1913.62	1881.49	1882.65	1890.00		
1913.35	1882.58	1882.58	1890.00		
1913.07	1881.72	1883.07	1890.00		
1912.80	1882.06	1883.55	1890.00		
1912.52	1883.60	1883.60	1890.00		
1912.25	1882.31	1883.55	1890.00		
1911.97	1882.21	1883.45	1890.00		
1911.70	1883.32	1883.32	1890.00		
1911.42	1883.19	1882.25	1890.00		
1911.15	1880.75	1882.25	1890.00		
1910.87	1880.72	1880.72	1890.00		
1910.60	1879.03	1880.13	1890.00		
1910.32	1878.41	1879.64	1890.00		
1910.05	1877.54	1878.85	1890.00		
1909.77	1877.88	1877.88	1890.00		
1909.50	1874.99	1876.19	1890.00		
1909.22	1871.12	1872.32	1890.00		
1908.95	1866.48	1867.87	1890.00		
1908.67	1860.33	1862.25	1890.00		
1908.40	1854.17	1856.05	1890.00		
1908.12	1848.02	1849.65	1890.00		
1907.85	1841.70	1842.90	1890.00		
1907.57	1835.54	1836.41	1890.00		
1907.30	1831.07	1832.09	1890.00		
1907.02	1829.54	1830.74	1890.00		
1906.75	1829.47	1830.79	1890.00		
1906.47	1829.57	1829.57	1890.00		
1906.20	1830.68	1831.88	1890.00		
1905.92	1831.62	1832.82	1890.00		
1905.65	1832.56	1833.76	1890.00		
1905.38	1833.72	1834.93	1890.00		
1905.10	1835.24	1836.48	1890.00		
1904.83	1836.76	1838.04	1890.00		
1904.55	1838.28	1839.57	1890.00		
1904.28	1839.81	1841.05	1890.00		
1904.00	1841.21	1842.41	1890.00		
1903.73	1841.69	1842.89	1890.00		
1903.45	1842.17	1843.37	1890.00		
1903.18	1843.12	1844.32	1890.00		
1902.90	1844.53	1845.73	1890.00		
1902.63	1846.63	1847.83	1890.00		
1902.35	1850.76	1851.96	1890.00		
1902.08	1851.98	1853.11	1890.00		
1901.80	1853.85	1855.05	1890.00		
1901.53	1855.46	1856.66	1890.00		
1901.25	1855.57	1855.57	1890.00		
1900.98	1854.39	1855.57	1890.00		
1900.70	1854.52	1854.52	1890.00		

**FOR CONSTRUCTION**

signed CMTS

REV	REVISIONS	SIGN	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			
CO	ISSUED FOR CONSTRUCTION	BY		
		CHECKED		

**CLIENT**

TANA WATER WORKS DEVELOPMENT AGENCY  
P. O. BOX 1292-10100  
NYERI

**PROJECT**

DESIGN FOR PROPOSED IHWAGI RAW GRAVITY MAIN

**Civil/Structural Engineers**

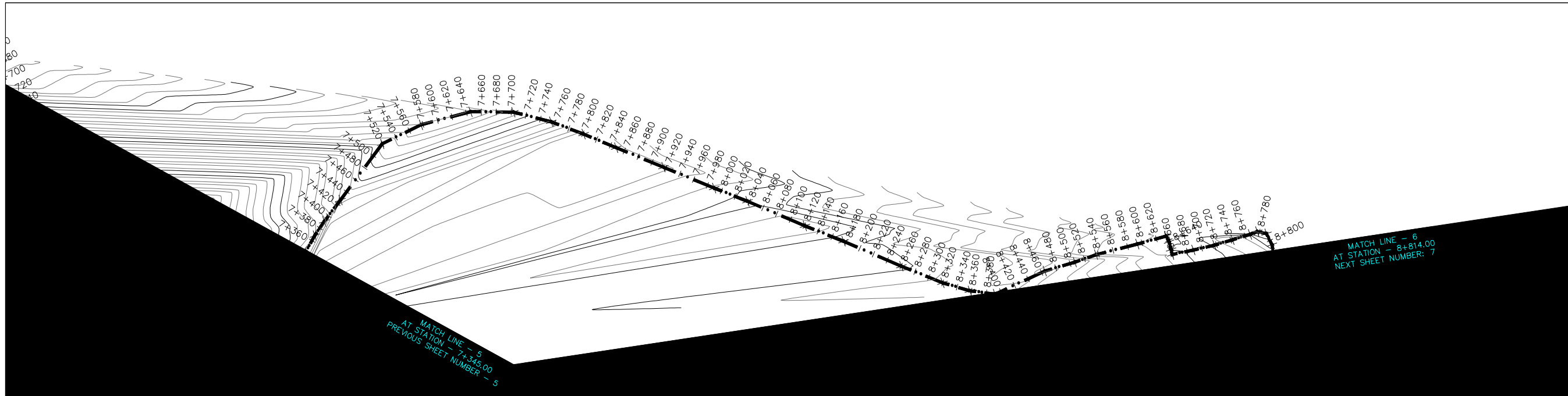
TANA WATER WORKS DEVELOPMENT AGENCY  
P. O. BOX 1292-10100  
NYERI

**Drawing Title**

PROPOSED RAW GRAVITY MAIN  
RAW GRAVITY MAIN  
PLAN AND PROFILE (SHEET 5 OF 7)

Designed by	DWN	Drawn by	JNM
Checked by	JMM	Approved by	
Scale	AS SHOWN (A1)	Date	AUG 2022
Job No.	1	ACAD File:	
STATUS	DRAWING No. TWWDA/PRGM/RGM-1		



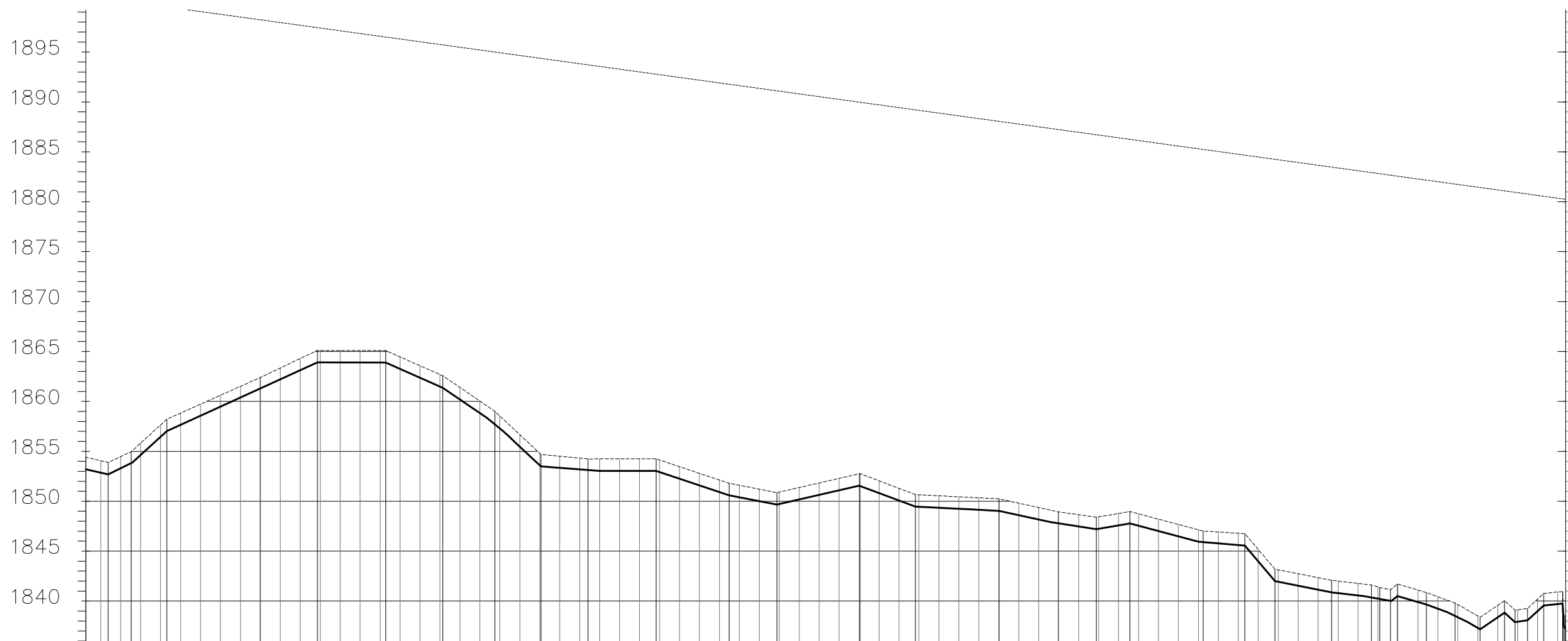


**NOTES**

- ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
- COORDINATES ARE BASED ON UTM.
- LOCATION OF AIR VALVES, WASHOUTS, BENDS AND OTHER FITTINGS AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER ON SITE.
- GROUND AND INVERT LEVEL SHOWN ARE AS SHOWN ON DRAWING UNLESS OTHERWISE INDICATED ON SITE BY THE ENGINEER.
- PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM COVER OF 1.0M. WHERE COVER IS LESS THAN THIS, PIPE TO BE SURROUNDED WITH CONCRETE.
- ALL BENDS ARE HORIZONTAL UNLESS OTHERWISE STATED.
- IN WATER LOGGED AREAS, PIPES TO BE BEDDED WITH SINGLE SIZED OR GRADED AGGREGATES AS PER CLAUSE 430.1 AND 216 OF TECHNICAL SPECIFICATIONS AND/OR ANCHOR BLOCKS AS MAY BE DIRECTED ON SITE BY THE ENGINEER.

**LEGEND:**

- - - - - PROPOSED PIPELINE
- ..... EXISTING GROUND PROFILE
- — — PIPE INVERT PROFILE
- - - - - EXISTING ROAD
- DAV AIR VALVE
- DAV DOUBLE AIR VALVE
- WASHOUT
- WO1 WASHOUT TYPE 1
- WO2 WASHOUT TYPE 2
- DN NOMINAL DIAMETER
- PN NOMINAL PRESSURE
- VB VERTICAL BEND
- HB HORIZONTAL BEND
- EXISTING STRUCTURE
- ER EARTH ROAD
- GR GRAVEL ROAD
- CUT



**FOR CONSTRUCTION**

REV	REVISIONS	SIGN	DATE	APPROVED
	CHECKED			
	CHECKED			
	CHECKED			
	CHECKED			
CO	ISSUED FOR CONSTRUCTION	BY		
		CHECKED		

**CLIENT**

TANA WATER WORKS DEVELOPMENT AGENCY  
P. O. BOX 1292-10100  
NYERI

**PROJECT**

DESIGN FOR PROPOSED IHWAGI RAW GRAVITY MAIN

**Civil/Structural Engineers**

TANA WATER WORKS DEVELOPMENT AGENCY  
P. O. BOX 1292-10100  
NYERI

**Drawing Title**

PROPOSED RAW GRAVITY MAIN  
RAW GRAVITY MAIN  
PLAN AND PROFILE (SHEET 6 OF 7)

Designed by	DWN	Drawn by	JNM
Checked by	JMM	Approved by	
Scale	AS SHOWN (A1)	Date	AUG 2022
Job No.	1	ACAD File:	
STATUS	DRAWING No.	TWWD/PRGM/RGM-	00
			REV

DISTANCE DATUM (m)	GROUND LEVELS (m)	INVERT LEVELS (m)	HGL (m)	FLOW DATA	TYPE OF PIPE AND SIZE
1900.43	1852.86	1854.06	1854.06		
1900.15	1853.30	1854.47	1854.47		
1899.88	1854.62	1855.82	1855.82		
1899.60	1856.45	1857.65	1857.65		
1899.33	1857.65	1858.83	1858.83		
1899.05	1858.56	1859.72	1859.72		
1898.78	1859.47	1860.62	1860.62		
1898.50	1860.39	1861.51	1861.51		
1898.23	1861.30	1862.40	1862.40		
1897.95	1862.21	1863.35	1863.35		
1897.68	1863.13	1864.30	1864.30		
1897.40	1863.91	1865.11	1865.11		
1897.13	1863.91	1865.11	1865.11		
1896.85	1863.90	1865.10	1865.10		
1896.58	1863.90	1865.10	1865.10		
1896.30	1863.26	1864.46	1864.46		
1896.03	1862.38	1863.58	1863.58		
1895.75	1861.49	1862.69	1862.69		
1895.48	1860.19	1861.39	1861.39		
1895.20	1858.83	1860.03	1860.03		
1894.93	1857.30	1858.54	1858.54		
1894.65	1855.47	1856.67	1856.67		
1894.38	1853.60	1854.80	1854.80		
1894.10	1853.34	1854.51	1854.51		
1893.83	1853.19	1854.32	1854.32		
1893.55	1854.24	1855.24	1855.24		
1893.28	1853.04	1854.24	1854.24		
1893.00	1853.05	1854.25	1854.25		
1892.73	1852.93	1854.13	1854.13		
1892.46	1853.46	1854.66	1854.66		
1892.18	1851.59	1852.79	1852.79		
1891.91	1850.93	1852.13	1852.13		
1891.63	1850.40	1851.60	1851.60		
1891.36	1850.01	1851.21	1851.21		
1891.08	1849.72	1850.92	1850.92		
1890.81	1850.17	1851.37	1851.37		
1890.53	1850.63	1851.83	1851.83		
1890.26	1851.09	1852.29	1852.29		
1889.98	1852.75	1854.05	1854.05		
1889.71	1850.81	1852.05	1852.05		
1889.43	1850.07	1851.29	1851.29		
1889.16	1849.45	1850.65	1850.65		
1888.88	1849.35	1850.55	1850.55		
1888.61	1849.24	1850.44	1850.44		
1888.33	1849.14	1850.34	1850.34		
1888.06	1849.04	1850.24	1850.24		
1887.78	1848.61	1849.81	1849.81		
1887.51	1848.17	1849.37	1849.37		
1887.23	1847.79	1848.94	1848.94		
1886.96	1847.48	1848.65	1848.65		
1886.68	1847.24	1848.44	1848.44		
1886.41	1847.57	1848.77	1848.77		
1886.13	1847.54	1848.74	1848.74		
1885.86	1847.01	1848.21	1848.21		
1885.58	1846.47	1847.67	1847.67		
1885.31	1847.14	1847.44	1847.44		
1885.03	1845.77	1846.92	1846.92		
1884.76	1845.60	1846.79	1846.79		
1884.48	1845.97	1847.17	1847.17		
1884.21	1841.93	1843.13	1843.13		
1883.93	1841.54	1842.74	1842.74		
1883.66	1841.15	1842.35	1842.35		
1883.38	1840.80	1842.00	1842.00		
1883.11	1840.57	1841.77	1841.77		
1882.83	1840.24	1841.41	1841.41		
1882.56	1840.49	1841.69	1841.69		
1882.28	1839.90	1841.10	1841.10		
1882.01	1839.24	1840.44	1840.44		
1881.73	1838.37	1839.65	1839.65		
1881.46	1837.32	1838.52	1838.52		
1881.18	1836.38	1837.58	1837.58		
1880.91	1837.93	1839.13	1839.13		
1880.63	1839.00	1840.20	1840.20		
1880.36	1840.91	1842.00	1842.00		