

- NOTES**
- NZTA DETAILS, STANDARDS AND SPECIFICATIONS APPLY UNLESS SHOWN OTHERWISE. DRAINAGE ASSETS TO BE VESTED TO COUNCIL WILL BE IN ACCORDANCE WITH THE PNCC ENGINEERING STANDARDS FOR LAND DEVELOPMENT (PART 6).
 - DRAINAGE PLANS TO BE READ IN CONJUNCTION WITH TYPICAL ROAD CROSS SECTIONS DRAWINGS.
 - DRAINAGE PLANS ARE TO BE READ IN CONJUNCTION WITH THE STORMWATER DRAINAGE TYPICAL DETAILS SHEETS TAT-2000-DG-H-1450 TO 1453.
 - REFER TO DRAWING TAT-3-DG-H-1441 FOR THE CROSS-CULVERT SCHEDULE.
 - REFER TO DRAWING TAT-3-DG-H-1434 FOR THE STORMWATER MANAGEMENT DEVICES SCHEDULE.

LEGEND		PROPOSED	
	PROPOSED DESIGNATION		WETLAND ACCESS TRACK
	COUNCIL BOUNDARY		EMERGENCY SPILLWAY
	EXISTING PROPERTY BOUNDARY		WETLAND FOREBAY BUND
	EXISTING STREAM (PERMANENT)		WETLAND ROCKLINED FOREBAY
	EXISTING STREAM (INTERMITTENT)		CULVERT
	EXISTING OVERLAND FLOW PATH		STORMWATER PIPE
	EXISTING CULVERT		GRILLE MANHOLE
	PROPOSED BRIDGE EXTENTS		SCRUFFY DOME MANHOLE
			MANHOLE
	PLANTED TREATMENT SWALE		PLANTED CONVEYANCE CHANNEL
	GRASSED CONVEYANCE CHANNEL		SEALED CONVEYANCE CHANNEL
	SEALED CONVEYANCE CHANNEL		SEALED CUT SLOPE DEBRIS CHANNEL
	INLET/OUTLET HEADWALL WITH RIPRAP		ROCKLINED CONVEYANCE CHANNEL
	CATCHPIT / BRIDGE CATCHPIT		CONCRETE CANVAS BENCH CHANNEL
	CATCHPIT MANHOLE		CUT-OFF DRAIN (GRASSED / ROCK LINED)
	FLOW SPLITTER / BYPASS MANHOLE		TYPE 1 / 2 - STREAM DIVERSION (PERMANENT)
	DEBRIS RACK: 7 No. 300Ø TIMBER POSTS AT 0.4m CENTRES		TYPE 3 - STREAM DIVERSION (INTERMITTENT)
			SPOIL SITES
			PERMANENT SEDIMENT BASIN



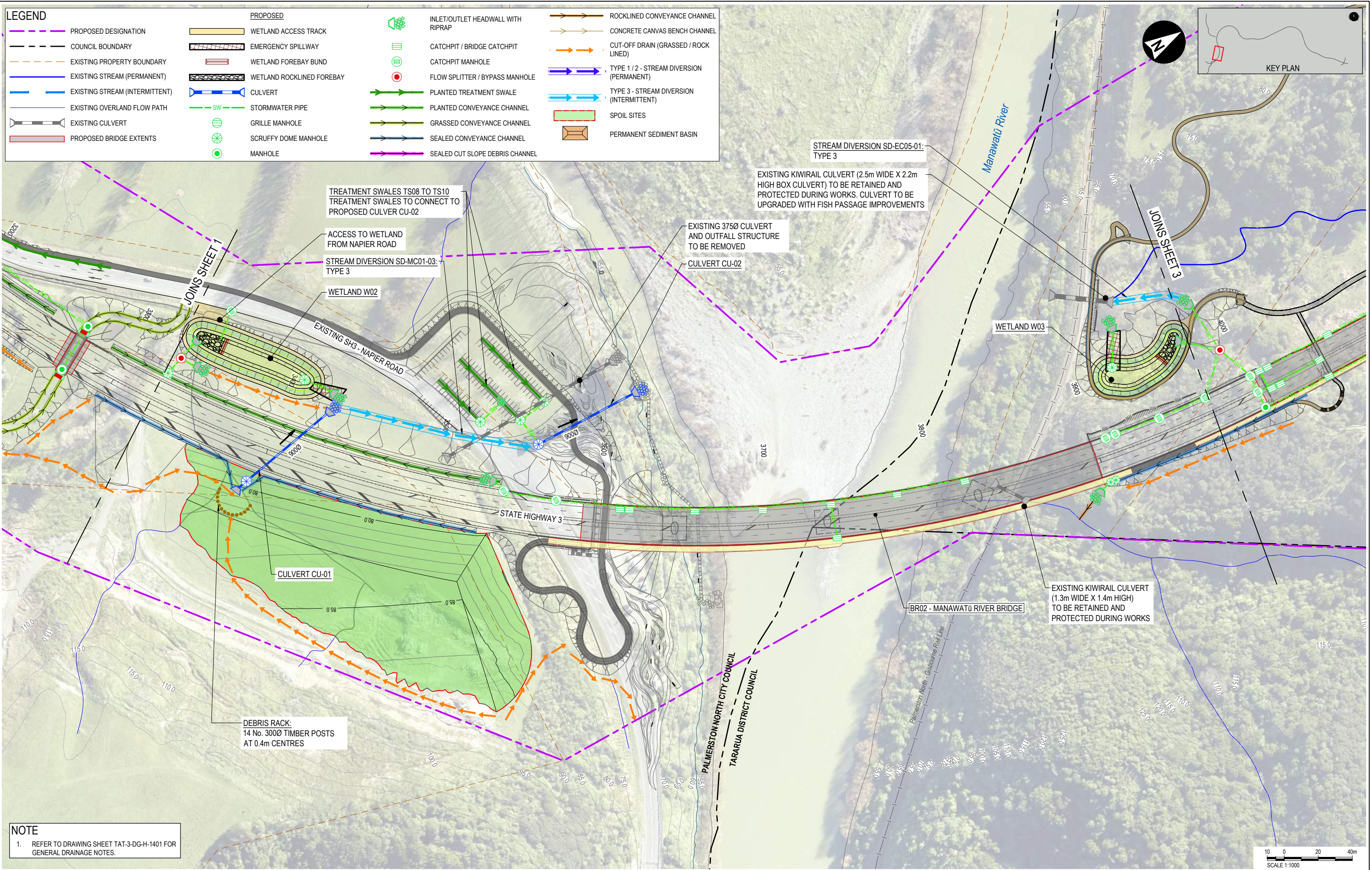
Te Ahu a Turanga
Manawātū Tararua Highway

CLIENT	REV	DATE	REVISION DETAILS	APPROVED
WAKA KOTAHĪ NZ TRANSPORT AGENCY	C	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN
	B	19/11/2019	ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH
	A	18/10/2019	CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH

SCALE	SIZE	CONSENT	PROJECT
1:1000	A1	NOT FOR CONSTRUCTION	TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY
DRAWN D. LOW		APPROVED	TITLE
DESIGNED D. HUGHES		T. WATTERSON	STORMWATER DRAINAGE LAYOUT PLAN SHEET 1
REVIEWED D. HUGHES		T. WATTERSON	DRAWING No.

DATE	PHASE	TYPE	DISC	NUMBER	REV
24/02/2020	3	DG	H	1401	C

PROJECT No.	PHASE	TYPE	DISC	NUMBER	REV
TAT	3	DG	H	1401	C



LEGEND	
PROPOSED DESIGNATION	PROPOSED
COUNCIL BOUNDARY	WETLAND ACCESS TRACK
EXISTING PROPERTY BOUNDARY	EMERGENCY SPILLWAY
EXISTING STREAM (PERMANENT)	WETLAND FOREBAY BUND
EXISTING STREAM (INTERMITTENT)	WETLAND ROCKLINED FOREBAY
EXISTING OVERLAND FLOW PATH	CULVERT
EXISTING CULVERT	STORMWATER PIPE
PROPOSED BRIDGE EXTENTS	GRILLE MANHOLE
	SCRUFFY DOME MANHOLE
	MANHOLE
	INLET/OUTLET HEADWALL WITH RIPRAP
	CATCHPIT / BRIDGE CATCHPIT
	CATCHPIT MANHOLE
	FLOW SPLITTER / BYPASS MANHOLE
	PLANTED TREATMENT SWALE
	PLANTED CONVEYANCE CHANNEL
	GRASSED CONVEYANCE CHANNEL
	SEALED CONVEYANCE CHANNEL
	SEALED CUT SLOPE DEBRIS CHANNEL
	ROCKLINED CONVEYANCE CHANNEL
	CONCRETE CANVAS BENCH CHANNEL
	CUT-OFF DRAIN (GRASSED / ROCK LINED)
	TYPE 1 / 2 - STREAM DIVERSION (PERMANENT)
	TYPE 3 - STREAM DIVERSION (INTERMITTENT)
	SPOIL SITES
	PERMANENT SEDIMENT BASIN

NOTE
1. REFER TO DRAWING SHEET TAT-3-DG-H-1401 FOR GENERAL DRAINAGE NOTES.



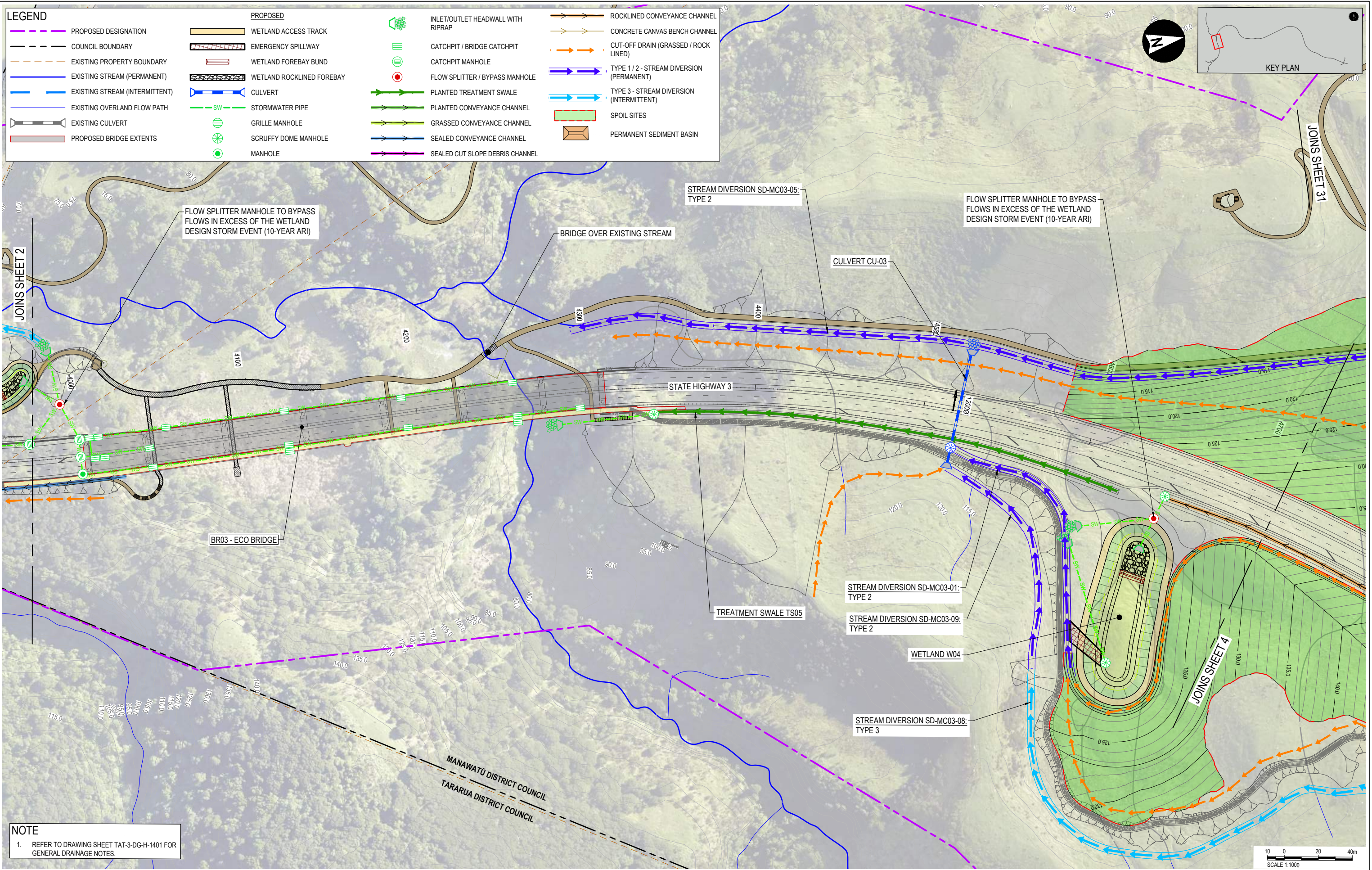
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C	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN
B	19/11/2019	ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH
A	18/10/2019	CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH

SCALE	SIZE
1:1000	A1
DRAWN	D. LOW
DESIGNED	D. HUGHES
REVIEWED	D. HUGHES

CONSENT NOT FOR CONSTRUCTION	
APPROVED	DATE
T. WATTERSON	24/02/2020
T. WATTERSON	

PROJECT	TE AHU A TURANGA: MANAWATU TARARUA HIGHWAY					
TITLE	STORMWATER DRAINAGE LAYOUT PLAN SHEET 2					
DRAWING No.	PROJECT No.	PHASE	TYPE	DISC	NUMBER	REV
TAT		3	DG	H	1402	C

OP1340 23/01/20



LEGEND		PROPOSED	
	PROPOSED DESIGNATION		WETLAND ACCESS TRACK
	COUNCIL BOUNDARY		EMERGENCY SPILLWAY
	EXISTING PROPERTY BOUNDARY		WETLAND FOREBAY BUND
	EXISTING STREAM (PERMANENT)		WETLAND ROCKLINED FOREBAY
	EXISTING STREAM (INTERMITTENT)		CULVERT
	EXISTING OVERLAND FLOW PATH		STORMWATER PIPE
	EXISTING CULVERT		GRILLE MANHOLE
	PROPOSED BRIDGE EXTENTS		SCRUFFY DOME MANHOLE
			MANHOLE
			INLET/OUTLET HEADWALL WITH RIPRAP
			CATCHPIT / BRIDGE CATCHPIT
			CATCHPIT MANHOLE
			FLOW SPLITTER / BYPASS MANHOLE
			PLANTED TREATMENT SWALE
			PLANTED CONVEYANCE CHANNEL
			GRASSSED CONVEYANCE CHANNEL
			SEALED CONVEYANCE CHANNEL
			SEALED CUT SLOPE DEBRIS CHANNEL
			ROCKLINED CONVEYANCE CHANNEL
			CONCRETE CANVAS BENCH CHANNEL
			CUT-OFF DRAIN (GRASSSED / ROCK LINED)
			TYPE 1 / 2 - STREAM DIVERSION (PERMANENT)
			TYPE 3 - STREAM DIVERSION (INTERMITTENT)
			SPOIL SITES
			PERMANENT SEDIMENT BASIN

NOTE
1. REFER TO DRAWING SHEET TAT-3-DG-H-1401 FOR GENERAL DRAINAGE NOTES.

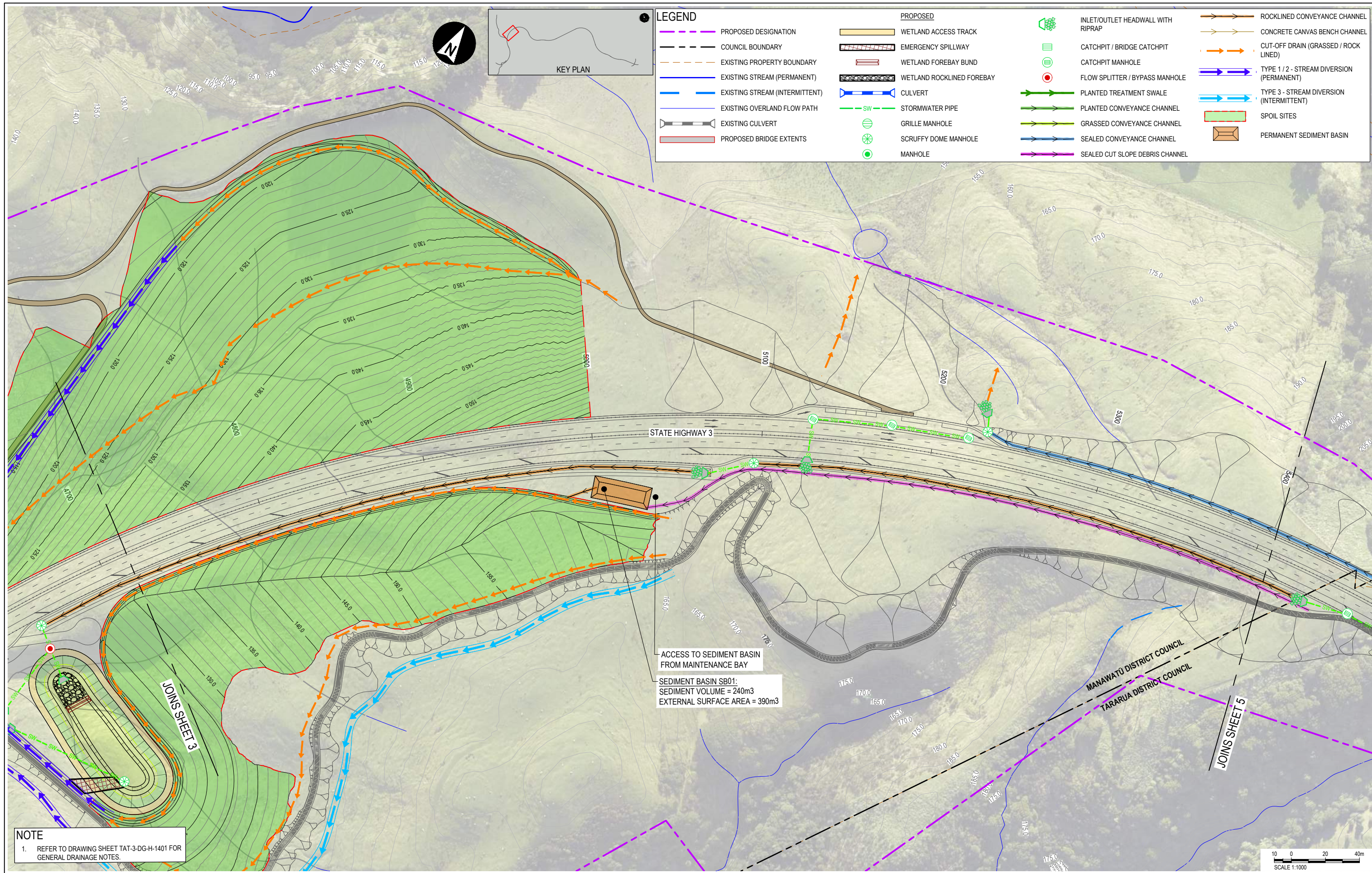


CLIENT	REV	DATE	REVISION DETAILS	APPROVED
MANAWATŪ DISTRICT COUNCIL TARARUA DISTRICT COUNCIL	C	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN
	B	19/11/2019	ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH
	A	18/10/2019	CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH

SCALE	SIZE
1:1000	A1
DRAWN	D. LOW
DESIGNED	D. HUGHES
REVIEWED	D. HUGHES

CONSENT NOT FOR CONSTRUCTION	
APPROVED	DATE
T. WATTERSON	24/02/2020
T. WATTERSON	

PROJECT	TITLE
TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY	STORMWATER DRAINAGE LAYOUT PLAN SHEET 3
DRAWING No.	PROJECT No.
TAT	3
PHASE	TYPE
3	DG
DISC	NUMBER
H	1403
REV	REV
C	C



NOTE
1. REFER TO DRAWING SHEET TAT-3-DG-H-1401 FOR GENERAL DRAINAGE NOTES.

ACCESS TO SEDIMENT BASIN FROM MAINTENANCE BAY
SEDIMENT BASIN SB01:
SEDIMENT VOLUME = 240m³
EXTERNAL SURFACE AREA = 390m²



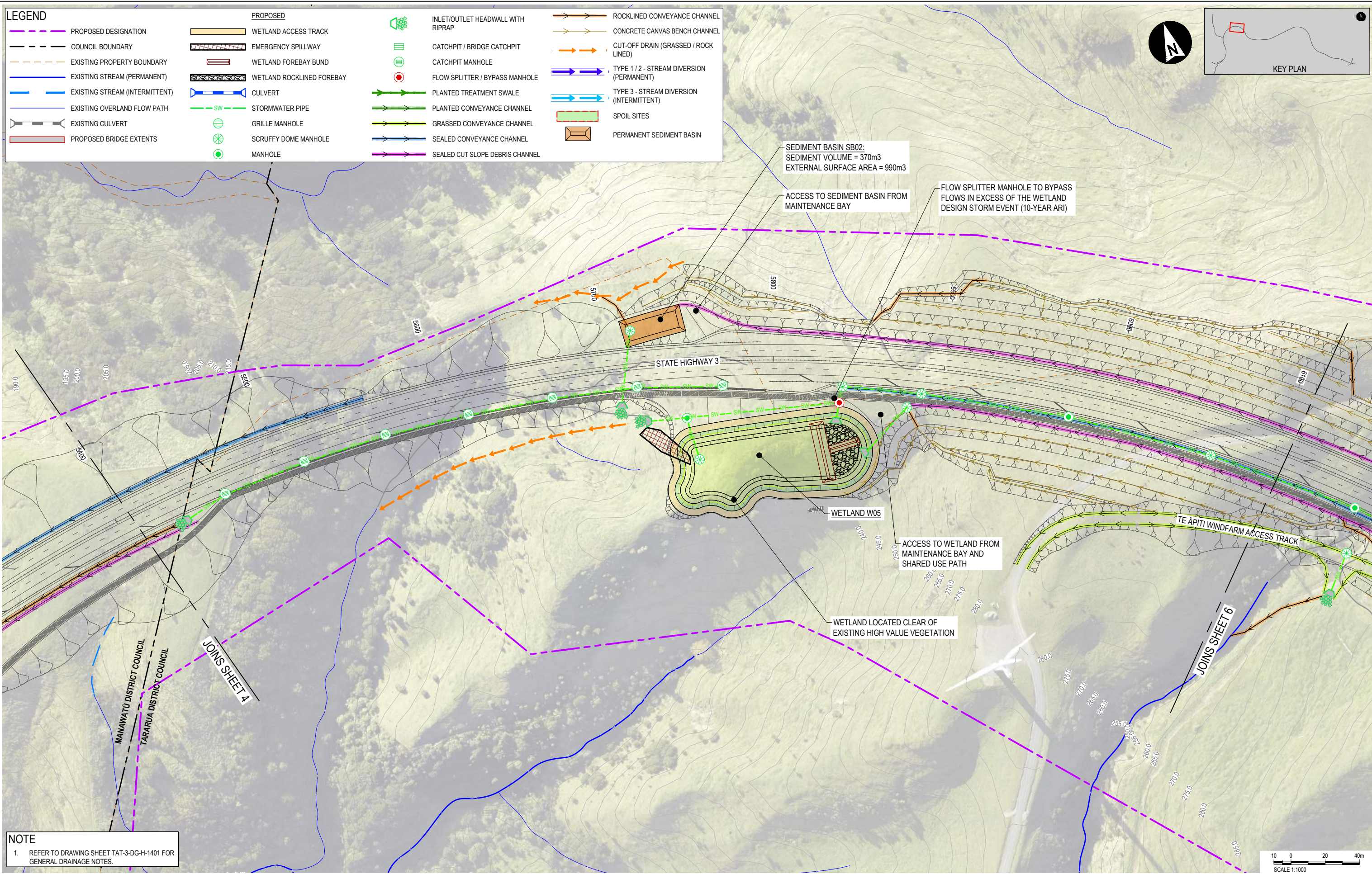
Te Ahu a Turanga
Manawātū Tararua Highway

CLIENT	REV	DATE	REVISION DETAILS	APPROVED
WAKA KOTAHĪ NZ TRANSPORT AGENCY	C	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN
	B	19/11/2019	ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH
	A	18/10/2019	CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH

SCALE	SIZE	CONSENT	PROJECT
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DRAWN D. LOW		APPROVED	TITLE
DESIGNED D. HUGHES		DATE 24/02/2020	STORMWATER DRAINAGE LAYOUT PLAN SHEET 4
REVIEWED D. HUGHES		T. WATTERSON	DRAWING No. PROJECT No. PHASE TYPE DISC NUMBER REV
		T. WATTERSON	TAT 3 DG H 1404 C

SCALE	SIZE	CONSENT	PROJECT
1:1000	A1	NOT FOR CONSTRUCTION	TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY
DRAWN D. LOW		APPROVED	TITLE
DESIGNED D. HUGHES		DATE 24/02/2020	STORMWATER DRAINAGE LAYOUT PLAN SHEET 4
REVIEWED D. HUGHES		T. WATTERSON	DRAWING No. PROJECT No. PHASE TYPE DISC NUMBER REV
		T. WATTERSON	TAT 3 DG H 1404 C

SCALE	SIZE	CONSENT	PROJECT
1:1000	A1	NOT FOR CONSTRUCTION	TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY
DRAWN D. LOW		APPROVED	TITLE
DESIGNED D. HUGHES		DATE 24/02/2020	STORMWATER DRAINAGE LAYOUT PLAN SHEET 4
REVIEWED D. HUGHES		T. WATTERSON	DRAWING No. PROJECT No. PHASE TYPE DISC NUMBER REV
		T. WATTERSON	TAT 3 DG H 1404 C

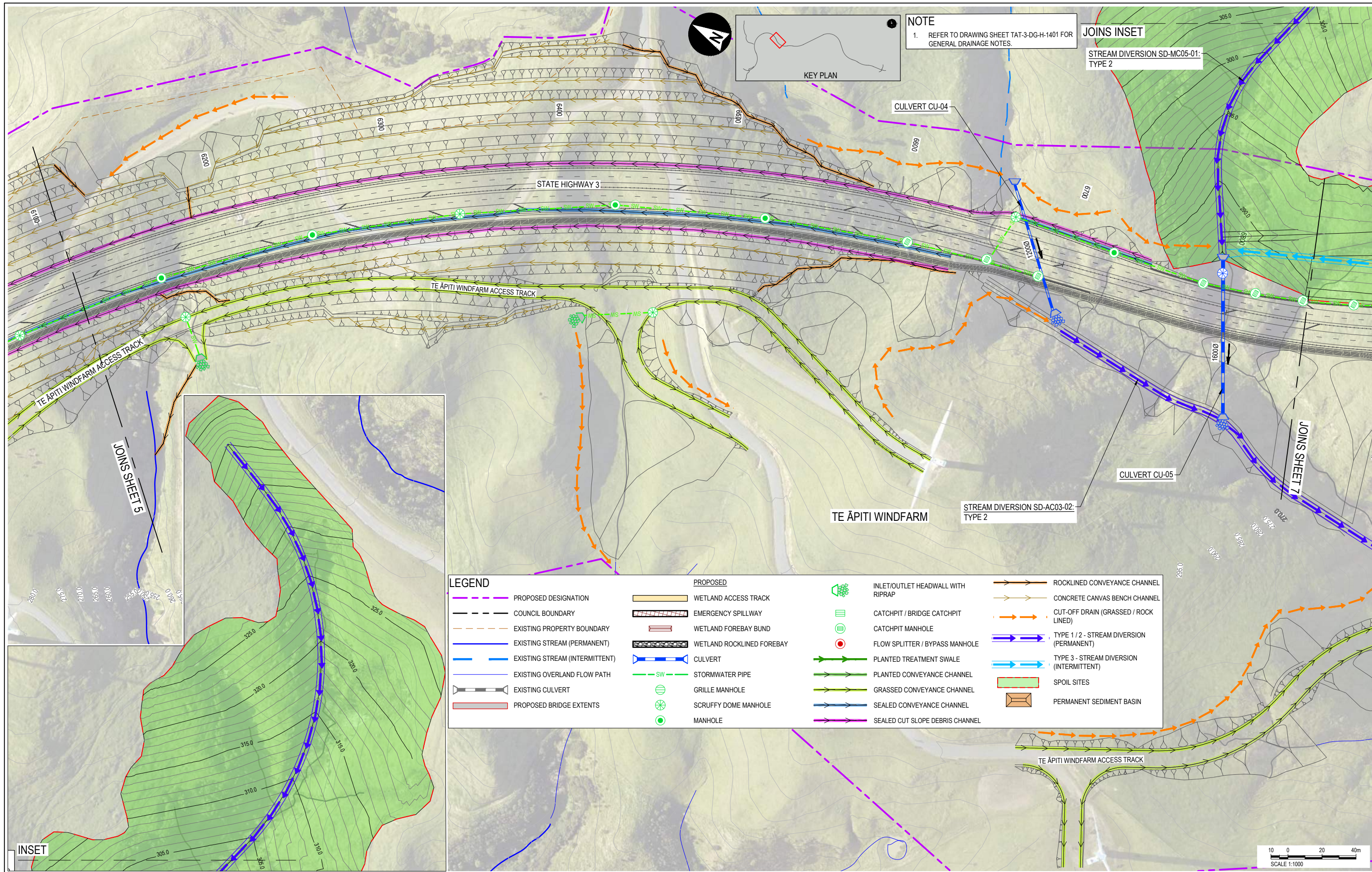


NOTE
1. REFER TO DRAWING SHEET TAT-3-DG-H-1401 FOR GENERAL DRAINAGE NOTES.



CLIENT		REV		DATE	REVISION DETAILS	APPROVED	SCALE	SIZE	CONSENT	PROJECT
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		B	19/11/2019		ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH				
		A	18/10/2019		CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH				
		DRAWN		DESIGNED		REVIEWED		APPROVED		TITLE
		D. LOW		D. HUGHES		D. HUGHES		DATE		STORMWATER DRAINAGE LAYOUT PLAN
								T. WATTERSON		SHEET 5
								T. WATTERSON		DRAWING No.
								T. WATTERSON		PROJECT No.
										PHASE
										3
										TYPE
										DG
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										H
										NUMBER
										1405
										REV
										C

OP1340 23/07/20



CLIENT

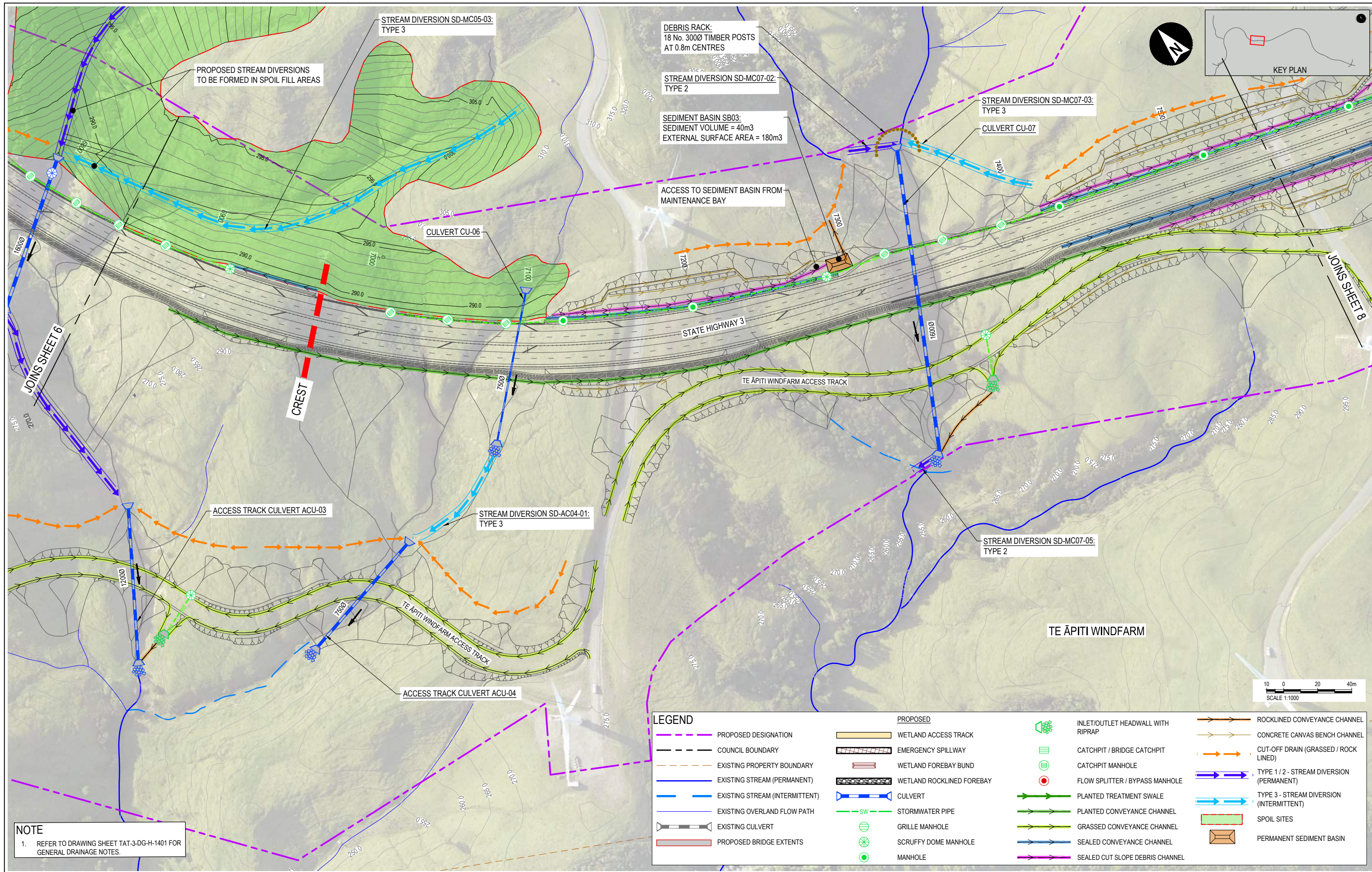
Te Ahu a Turanga
Manawatū Tararua Highway

REV	DATE	REVISION DETAILS	APPROVED
C	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN
B	19/11/2019	ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH
A	18/10/2019	CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH

SCALE	1:1000
SIZE	A1
DRAWN	D. LOW
DESIGNED	D. HUGHES
REVIEWED	D. HUGHES

CONSENT NOT FOR CONSTRUCTION	
APPROVED	DATE
T. WATTERSON	24/02/2020
T. WATTERSON	

PROJECT	TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY										
TITLE	STORMWATER DRAINAGE LAYOUT PLAN SHEET 6										
DRAWING No.	TAT	PHASE	3	TYPE	DG	DISC	H	NUMBER	1406	REV	C



NOTE
 1. REFER TO DRAWING SHEET TAT-3-DG-H-1401 FOR GENERAL DRAINAGE NOTES.

LEGEND

PROPOSED DESIGNATION	WETLAND ACCESS TRACK	INLET/OUTLET HEADWALL WITH RIPRAP	ROCKLINED CONVEYANCE CHANNEL
COUNCIL BOUNDARY	EMERGENCY SPILLWAY	CATCHPIT / BRIDGE CATCHPIT	CONCRETE CANVAS BENCH CHANNEL
EXISTING PROPERTY BOUNDARY	WETLAND FOREBAY BUND	CATCHPIT MANHOLE	CUT-OFF DRAIN (GRASSED / ROCK LINED)
EXISTING STREAM (PERMANENT)	WETLAND ROCKLINED FOREBAY	FLOW SPLITTER / BYPASS MANHOLE	TYPE 1 / 2 - STREAM DIVERSION (PERMANENT)
EXISTING STREAM (INTERMITTENT)	CULVERT	PLANTED TREATMENT SWALE	TYPE 3 - STREAM DIVERSION (INTERMITTENT)
EXISTING OVERLAND FLOW PATH	STORMWATER PIPE	PLANTED CONVEYANCE CHANNEL	SPOIL SITES
EXISTING CULVERT	GRILLE MANHOLE	GRASSED CONVEYANCE CHANNEL	PERMANENT SEDIMENT BASIN
PROPOSED BRIDGE EXTENTS	SCRUFFY DOME MANHOLE	SEALED CONVEYANCE CHANNEL	
	MANHOLE	SEALED CUT SLOPE DEBRIS CHANNEL	



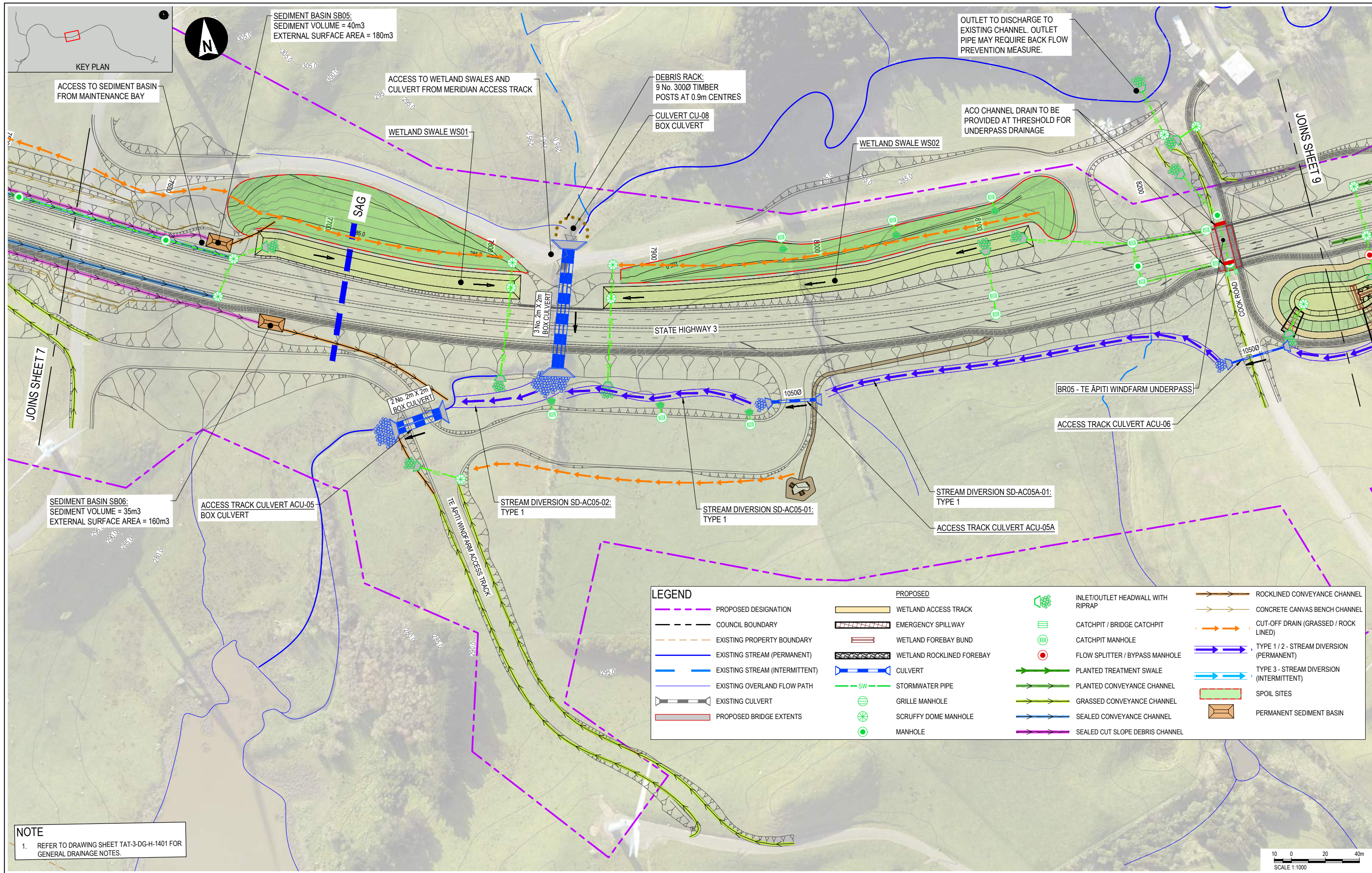
Te Ahu a Turanga
 Manawatū Tararua Highway

REV	DATE	REVISION DETAILS	APPROVED
C	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN
B	19/11/2019	ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH
A	18/10/2019	CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH

SCALE	SIZE	
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DRAWN	DESIGNED	REVIEWED
D. LOW	D. HUGHES	D. HUGHES

CONSENT	APPROVED
NOT FOR CONSTRUCTION	T. WATTERSON
	T. WATTERSON

PROJECT	TITLE					
TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY	STORMWATER DRAINAGE LAYOUT PLAN SHEET 7					
DRAWING No.	PROJECT No.	PHASE	TYPE	DISC	NUMBER	REV
TAT		3	DG	H	1407	C



NOTE
 1. REFER TO DRAWING SHEET TAT-3-DG-H-1401 FOR GENERAL DRAINAGE NOTES.



Te Ahu a Turanga
 Manawātū Tararua Highway

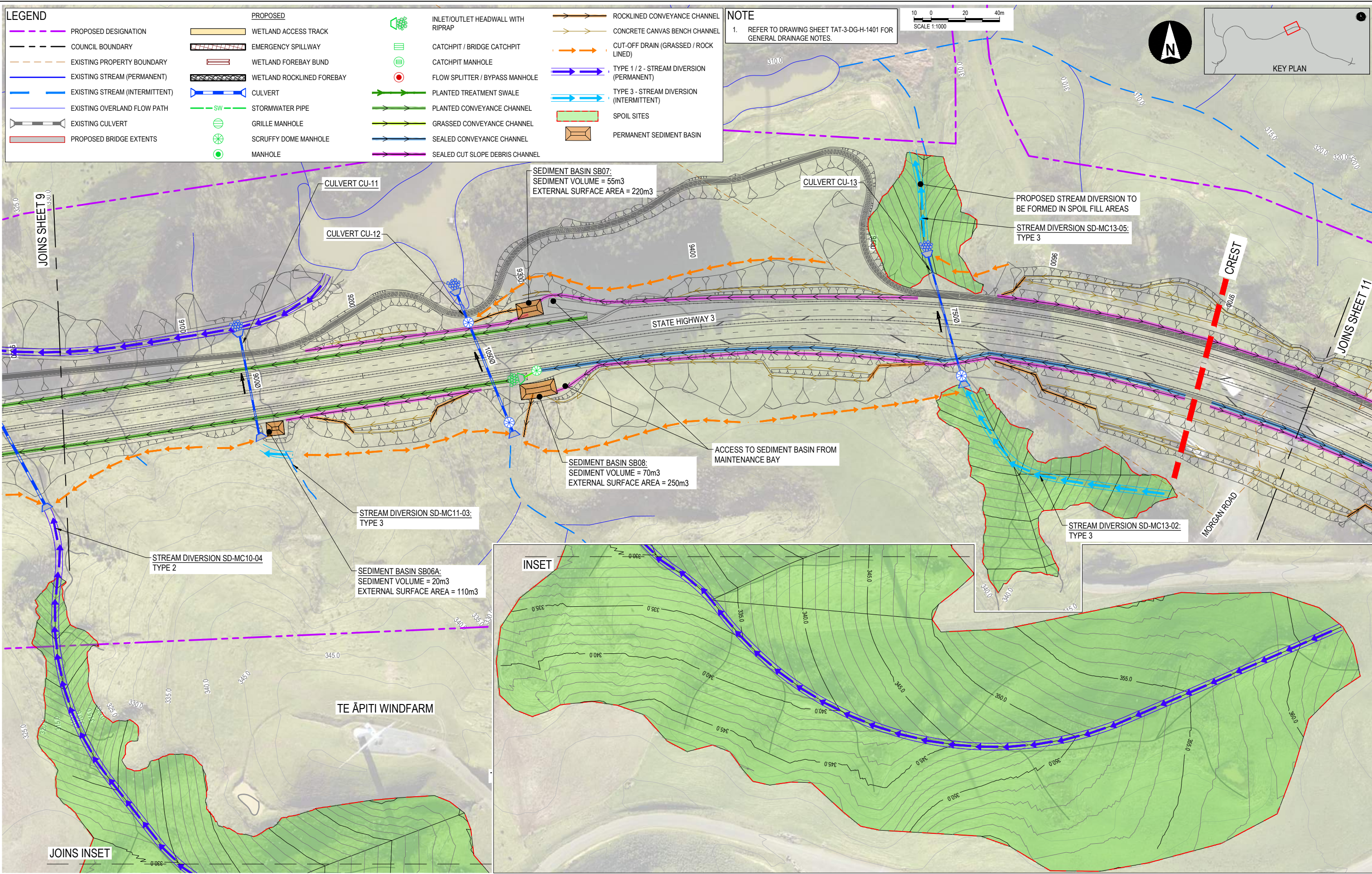
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WAKA KOTAHĪ NZ TRANSPORT AGENCY	C	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN	1:1000	A1	NOT FOR CONSTRUCTION	TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY
	B	19/11/2019	ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH				
	A	18/10/2019	CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH				

REV	DATE	REVISION DETAILS	APPROVED	SCALE	SIZE	CONSENT	PROJECT

SCALE	SIZE	CONSENT	PROJECT
1:1000	A1	NOT FOR CONSTRUCTION	TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY

PROJECT	TITLE	DRAWING No.	PROJECT No.	PHASE	TYPE	DISC	NUMBER	REV
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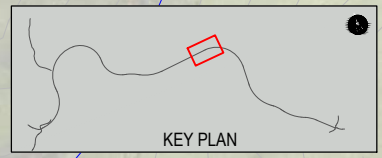
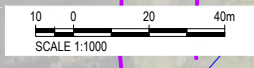
GP1340 23/01/20



LEGEND

PROPOSED DESIGNATION	PROPOSED WETLAND ACCESS TRACK	INLET/OUTLET HEADWALL WITH RIPRAP	ROCKLINED CONVEYANCE CHANNEL
COUNCIL BOUNDARY	EMERGENCY SPILLWAY	CATCHPIT / BRIDGE CATCHPIT	CONCRETE CANVAS BENCH CHANNEL
EXISTING PROPERTY BOUNDARY	WETLAND FOREBAY BUND	CATCHPIT MANHOLE	CUT-OFF DRAIN (GRASSED / ROCK LINED)
EXISTING STREAM (PERMANENT)	WETLAND ROCKLINED FOREBAY	FLOW SPLITTER / BYPASS MANHOLE	TYPE 1 / 2 - STREAM DIVERSION (PERMANENT)
EXISTING STREAM (INTERMITTENT)	CULVERT	PLANTED TREATMENT SWALE	TYPE 3 - STREAM DIVERSION (INTERMITTENT)
EXISTING OVERLAND FLOW PATH	STORMWATER PIPE	PLANTED CONVEYANCE CHANNEL	SPOIL SITES
EXISTING CULVERT	GRILLE MANHOLE	GRASSED CONVEYANCE CHANNEL	PERMANENT SEDIMENT BASIN
PROPOSED BRIDGE EXTENTS	SCRUFFY DOME MANHOLE	SEALED CONVEYANCE CHANNEL	
	MANHOLE	SEALED CUT SLOPE DEBRIS CHANNEL	

NOTE
1. REFER TO DRAWING SHEET TAT-3-DG-H-1401 FOR GENERAL DRAINAGE NOTES.



Project: 2020-03-31 11:11:46 Client: DCPA Engineer: N. MANAWATU TARARUA HIGHWAY BUSINESS TECHNICAL - DESIGN WORKING UNDER THE RESOURCE MANAGEMENT ACT 1991 AND CONSULTING ACT 1985

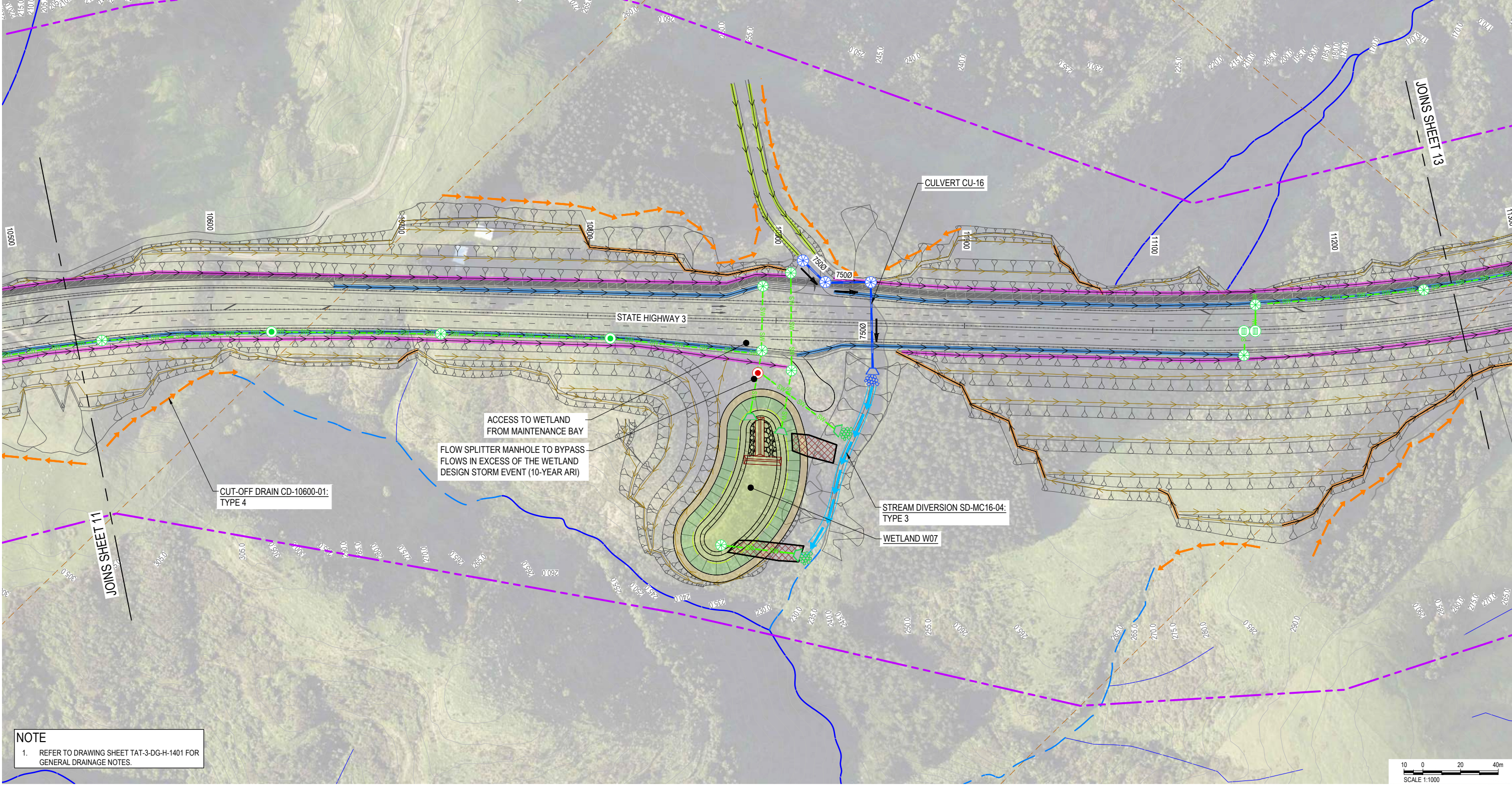
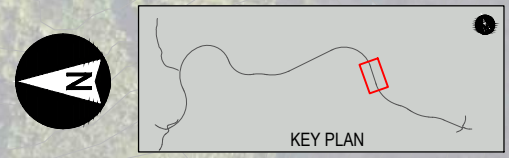
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		C	24/02/2020		ISSUED FOR REGIONAL CONSENT	D. MCGAHAN	1:1000	A1	NOT FOR CONSTRUCTION		TE AHU A TURANGA: MANAWATU TARARUA HIGHWAY
		B	19/11/2019		ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH	DRAWN		APPROVED		TITLE
		A	18/10/2019		CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH	D. LOW		DATE		STORMWATER DRAINAGE LAYOUT PLAN
							DESIGNED		24/02/2020		SHEET 10
							D. HUGHES		T. WATTERSON		DRAWING No.
							REVIEWED		T. WATTERSON		PROJECT No.
							D. HUGHES				PHASE
											3
											TYPE
											DISC
											H
											NUMBER
											1410
											REV
											C



Te Ahu a Turanga
Manawatū Tararua Highway

LEGEND

- | | | | |
|---|--|---|--|
| <ul style="list-style-type: none"> --- PROPOSED DESIGNATION - - - COUNCIL BOUNDARY - - - EXISTING PROPERTY BOUNDARY — EXISTING STREAM (PERMANENT) - - - EXISTING STREAM (INTERMITTENT) — EXISTING OVERLAND FLOW PATH — EXISTING CULVERT — PROPOSED BRIDGE EXTENTS | <p>PROPOSED</p> <ul style="list-style-type: none"> — WETLAND ACCESS TRACK — EMERGENCY SPILLWAY — WETLAND FOREBAY BUND — WETLAND ROCKLINED FOREBAY — CULVERT — SW — STORMWATER PIPE — GRILLE MANHOLE — SCRUFFY DOME MANHOLE — MANHOLE | <ul style="list-style-type: none"> — INLET/OUTLET HEADWALL WITH RIPRAP — CATCHPIT / BRIDGE CATCHPIT — CATCHPIT MANHOLE — FLOW SPLITTER / BYPASS MANHOLE — PLANTED TREATMENT SWALE — PLANTED CONVEYANCE CHANNEL — GRASSSED CONVEYANCE CHANNEL — SEALED CONVEYANCE CHANNEL — SEALED CUT SLOPE DEBRIS CHANNEL | <ul style="list-style-type: none"> — ROCKLINED CONVEYANCE CHANNEL — CONCRETE CANVAS BENCH CHANNEL — CUT-OFF DRAIN (GRASSSED / ROCK LINED) — TYPE 1 / 2 - STREAM DIVERSION (PERMANENT) — TYPE 3 - STREAM DIVERSION (INTERMITTENT) — SPOIL SITES — PERMANENT SEDIMENT BASIN |
|---|--|---|--|

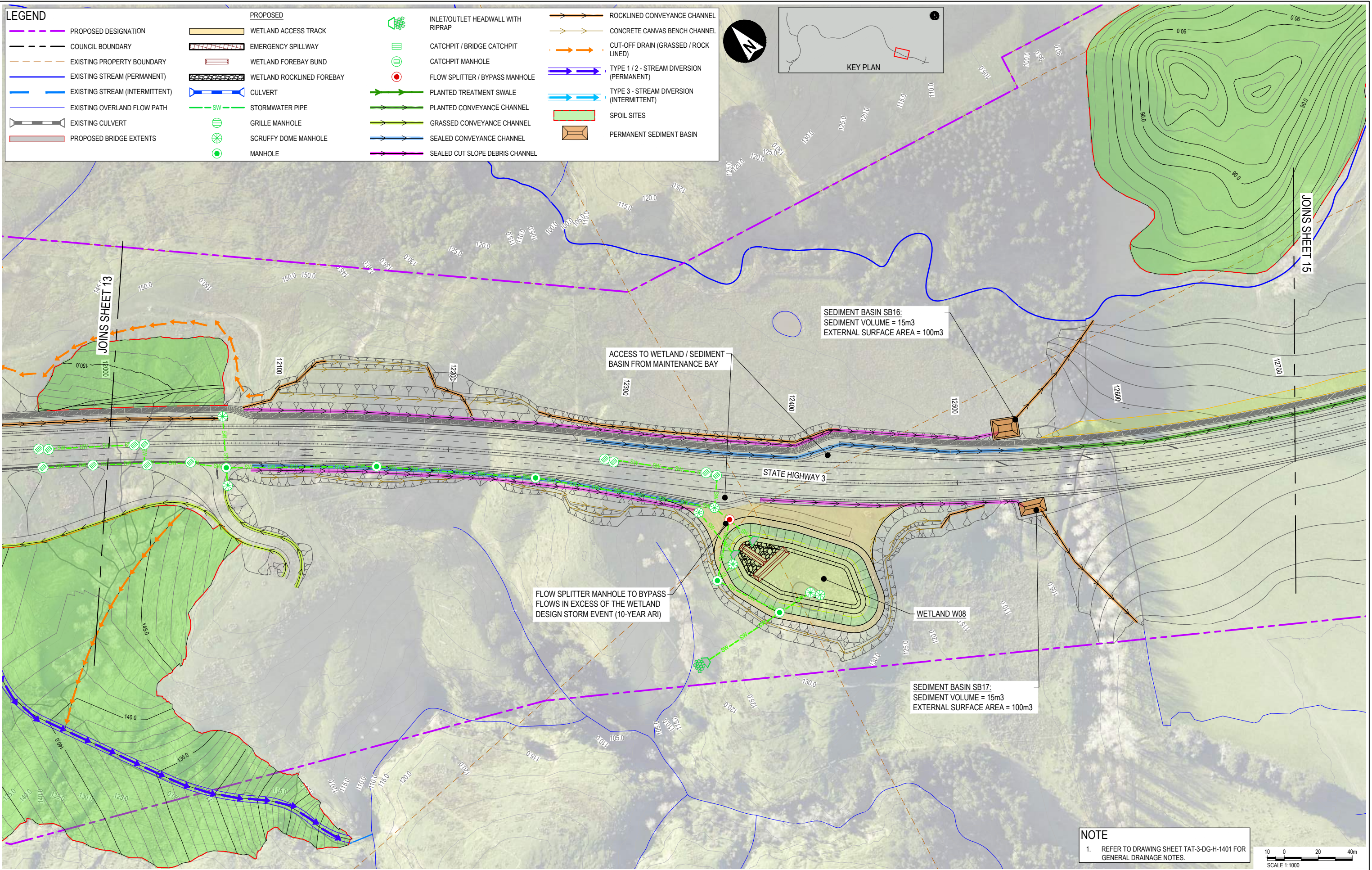


NOTE
1. REFER TO DRAWING SHEET TAT-3-DG-H-1401 FOR GENERAL DRAINAGE NOTES.

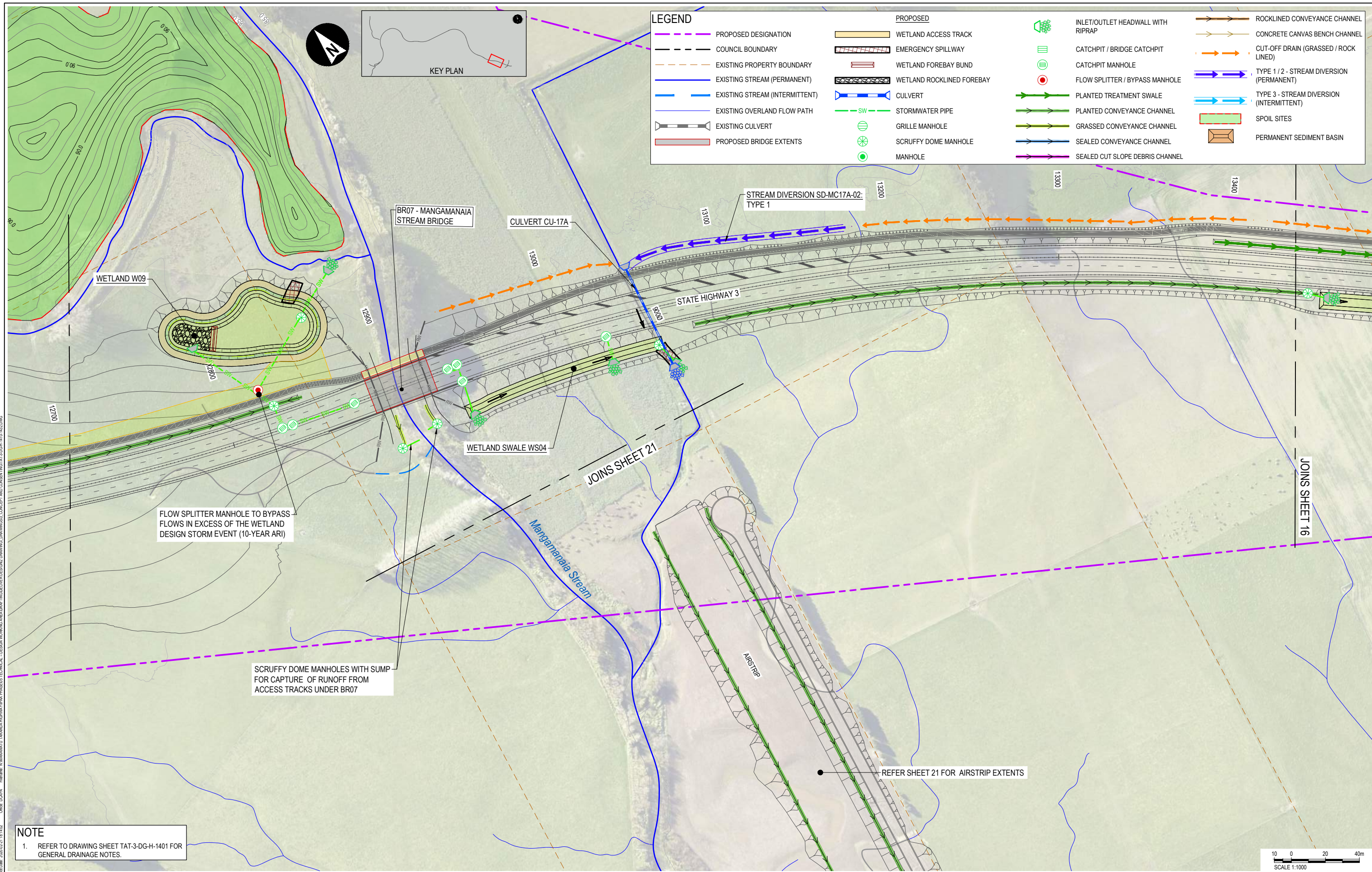
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CLIENT			REV			APPROVED			SCALE			SIZE			CONSENT			PROJECT		
WAKA KOTAHU NZ TRANSPORT AGENCY			C	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN			1:1000			A1			NOT FOR CONSTRUCTION			TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY		
Te Ahu a Turanga Manawatū Tararua Highway			B	19/11/2019	ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH			DRAWN			D. LOW			APPROVED			TITLE		
			A	18/10/2019	CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH			DESIGNED			D. HUGHES			DATE			STORMWATER DRAINAGE LAYOUT PLAN		
									REVIEWED			D. HUGHES			T. WATTERSON			SHEET 12		
															DATE			DRAWING No.		
															24/02/2020			PROJECT No.		
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																		3		
																		DG		
																		H		
																		NUMBER		
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																		REV		
																		C		

Project: MANAWATŪ TARARUA HIGHWAY PHASE 3 TECHNICAL - DESIGN WORKING AND CONSENTING DRAWING. DRAWING: CONCEPT AND CONSENTING. DATE: 23/07/2020. SHEET: 12 OF 14.



Project: 2020/03/31 11:13:22
 Client: WAKA KOTAHU
 Designer: N. MANAWATU TARARUA HIGHWAY
 Drafter: D. LOW
 Checker: D. HUGHES
 Title: STORMWATER DRAINAGE LAYOUT PLAN
 Drawing No: TAT-3-DG-H-1401-1414-1415-1416-1417-1418-1419-1420-1421-1422-1423-1424-1425-1426-1427-1428-1429-1430-1431-1432-1433-1434-1435-1436-1437-1438-1439-1440-1441-1442-1443-1444-1445-1446-1447-1448-1449-1450-1451-1452-1453-1454-1455-1456-1457-1458-1459-1460-1461-1462-1463-1464-1465-1466-1467-1468-1469-1470-1471-1472-1473-1474-1475-1476-1477-1478-1479-1480-1481-1482-1483-1484-1485-1486-1487-1488-1489-1490-1491-1492-1493-1494-1495-1496-1497-1498-1499-1500-1501-1502-1503-1504-1505-1506-1507-1508-1509-1510-1511-1512-1513-1514-1515-1516-1517-1518-1519-1520-1521-1522-1523-1524-1525-1526-1527-1528-1529-1530-1531-1532-1533-1534-1535-1536-1537-1538-1539-1540-1541-1542-1543-1544-1545-1546-1547-1548-1549-1550-1551-1552-1553-1554-1555-1556-1557-1558-1559-1560-1561-1562-1563-1564-1565-1566-1567-1568-1569-1570-1571-1572-1573-1574-1575-1576-1577-1578-1579-1580-1581-1582-1583-1584-1585-1586-1587-1588-1589-1590-1591-1592-1593-1594-1595-1596-1597-1598-1599-1600-1601-1602-1603-1604-1605-1606-1607-1608-1609-1610-1611-1612-1613-1614-1615-1616-1617-1618-1619-1620-1621-1622-1623-1624-1625-1626-1627-1628-1629-1630-1631-1632-1633-1634-1635-1636-1637-1638-1639-1640-1641-1642-1643-1644-1645-1646-1647-1648-1649-1650-1651-1652-1653-1654-1655-1656-1657-1658-1659-1660-1661-1662-1663-1664-1665-1666-1667-1668-1669-1670-1671-1672-1673-1674-1675-1676-1677-1678-1679-1680-1681-1682-1683-1684-1685-1686-1687-1688-1689-1690-1691-1692-1693-1694-1695-1696-1697-1698-1699-1700-1701-1702-1703-1704-1705-1706-1707-1708-1709-1710-1711-1712-1713-1714-1715-1716-1717-1718-1719-1720-1721-1722-1723-1724-1725-1726-1727-1728-1729-1730-1731-1732-1733-1734-1735-1736-1737-1738-1739-1740-1741-1742-1743-1744-1745-1746-1747-1748-1749-1750-1751-1752-1753-1754-1755-1756-1757-1758-1759-1760-1761-1762-1763-1764-1765-1766-1767-1768-1769-1770-1771-1772-1773-1774-1775-1776-1777-1778-1779-1780-1781-1782-1783-1784-1785-1786-1787-1788-1789-1790-1791-1792-1793-1794-1795-1796-1797-1798-1799-1800-1801-1802-1803-1804-1805-1806-1807-1808-1809-1810-1811-1812-1813-1814-1815-1816-1817-1818-1819-1820-1821-1822-1823-1824-1825-1826-1827-1828-1829-1830-1831-1832-1833-1834-1835-1836-1837-1838-1839-1840-1841-1842-1843-1844-1845-1846-1847-1848-1849-1850-1851-1852-1853-1854-1855-1856-1857-1858-1859-1860-1861-1862-1863-1864-1865-1866-1867-1868-1869-1870-1871-1872-1873-1874-1875-1876-1877-1878-1879-1880-1881-1882-1883-1884-1885-1886-1887-1888-1889-1890-1891-1892-1893-1894-1895-1896-1897-1898-1899-1900-1901-1902-1903-1904-1905-1906-1907-1908-1909-1910-1911-1912-1913-1914-1915-1916-1917-1918-1919-1920-1921-1922-1923-1924-1925-1926-1927-1928-1929-1930-1931-1932-1933-1934-1935-1936-1937-1938-1939-1940-1941-1942-1943-1944-1945-1946-1947-1948-1949-1950-1951-1952-1953-1954-1955-1956-1957-1958-1959-1960-1961-1962-1963-1964-1965-1966-1967-1968-1969-1970-1971-1972-1973-1974-1975-1976-1977-1978-1979-1980-1981-1982-1983-1984-1985-1986-1987-1988-1989-1990-1991-1992-1993-1994-1995-1996-1997-1998-1999-2000-2001-2002-2003-2004-2005-2006-2007-2008-2009-2010-2011-2012-2013-2014-2015-2016-2017-2018-2019-2020-2021-2022-2023-2024-2025-2026-2027-2028-2029-2030-2031-2032-2033-2034-2035-2036-2037-2038-2039-2040-2041-2042-2043-2044-2045-2046-2047-2048-2049-2050-2051-2052-2053-2054-2055-2056-2057-2058-2059-2060-2061-2062-2063-2064-2065-2066-2067-2068-2069-2070-2071-2072-2073-2074-2075-2076-2077-2078-2079-2080-2081-2082-2083-2084-2085-2086-2087-2088-2089-2090-2091-2092-2093-2094-2095-2096-2097-2098-2099-2100-2101-2102-2103-2104-2105-2106-2107-2108-2109-2110-2111-2112-2113-2114-2115-2116-2117-2118-2119-2120-2121-2122-2123-2124-2125-2126-2127-2128-2129-2130-2131-2132-2133-2134-2135-2136-2137-2138-2139-2140-2141-2142-2143-2144-2145-2146-2147-2148-2149-2150-2151-2152-2153-2154-2155-2156-2157-2158-2159-2160-2161-2162-2163-2164-2165-2166-2167-2168-2169-2170-2171-2172-2173-2174-2175-2176-2177-2178-2179-2180-2181-2182-2183-2184-2185-2186-2187-2188-2189-2190-2191-2192-2193-2194-2195-2196-2197-2198-2199-2200-2201-2202-2203-2204-2205-2206-2207-2208-2209-2210-2211-2212-2213-2214-2215-2216-2217-2218-2219-2220-2221-2222-2223-2224-2225-2226-2227-2228-2229-2230-2231-2232-2233-2234-2235-2236-2237-2238-2239-2240-2241-2242-2243-2244-2245-2246-2247-2248-2249-2250-2251-2252-2253-2254-2255-2256-2257-2258-2259-2260-2261-2262-2263-2264-2265-2266-2267-2268-2269-2270-2271-2272-2273-2274-2275-2276-2277-2278-2279-2280-2281-2282-2283-2284-2285-2286-2287-2288-2289-2290-2291-2292-2293-2294-2295-2296-2297-2298-2299-2300-2301-2302-2303-2304-2305-2306-2307-2308-2309-2310-2311-2312-2313-2314-2315-2316-2317-2318-2319-2320-2321-2322-2323-2324-2325-2326-2327-2328-2329-2330-2331-2332-2333-2334-2335-2336-2337-2338-2339-2340-2341-2342-2343-2344-2345-2346-2347-2348-2349-2350-2351-2352-2353-2354-2355-2356-2357-2358-2359-2360-2361-2362-2363-2364-2365-2366-2367-2368-2369-2370-2371-2372-2373-2374-2375-2376-2377-2378-2379-2380-2381-2382-2383-2384-2385-2386-2387-2388-2389-2390-2391-2392-2393-2394-2395-2396-2397-2398-2399-2400-2401-2402-2403-2404-2405-2406-2407-2408-2409-2410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Project: 2020/03/31 15:14:02 Client: DCPA Engineer: N. MANAWATU TARARUA HIGHWAY PROJECT - DESIGN WORKING UNDER THE RESOURCE MANAGEMENT ACT AND CONSULTING ENGINEERING ACT 1988



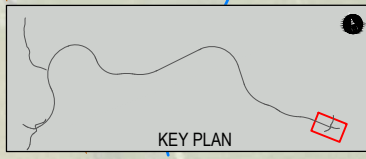
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C	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN
B	19/11/2019	ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH
A	18/10/2019	CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH

SCALE	SIZE
1:1000	A1
DRAWN	D. LOW
DESIGNED	D. HUGHES
REVIEWED	D. HUGHES

CONSENT NOT FOR CONSTRUCTION	
APPROVED	DATE 24/02/2020
T. WATTERSON	
T. WATTERSON	

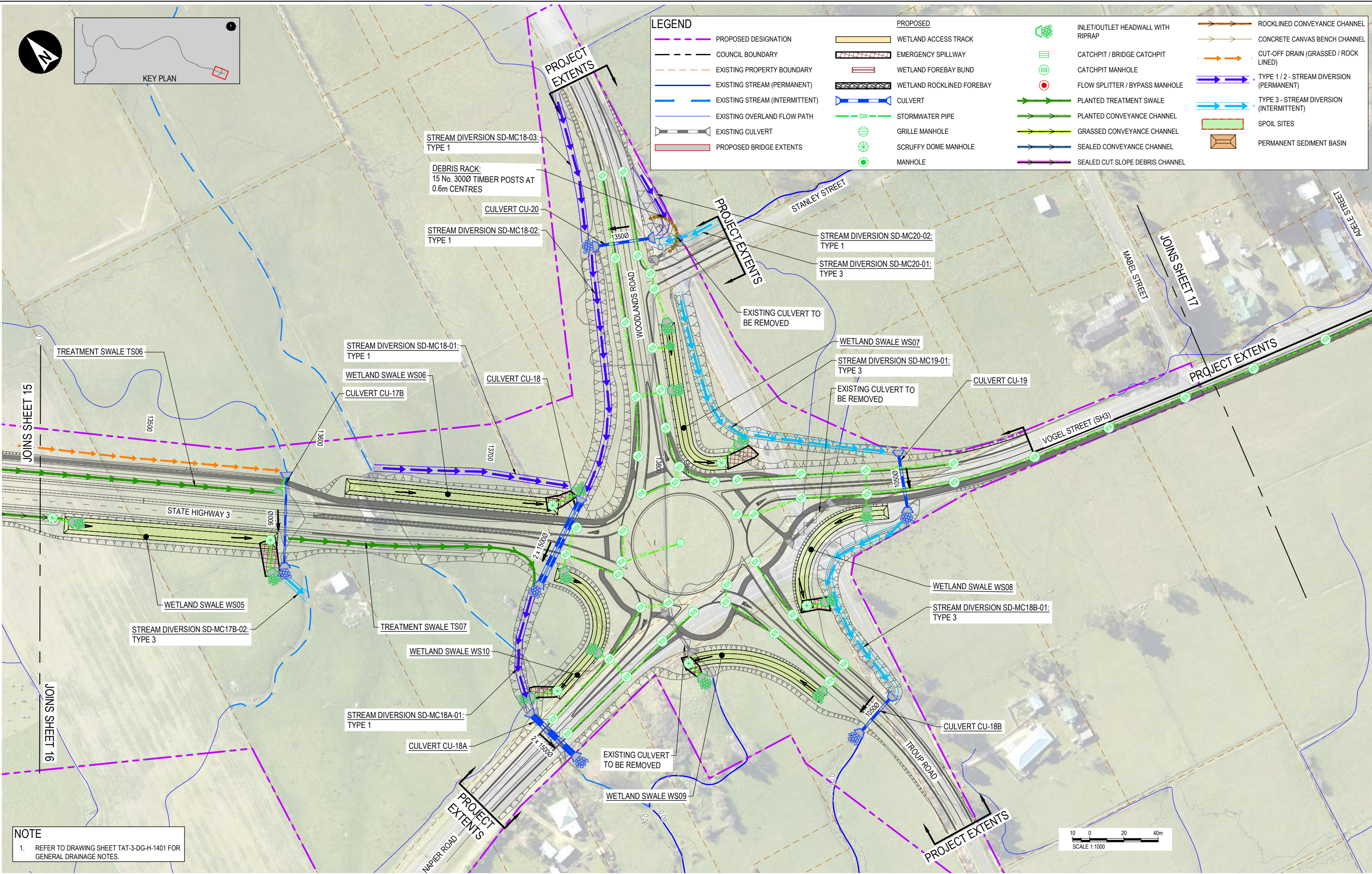
CLIENT	PROJECT	TITLE
WAKA KOTAHI NZ TRANSPORT AGENCY	TE AHU A TURANGA: MANAWATU TARARUA HIGHWAY	STORMWATER DRAINAGE LAYOUT PLAN SHEET 15
	DRAWING No. TAT	PROJECT No. 3
		PHASE 3
		TYPE DG
		DISC H
		NUMBER 1415
		REV C

OP1340 23/07/20

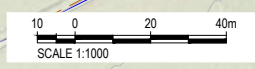


LEGEND

PROPOSED DESIGNATION	PROPOSED WETLAND ACCESS TRACK	INLET/OUTLET HEADWALL WITH RIPRAP	ROCKLINED CONVEYANCE CHANNEL
COUNCIL BOUNDARY	EMERGENCY SPILLWAY	CATCHPIT / BRIDGE CATCHPIT	CONCRETE CANVAS BENCH CHANNEL
EXISTING PROPERTY BOUNDARY	WETLAND FOREBAY BUND	CATCHPIT MANHOLE	CUT-OFF DRAIN (GRASSED / ROCK LINED)
EXISTING STREAM (PERMANENT)	WETLAND ROCKLINED FOREBAY	FLOW SPLITTER / BYPASS MANHOLE	TYPE 1 / 2 - STREAM DIVERSION (PERMANENT)
EXISTING STREAM (INTERMITTENT)	CULVERT	PLANTED TREATMENT SWALE	TYPE 3 - STREAM DIVERSION (INTERMITTENT)
EXISTING OVERLAND FLOW PATH	STORMWATER PIPE	PLANTED CONVEYANCE CHANNEL	SPOIL SITES
EXISTING CULVERT	GRILLE MANHOLE	GRASSED CONVEYANCE CHANNEL	PERMANENT SEDIMENT BASIN
PROPOSED BRIDGE EXTENTS	SCRUFFY DOME MANHOLE	SEALED CONVEYANCE CHANNEL	
	MANHOLE	SEALED CUT SLOPE DEBRIS CHANNEL	



NOTE
1. REFER TO DRAWING SHEET TAT-3-DG-H-1401 FOR GENERAL DRAINAGE NOTES.



REV	DATE	REVISION DETAILS	APPROVED
C	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN
B	19/11/2019	ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH
A	18/10/2019	CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH

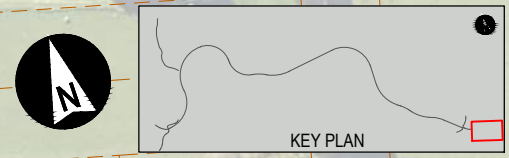
SCALE	1:1000
SIZE	A1
DRAWN	D. LOW
DESIGNED	D. HUGHES
REVIEWED	D. HUGHES

CONSENT NOT FOR CONSTRUCTION
APPROVED
T. WATTERSON
T. WATTERSON

PROJECT	TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY									
TITLE	STORMWATER DRAINAGE LAYOUT PLAN SHEET 16									
DRAWING No.	TAT	PHASE	3	TYPE	DISC	H	NUMBER	1416	REV	C

Project: 2020/03/31 11:14:29 Client: DDP/PA Engineer: N. MANAWATU TARARUA HIGHWAY PROJECT DESIGN WORKING UNDER THE RESOURCE MANAGEMENT ACT 1991 DRAWING: DRAWINGS - DESIGN WORKING UNDER THE RESOURCE MANAGEMENT ACT 1991 CONSULTING: CONCEPT AND CONSULTING/DT/3-DG/H-1416-1612/DWG

LEGEND		PROPOSED	
	PROPOSED DESIGNATION		WETLAND ACCESS TRACK
	COUNCIL BOUNDARY		EMERGENCY SPILLWAY
	EXISTING PROPERTY BOUNDARY		WETLAND FOREBAY BUND
	EXISTING STREAM (PERMANENT)		WETLAND ROCKLINED FOREBAY
	EXISTING STREAM (INTERMITTENT)		CULVERT
	EXISTING OVERLAND FLOW PATH		STORMWATER PIPE
	EXISTING CULVERT		GRILLE MANHOLE
	PROPOSED BRIDGE EXTENTS		SCRUFFY DOME MANHOLE
			MANHOLE
			INLET/OUTLET HEADWALL WITH RIPRAP
			CATCHPIT / BRIDGE CATCHPIT
			CATCHPIT MANHOLE
			FLOW SPLITTER / BYPASS MANHOLE
			PLANTED TREATMENT SWALE
			PLANTED CONVEYANCE CHANNEL
			GRASSED CONVEYANCE CHANNEL
			SEALED CONVEYANCE CHANNEL
			SEALED CUT SLOPE DEBRIS CHANNEL
			ROCKLINED CONVEYANCE CHANNEL
			CONCRETE CANVAS BENCH CHANNEL
			CUT-OFF DRAIN (GRASSED / ROCK LINED)
			TYPE 1 / 2 - STREAM DIVERSION (PERMANENT)
			TYPE 3 - STREAM DIVERSION (INTERMITTENT)
			SPOIL SITES
			PERMANENT SEDIMENT BASIN

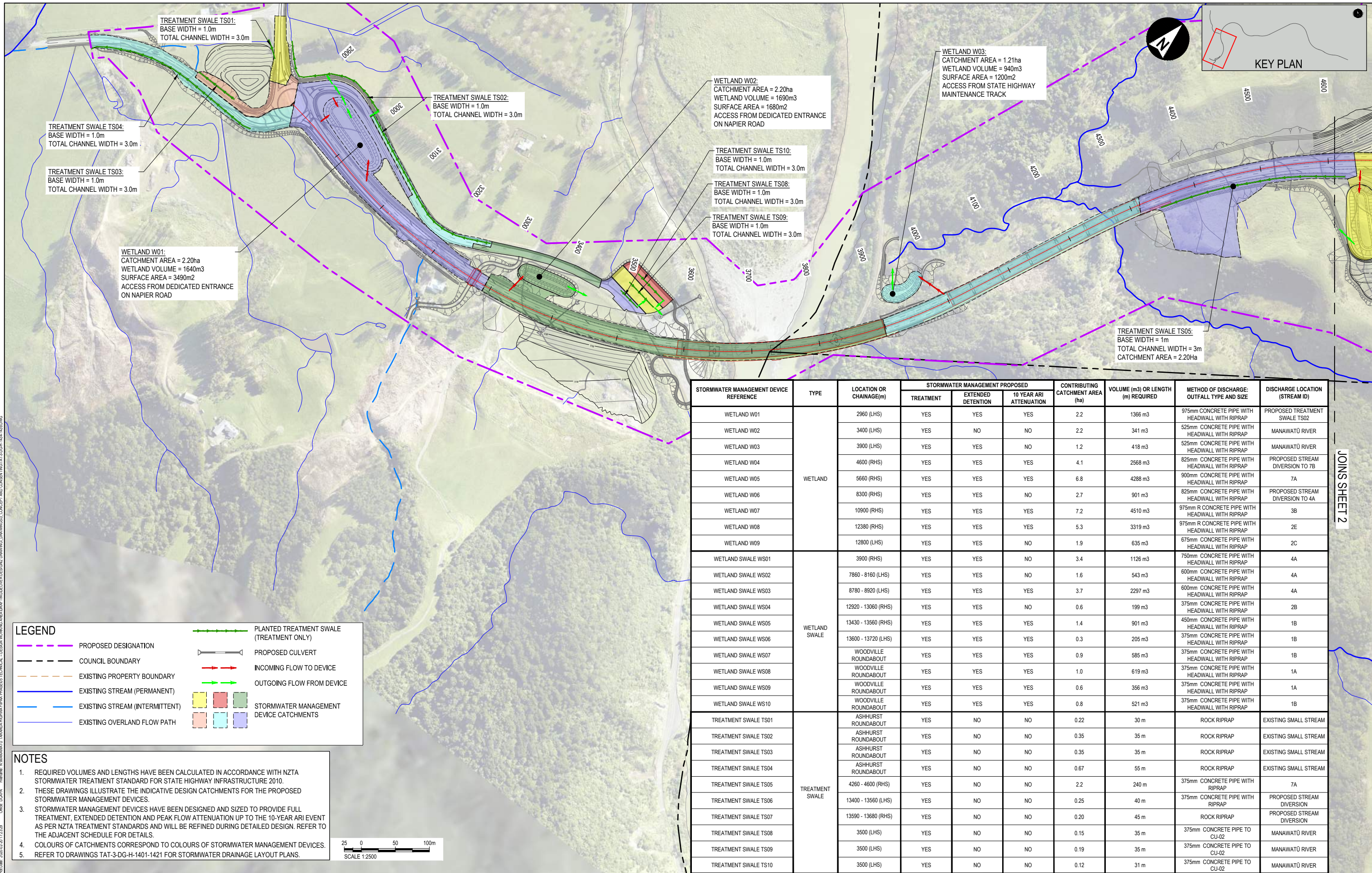


NOTE
1. REFER TO DRAWING SHEET TAT-3-DG-H-1401 FOR GENERAL DRAINAGE NOTES.

SCALE 1:1000
10 0 20 40m

CLIENT		REV		DATE		REVISION DETAILS		APPROVED		SCALE		SIZE		CONSENT		PROJECT	
		C		24/02/2020		ISSUED FOR REGIONAL CONSENT		D. MCGAHAN		1:1000		A1		NOT FOR CONSTRUCTION		TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY	
		B		19/11/2019		ISSUED FOR CONCEPT DESIGN		D. MACKINTOSH		DRAWN				APPROVED		TITLE	
		A		18/10/2019		CONCEPT DESIGN - DRAFT REVIEW		D. MACKINTOSH		D. LOW				DATE		STORMWATER DRAINAGE LAYOUT PLAN	
										DESIGNED				24/02/2020		SHEET 17	
										REVIEWED				T. WATTERSON		DRAWING No.	
										D. HUGHES				T. WATTERSON		PROJECT No.	
														3		PHASE	
														H		TYPE	
														1417		DISC	
														C		NUMBER	
																REV	





Project: 2020/03/20/12129 Client: DOPH Engineer: N. MANAWATU, TARARUA HIGHWAY BUSINESS TECHNICAL DESIGN WORKING UNDER THE RESOURCE MANAGEMENT ACT 1991 DRAWING: DRAINAGES, CONCEPT AND CONSULTING TAT-3-DG-H-1401-1421

LEGEND

- PROPOSED DESIGNATION
- COUNCIL BOUNDARY
- EXISTING PROPERTY BOUNDARY
- EXISTING STREAM (PERMANENT)
- EXISTING STREAM (INTERMITTENT)
- EXISTING OVERLAND FLOW PATH
- PLANTED TREATMENT SWALE (TREATMENT ONLY)
- PROPOSED CULVERT
- INCOMING FLOW TO DEVICE
- OUTGOING FLOW FROM DEVICE
- STORMWATER MANAGEMENT DEVICE CATCHMENTS

- NOTES**
- REQUIRED VOLUMES AND LENGTHS HAVE BEEN CALCULATED IN ACCORDANCE WITH NZTA STORMWATER TREATMENT STANDARD FOR STATE HIGHWAY INFRASTRUCTURE 2010.
 - THESE DRAWINGS ILLUSTRATE THE INDICATIVE DESIGN CATCHMENTS FOR THE PROPOSED STORMWATER MANAGEMENT DEVICES.
 - STORMWATER MANAGEMENT DEVICES HAVE BEEN DESIGNED AND SIZED TO PROVIDE FULL TREATMENT, EXTENDED DETENTION AND PEAK FLOW ATTENUATION UP TO THE 10-YEAR ARI EVENT AS PER NZTA TREATMENT STANDARDS AND WILL BE REFINED DURING DETAILED DESIGN. REFER TO THE ADJACENT SCHEDULE FOR DETAILS.
 - COLOURS OF CATCHMENTS CORRESPOND TO COLOURS OF STORMWATER MANAGEMENT DEVICES.
 - REFER TO DRAWINGS TAT-3-DG-H-1401-1421 FOR STORMWATER DRAINAGE LAYOUT PLANS.



STORMWATER MANAGEMENT DEVICE REFERENCE	TYPE	LOCATION OR CHAINAGE(m)	STORMWATER MANAGEMENT PROPOSED			CONTRIBUTING CATCHMENT AREA (ha)	VOLUME (m3) OR LENGTH (m) REQUIRED	METHOD OF DISCHARGE: OUTFALL TYPE AND SIZE	DISCHARGE LOCATION (STREAM ID)
			TREATMENT	EXTENDED DETENTION	10 YEAR ARI ATTENUATION				
WETLAND W01	WETLAND	2960 (LHS)	YES	YES	YES	2.2	1366 m3	975mm CONCRETE PIPE WITH HEADWALL WITH RIPRAP	PROPOSED TREATMENT SWALE TS02
WETLAND W02		3400 (LHS)	YES	NO	NO	2.2	341 m3	525mm CONCRETE PIPE WITH HEADWALL WITH RIPRAP	MANAWATU RIVER
WETLAND W03		3900 (LHS)	YES	YES	NO	1.2	418 m3	525mm CONCRETE PIPE WITH HEADWALL WITH RIPRAP	MANAWATU RIVER
WETLAND W04		4600 (RHS)	YES	YES	YES	4.1	2568 m3	825mm CONCRETE PIPE WITH HEADWALL WITH RIPRAP	PROPOSED STREAM DIVERSION TO 7B
WETLAND W05		5660 (RHS)	YES	YES	YES	6.8	4288 m3	900mm CONCRETE PIPE WITH HEADWALL WITH RIPRAP	7A
WETLAND W06		8300 (RHS)	YES	YES	NO	2.7	901 m3	825mm CONCRETE PIPE WITH HEADWALL WITH RIPRAP	PROPOSED STREAM DIVERSION TO 4A
WETLAND W07		10900 (RHS)	YES	YES	YES	7.2	4510 m3	975mm R CONCRETE PIPE WITH HEADWALL WITH RIPRAP	3B
WETLAND W08		12380 (RHS)	YES	YES	YES	5.3	3319 m3	975mm R CONCRETE PIPE WITH HEADWALL WITH RIPRAP	2E
WETLAND W09		12800 (LHS)	YES	YES	NO	1.9	635 m3	675mm CONCRETE PIPE WITH HEADWALL WITH RIPRAP	2C
WETLAND SWALE WS01	WETLAND SWALE	3900 (RHS)	YES	YES	NO	3.4	1126 m3	750mm CONCRETE PIPE WITH HEADWALL WITH RIPRAP	4A
WETLAND SWALE WS02		7860 - 8160 (LHS)	YES	YES	NO	1.6	543 m3	600mm CONCRETE PIPE WITH HEADWALL WITH RIPRAP	4A
WETLAND SWALE WS03		8780 - 8920 (LHS)	YES	YES	YES	3.7	2297 m3	600mm CONCRETE PIPE WITH HEADWALL WITH RIPRAP	4A
WETLAND SWALE WS04		12920 - 13060 (RHS)	YES	YES	NO	0.6	199 m3	375mm CONCRETE PIPE WITH HEADWALL WITH RIPRAP	2B
WETLAND SWALE WS05		13430 - 13560 (RHS)	YES	YES	YES	1.4	901 m3	450mm CONCRETE PIPE WITH HEADWALL WITH RIPRAP	1B
WETLAND SWALE WS06		13600 - 13720 (LHS)	YES	YES	YES	0.3	205 m3	375mm CONCRETE PIPE WITH HEADWALL WITH RIPRAP	1B
WETLAND SWALE WS07		WOODVILLE ROUNDABOUT	YES	YES	YES	0.9	585 m3	375mm CONCRETE PIPE WITH HEADWALL WITH RIPRAP	1B
WETLAND SWALE WS08		WOODVILLE ROUNDABOUT	YES	YES	YES	1.0	619 m3	375mm CONCRETE PIPE WITH HEADWALL WITH RIPRAP	1A
WETLAND SWALE WS09		WOODVILLE ROUNDABOUT	YES	YES	YES	0.6	356 m3	375mm CONCRETE PIPE WITH HEADWALL WITH RIPRAP	1A
WETLAND SWALE WS10		WOODVILLE ROUNDABOUT	YES	YES	YES	0.8	521 m3	375mm CONCRETE PIPE WITH HEADWALL WITH RIPRAP	1B
TREATMENT SWALE TS01	TREATMENT SWALE	ASHHURST ROUNDABOUT	YES	NO	NO	0.22	30 m	ROCK RIPRAP	EXISTING SMALL STREAM
TREATMENT SWALE TS02		ASHHURST ROUNDABOUT	YES	NO	NO	0.35	35 m	ROCK RIPRAP	EXISTING SMALL STREAM
TREATMENT SWALE TS03		ASHHURST ROUNDABOUT	YES	NO	NO	0.35	35 m	ROCK RIPRAP	EXISTING SMALL STREAM
TREATMENT SWALE TS04		ASHHURST ROUNDABOUT	YES	NO	NO	0.67	55 m	ROCK RIPRAP	EXISTING SMALL STREAM
TREATMENT SWALE TS05		4260 - 4600 (RHS)	YES	NO	NO	2.2	240 m	375mm CONCRETE PIPE WITH RIPRAP	7A
TREATMENT SWALE TS06		13400 - 13560 (LHS)	YES	NO	NO	0.25	40 m	375mm CONCRETE PIPE WITH RIPRAP	PROPOSED STREAM DIVERSION
TREATMENT SWALE TS07		13590 - 13680 (RHS)	YES	NO	NO	0.20	45 m	ROCK RIPRAP	PROPOSED STREAM DIVERSION
TREATMENT SWALE TS08		3500 (LHS)	YES	NO	NO	0.15	35 m	375mm CONCRETE PIPE TO CU-02	MANAWATU RIVER
TREATMENT SWALE TS09		3500 (LHS)	YES	NO	NO	0.19	35 m	375mm CONCRETE PIPE TO CU-02	MANAWATU RIVER
TREATMENT SWALE TS10		3500 (LHS)	YES	NO	NO	0.12	31 m	375mm CONCRETE PIPE TO CU-02	MANAWATU RIVER

JOINS SHEET 2

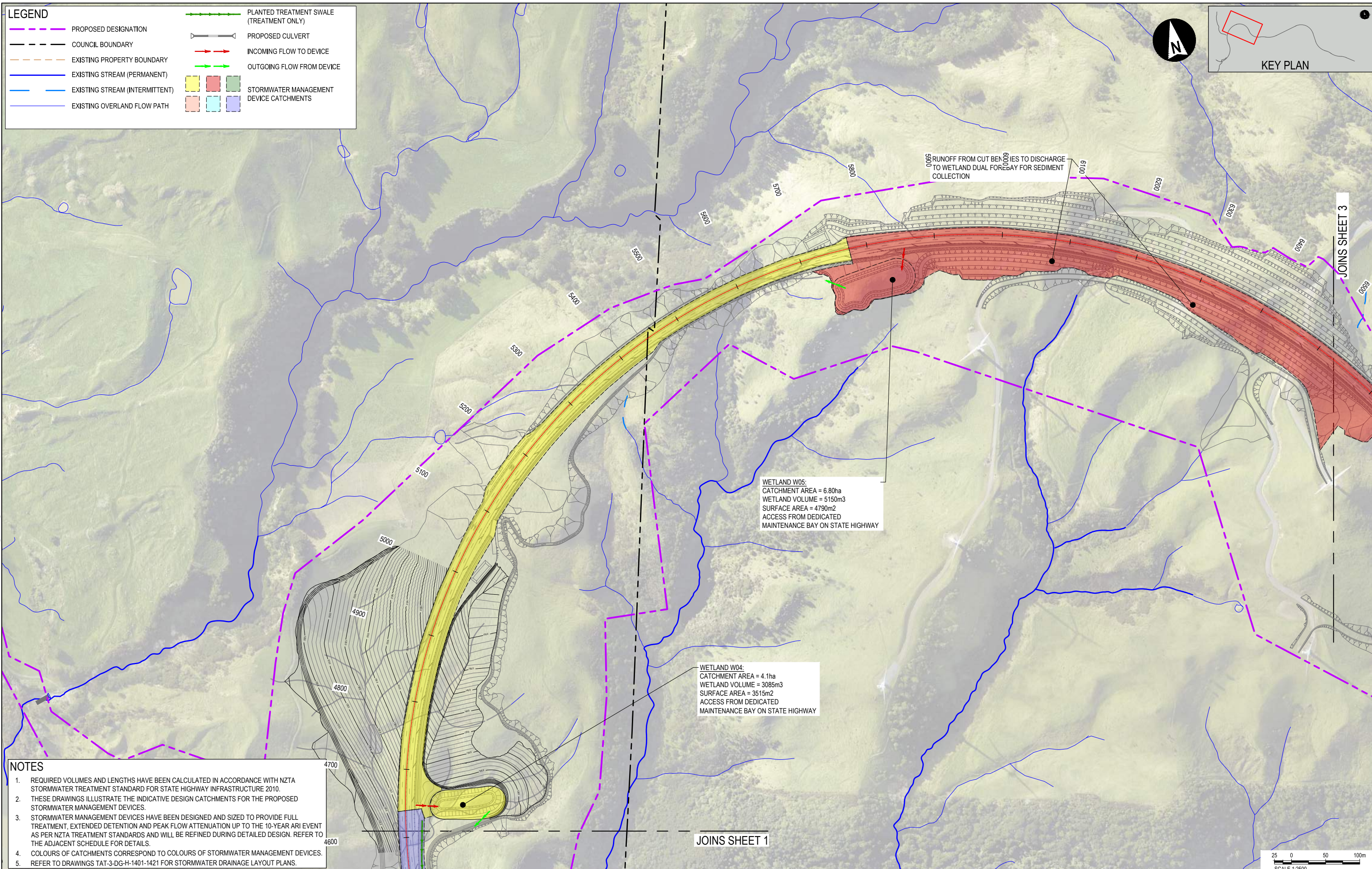
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	A	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN	1:2500	A1	NOT FOR CONSTRUCTION	TE AHU A TURANGA: MANAWATU TARARUA HIGHWAY
				APPROVED	DRAWN	DESIGNED	DATE	TITLE
				T. WATTERSON	D. LOW	J. MILLER	24/02/2020	STORMWATER MANAGEMENT DEVICES CATCHMENT PLAN SHEET 1
				REVIEWED	DATE	DISC	NUMBER	REV
				D. HUGHES	T. WATTERSON	H	1434	A



LEGEND

- PROPOSED DESIGNATION
- COUNCIL BOUNDARY
- EXISTING PROPERTY BOUNDARY
- EXISTING STREAM (PERMANENT)
- EXISTING STREAM (INTERMITTENT)
- EXISTING OVERLAND FLOW PATH
- PLANTED TREATMENT SWALE (TREATMENT ONLY)
- PROPOSED CULVERT
- INCOMING FLOW TO DEVICE
- OUTGOING FLOW FROM DEVICE
- STORMWATER MANAGEMENT DEVICE CATCHMENTS

KEY PLAN



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 - COLOURS OF CATCHMENTS CORRESPOND TO COLOURS OF STORMWATER MANAGEMENT DEVICES.
 - REFER TO DRAWINGS TAT-3-DG-H-1401-1421 FOR STORMWATER DRAINAGE LAYOUT PLANS.

CLIENT		REV		DATE	REVISION DETAILS	APPROVED	SCALE	SIZE	CONSENT	PROJECT
		A	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN	1:2500	A1	NOT FOR CONSTRUCTION	TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY	
DRAWN		DESIGNED		REVIEWED		APPROVED		DATE		TITLE
D. LOW		J. MILLER		D. HUGHES		T. WATTERSON		24/02/2020		STORMWATER MANAGEMENT DEVICES CATCHMENT PLAN SHEET 2
DRAWING No.	PROJECT No.	PHASE	TYPE	DISC	NUMBER	REV				
TAT	3	DG	H	1435	A					



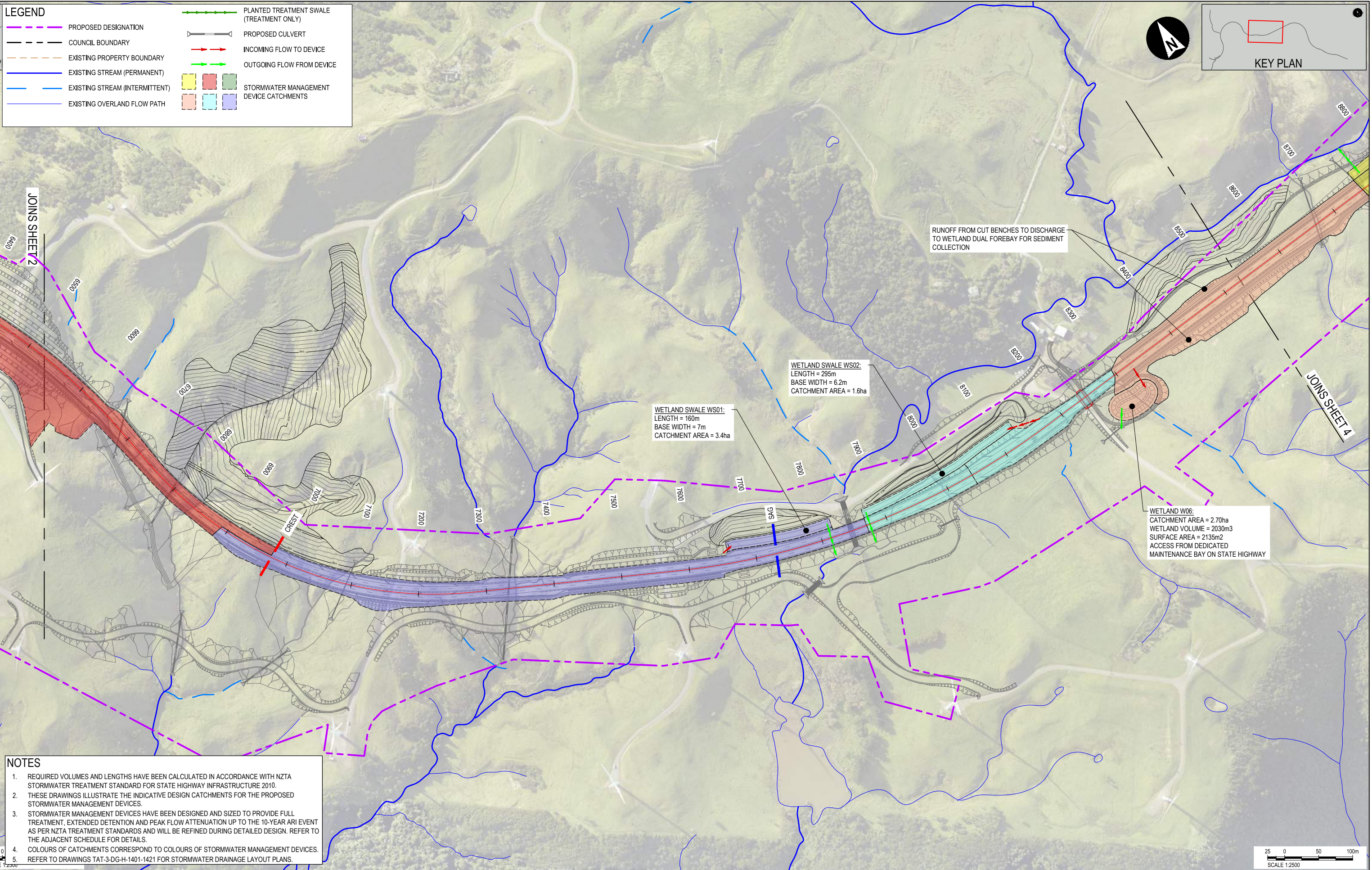
LEGEND

- PROPOSED DESIGNATION
- COUNCIL BOUNDARY
- EXISTING PROPERTY BOUNDARY
- EXISTING STREAM (PERMANENT)
- EXISTING STREAM (INTERMITTENT)
- EXISTING OVERLAND FLOW PATH
- PLANTED TREATMENT SWALE (TREATMENT ONLY)
- PROPOSED CULVERT
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- OUTGOING FLOW FROM DEVICE
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KEY PLAN

JOINS SHEET 2

JOINS SHEET 4



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CLIENT		REV		DATE	REVISION DETAILS	APPROVED	SCALE	SIZE	CONSENT	PROJECT
		A	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN	1:2500	A1	NOT FOR CONSTRUCTION	TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY	
DRAWN		DESIGNED		REVIEWED		APPROVED		DATE	TITLE	
D. LOW		J. MILLER		D. HUGHES		T. WATTERSON		24/02/2020	STORMWATER MANAGEMENT DEVICES CATCHMENT PLAN SHEET 3	
DRAWING No.	PROJECT No.	PHASE	TYPE	DISC	NUMBER	REV				
TAT		3	DG	H	1436	A				

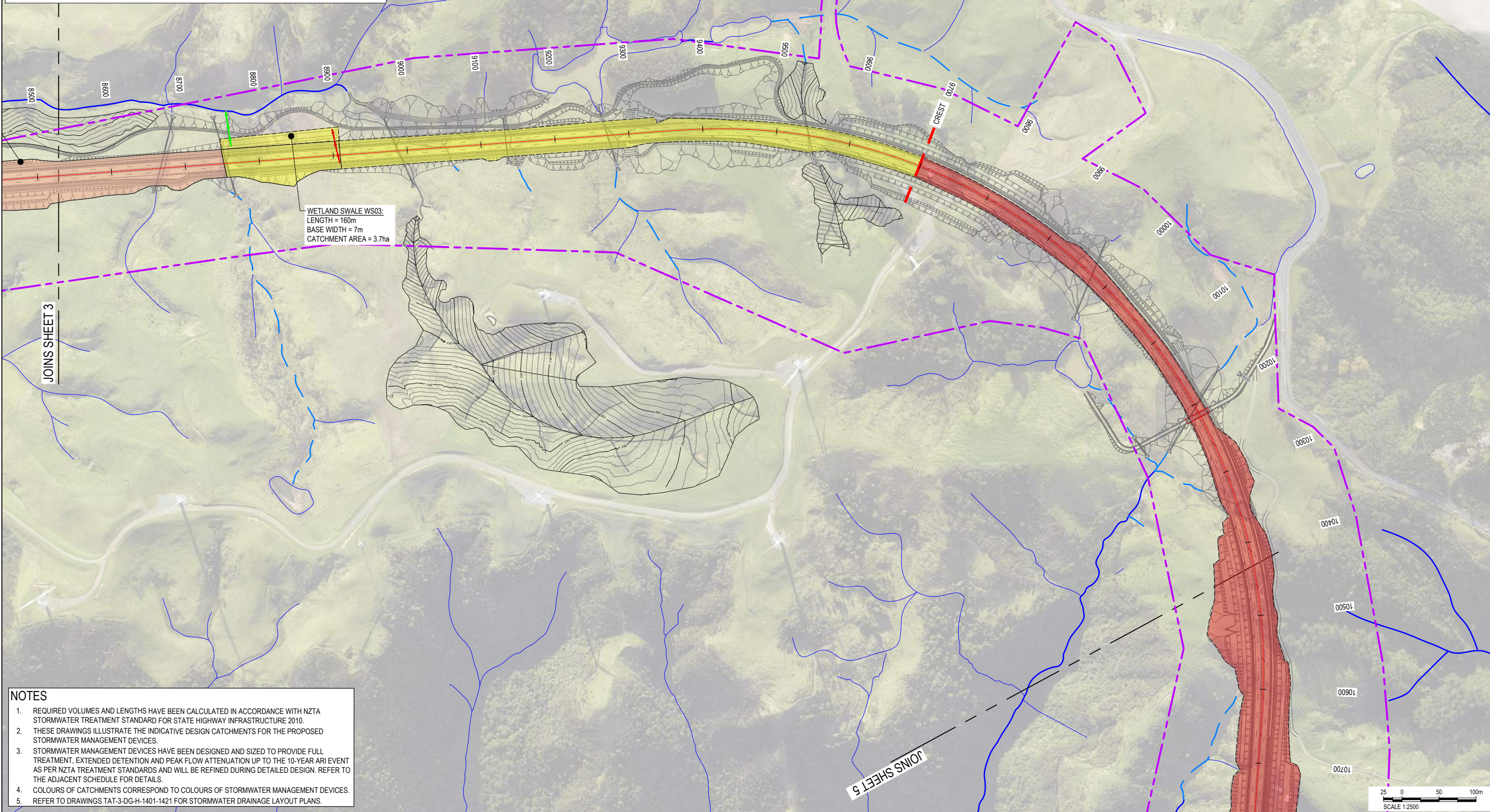
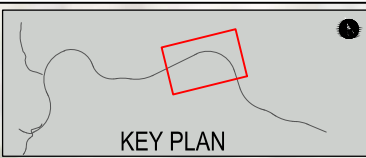


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 1401-1421

OP1340 23/01/20

LEGEND

- PROPOSED DESIGNATION
- COUNCIL BOUNDARY
- EXISTING PROPERTY BOUNDARY
- EXISTING STREAM (PERMANENT)
- EXISTING STREAM (INTERMITTENT)
- EXISTING OVERLAND FLOW PATH
- PLANTED TREATMENT SWALE (TREATMENT ONLY)
- PROPOSED CULVERT
- INCOMING FLOW TO DEVICE
- OUTGOING FLOW FROM DEVICE
- STORMWATER MANAGEMENT DEVICE CATCHMENTS

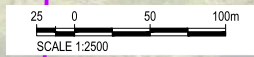


WETLAND SWALE WS03:
 LENGTH = 160m
 BASE WIDTH = 7m
 CATCHMENT AREA = 3.7ha

JOINS SHEET 3

JOINS SHEET 5

- NOTES**
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 4. COLOURS OF CATCHMENTS CORRESPOND TO COLOURS OF STORMWATER MANAGEMENT DEVICES.
 5. REFER TO DRAWINGS TAT-3-DG-H-1401-1421 FOR STORMWATER DRAINAGE LAYOUT PLANS.

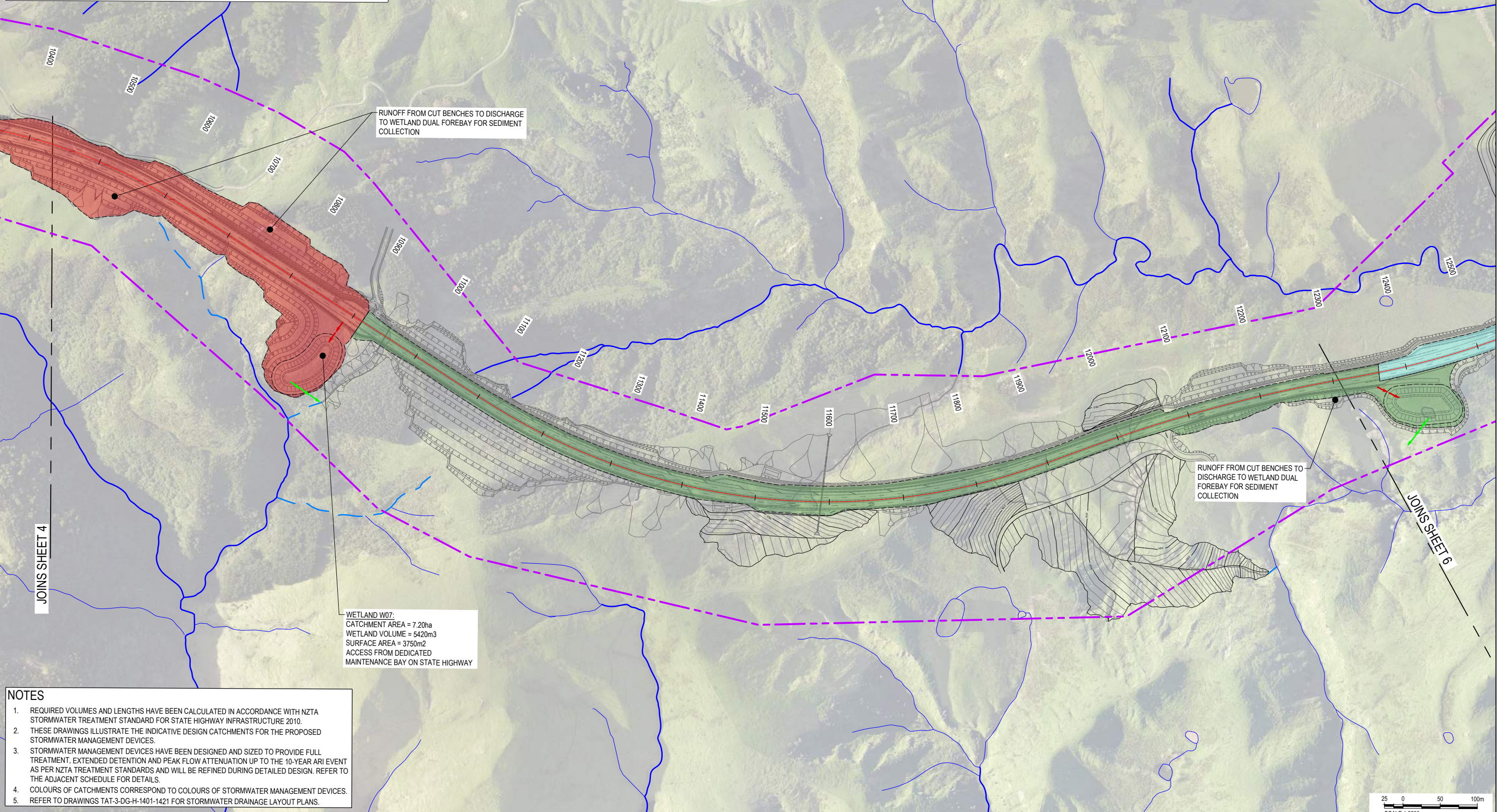
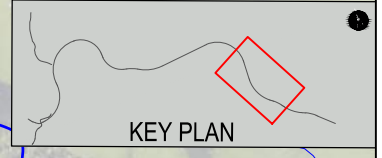


CLIENT		REV	DATE	REVISION DETAILS	APPROVED	SCALE	SIZE	CONSENT	PROJECT
		A	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. McGAHAN	1:2500	A1	NOT FOR CONSTRUCTION	TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY
WAKA KOTAHI NZ TRANSPORT AGENCY						DRAWN D. LOW		APPROVED	
Te Ahu a Turanga Manawatū Tararua Highway						DESIGNED J. MILLER		DATE 24/02/2020	
						REVIEWED D. HUGHES		T. WATTERSON	
								T. WATTERSON	
TITLE	STORMWATER MANAGEMENT DEVICES CATCHMENT PLAN SHEET 4								
DRAWING No.	PROJECT No.	PHASE	TYPE	DISC	NUMBER	REV			
TAT		3	DG	H	1437	A			

Project: 200-03-01-12420 Client: DOPH Engineer: N. MANAWATŪ TARARUA HIGHWAY PROJECT - DESIGN WORKING UNDER THE RESOURCE MANAGEMENT ACT 1991 AND THE CONSENTS ACT 1992

LEGEND

- PROPOSED DESIGNATION
- COUNCIL BOUNDARY
- EXISTING PROPERTY BOUNDARY
- EXISTING STREAM (PERMANENT)
- EXISTING STREAM (INTERMITTENT)
- EXISTING OVERLAND FLOW PATH
- PLANTED TREATMENT SWALE (TREATMENT ONLY)
- PROPOSED CULVERT
- INCOMING FLOW TO DEVICE
- OUTGOING FLOW FROM DEVICE
- STORMWATER MANAGEMENT DEVICE CATCHMENTS



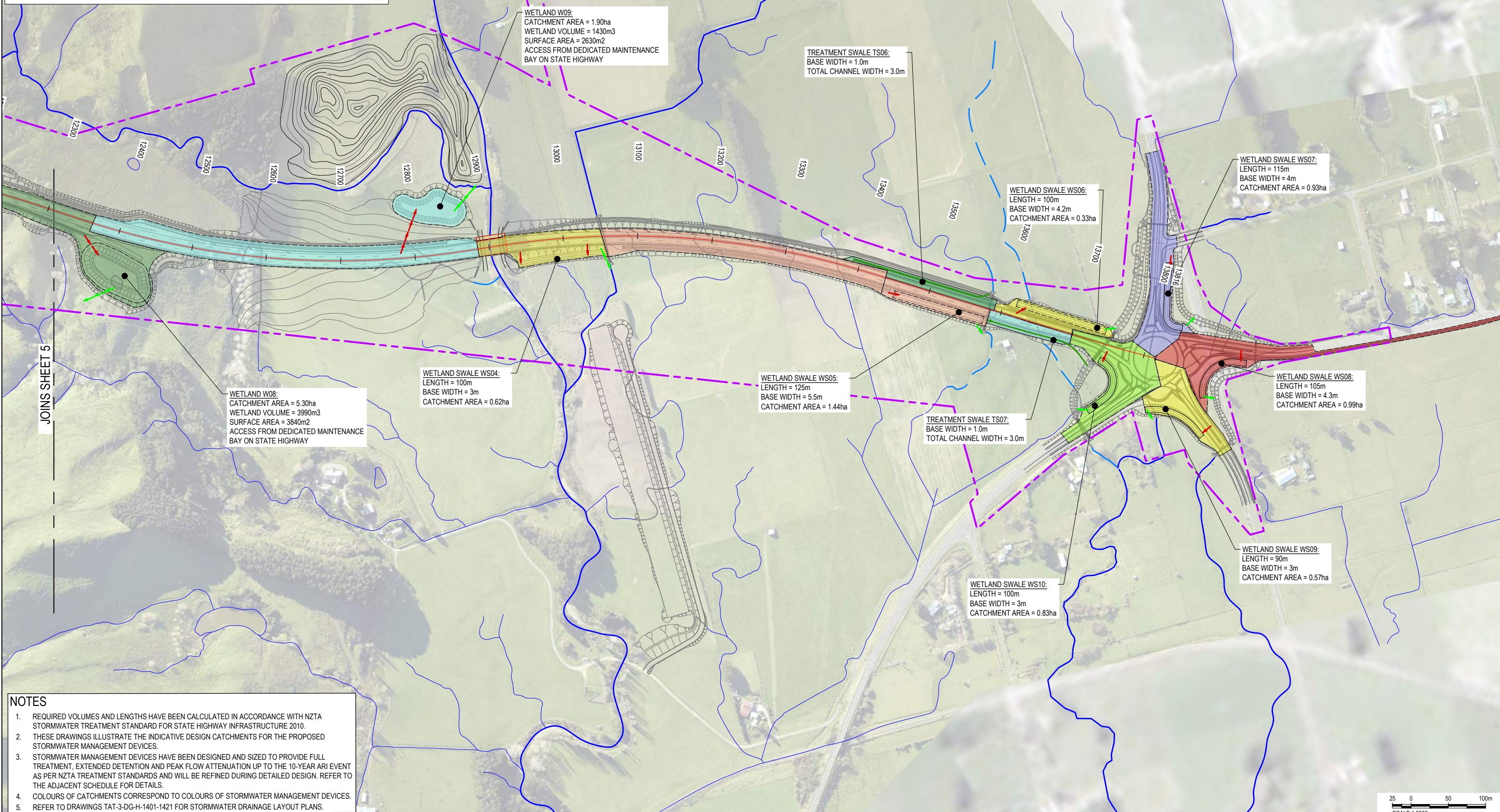
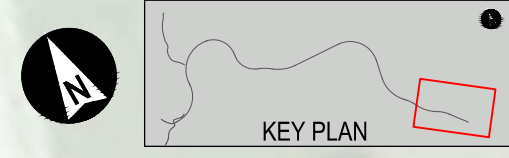
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CLIENT		REV		DATE	REVISION DETAILS	APPROVED	SCALE	SIZE	CONSENT	PROJECT
		A	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN	1:2500	A1	NOT FOR CONSTRUCTION	TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY	
WAKA KOTAHĪ NZ TRANSPORT AGENCY		Te Ahu a Turanga Manawatū Tararua Highway		DRAWN D. LOW		APPROVED		DATE 24/02/2020	TITLE	
				DESIGNED J. MILLER		T. WATTERSON			STORMWATER MANAGEMENT DEVICES CATCHMENT PLAN SHEET 5	
				REVIEWED D. HUGHES		T. WATTERSON			DRAWING No.	
									PROJECT No. TAT	
									PHASE 3	
									TYPE DG	
									DISC H	
									NUMBER 1438	
									REV A	

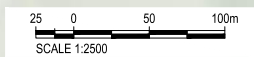
Project: 2020/03/30/12/46 Client: DOPH Engineer: N. MANAWATŪ TARARUA HIGHWAY PHASE 3 TECHNICAL - DESIGN WORKING UNDER THE RESOURCE MANAGEMENT ACT 1991 DRAWING: DRAWINGS, CONCEPT AND CONSULTING (D/C) 1401-1421

LEGEND

- PROPOSED DESIGNATION
- COUNCIL BOUNDARY
- EXISTING PROPERTY BOUNDARY
- EXISTING STREAM (PERMANENT)
- EXISTING STREAM (INTERMITTENT)
- EXISTING OVERLAND FLOW PATH
- PLANTED TREATMENT SWALE (TREATMENT ONLY)
- PROPOSED CULVERT
- INCOMING FLOW TO DEVICE
- OUTGOING FLOW FROM DEVICE
- STORMWATER MANAGEMENT DEVICE CATCHMENTS



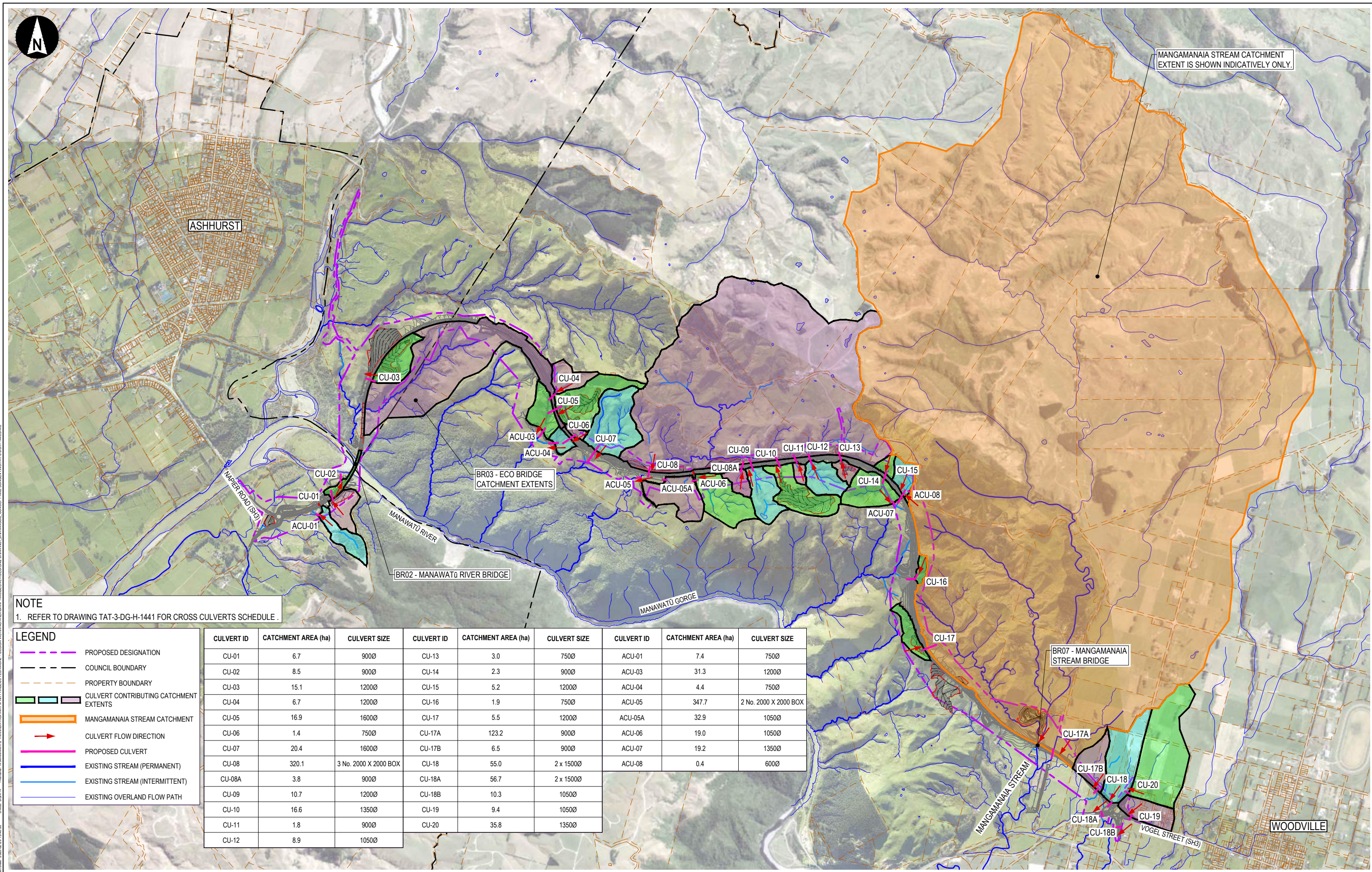
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CLIENT		REVISION DETAILS		APPROVED	SCALE	SIZE	CONSENT	PROJECT
A	24/02/2020	ISSUED FOR REGIONAL CONSENT		D. MCGAHAN	1:2500	A1	NOT FOR CONSTRUCTION	TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY
					DRAWN		APPROVED	TITLE
					D. LOW		DATE	STORMWATER MANAGEMENT DEVICES
					DESIGNED		24/02/2020	CATCHMENT PLAN
					J. MILLER			SHEET 6
					REVIEWED		T. WATTERSON	DRAWING No.
					D. HUGHES		T. WATTERSON	PROJECT No.
								TAT
								PHASE
								3
								TYPE
								DG
								DISC
								H
								NUMBER
								1439
								REV
								A



Project: 200-03-03-17250 Client: DOPH Engineer: N. MANAWATŪ TARARUA HIGHWAY PHASE 3 - DESIGN WORKING UNDER THE RESOURCE MANAGEMENT ACT 1991 DRAWING: DRAWINGS, CONCEPT AND CONSULTING (DOPH) 101-103.DWG



NOTE
1. REFER TO DRAWING TAT-3-DG-H-1441 FOR CROSS CULVERTS SCHEDULE.

LEGEND

- PROPOSED DESIGNATION
- COUNCIL BOUNDARY
- PROPERTY BOUNDARY
- CULVERT CONTRIBUTING CATCHMENT EXTENTS
- MANGAMANAI A STREAM CATCHMENT
- CULVERT FLOW DIRECTION
- PROPOSED CULVERT
- EXISTING STREAM (PERMANENT)
- EXISTING STREAM (INTERMITTENT)
- EXISTING OVERLAND FLOW PATH

CULVERT ID	CATCHMENT AREA (ha)	CULVERT SIZE	CULVERT ID	CATCHMENT AREA (ha)	CULVERT SIZE	CULVERT ID	CATCHMENT AREA (ha)	CULVERT SIZE
CU-01	6.7	900Ø	CU-13	3.0	750Ø	ACU-01	7.4	750Ø
CU-02	8.5	900Ø	CU-14	2.3	900Ø	ACU-03	31.3	1200Ø
CU-03	15.1	1200Ø	CU-15	5.2	1200Ø	ACU-04	4.4	750Ø
CU-04	6.7	1200Ø	CU-16	1.9	750Ø	ACU-05	347.7	2 No. 2000 X 2000 BOX
CU-05	16.9	1600Ø	CU-17	5.5	1200Ø	ACU-05A	32.9	1050Ø
CU-06	1.4	750Ø	CU-17A	123.2	900Ø	ACU-06	19.0	1050Ø
CU-07	20.4	1600Ø	CU-17B	6.5	900Ø	ACU-07	19.2	1350Ø
CU-08	320.1	3 No. 2000 X 2000 BOX	CU-18	55.0	2 x 1500Ø	ACU-08	0.4	600Ø
CU-08A	3.8	900Ø	CU-18A	56.7	2 x 1500Ø			
CU-09	10.7	1200Ø	CU-18B	10.3	1050Ø			
CU-10	16.6	1350Ø	CU-19	9.4	1050Ø			
CU-11	1.8	900Ø	CU-20	35.8	1350Ø			
CU-12	8.9	1050Ø						

CLIENT



Te Ahu a Turanga
Manawatu Tararua Highway

REV	DATE	REVISION DETAILS	APPROVED
C	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN
B	19/11/2019	ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH
A	18/10/2019	CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH

SCALE	SIZE
1:15000	A1
DRAWN	D. LOW
DESIGNED	J. IRVINE
REVIEWED	D. HUGHES

CONSENT	
NOT FOR CONSTRUCTION	
APPROVED	DATE
T. WATTERSON	24/02/2020
T. WATTERSON	

PROJECT	TE AHU A TURANGA: MANAWATU TARARUA HIGHWAY					
TITLE	CROSS CULVERTS CATCHMENT OVERVIEW PLAN					
DRAWING No.	PROJECT No.	PHASE	TYPE	DISC	NUMBER	REV
TAT		3	DG	H	1440	C

Project: N MANAWATU TARARUA HIGHWAY PHASE 03 TECHNICAL - DESIGN WORKING AREA/UTING/DESIGN DRAWING - DRAWINGS, CONCEPT AND CONSENTING/TA/3-DG-H-1441/DWG
 File Name: N MANAWATU TARARUA HIGHWAY PHASE 03 TECHNICAL - DESIGN WORKING AREA/UTING/DESIGN DRAWING - DRAWINGS, CONCEPT AND CONSENTING/TA/3-DG-H-1441/DWG
 Plot Date: 2020-02-20 14:46:55

MANAWATŪ TARARUA HIGHWAY CULVERTS

CULVERT ID	CHAINAGE (m)	CATCHMENT AREA (ha)	DESIGN FLOWS AND FREEBOARD					CULVERT CHARACTERISTICS							OUTLET AND ENERGY DISSIPATION				STREAM CATCHMENT	
			10% AEP FLOW (m³/s)	1% AEP FLOW (m³/s)	1% AEP HEADWATER LEVEL (mRL)	MIN ROAD LEVEL AT INLET (mRL)	FREEBOARD (1% AEP)	SIZE (mm)	NO. OF BARRELS	LENGTH (m)	GRADIENT (%)	MAXIMUM COVER FROM SOFFIT (m)	PIPE MATERIAL	FISH SPECIES	FISH PASSAGE TREATMENT REQUIRED	INLET CONFIGURATION	OUTLET STRUCTURE	STRUCTURE LENGTH (m)		D50 (mm)
CU-01	3390	6.7	0.6	1.4	77.3	78.2	0.9	900 Ø	1	74	7.0%	3.1	RCRRJ PIPE HS2 SUPPORT, CLASS 4	NO FISH PASSAGE REQUIRED	N/A	HEADWALL (WW1050), SECONDARY INLET AND DEBRIS RACK	RIPRAP APRON	5	250	8A
CU-02	SH3 (NAPIER ROAD)	8.5	0.8	1.7	70.0	71.0	1.1	900 Ø	1	59	13.7%	8.0	RCRRJ PIPE HS2 SUPPORT, CLASS 4	NO FISH PASSAGE REQUIRED	N/A	SCRUFFY DOME	RIPRAP APRON	5	350	8A
CU-03	4680	15.1	1.4	3.0	110.3	111.6	1.3	1200 Ø	1	69	6.8%	5.6	RCRRJ PIPE HS2 SUPPORT, CLASS 6	CLIMBERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1350) AND SECONDARY INLET	RIPRAP APRON	7	350	7B
CU-04	4530	6.7	0.6	1.4	285.0	289.4	4.3	1200 Ø	1	86	0.9%	4.4	RCRRJ PIPE HS2 SUPPORT, CLASS 4	CLIMBERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1350)	RIPRAP APRON	5	125	5B
CU-05	6800	16.9	1.6	3.4	285.4	288.9	3.5	1600 Ø	1	90	9.0%	8.3	RCRRJ PIPE HS3 SUPPORT, CLASS 8	NO FISH PASSAGE REQUIRED	N/A	HEADWALL (WW1800), AND SECONDARY INLET	RIPRAP APRON	7	125	5B
CU-06	7100	1.4	0.1	0.3	284.6	288.9	4.3	750 Ø	1	88	6.8%	8.9	RCRRJ PIPE HS3 SUPPORT, CLASS 6	NO FISH PASSAGE REQUIRED	N/A	HEADWALL (WW1050)	RIPRAP APRON	3	125	5B
CU-07	7330	20.4	1.9	4.1	269.7	287.3	17.6	1600 Ø	1	179	7.2%	23.7	RCRRJ PIPE HS3 SUPPORT, CLASS 8	CLIMBERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1800) AND DEBRIS RACK	RIPRAP APRON	7.2	150	5A
CU-08	7850	320.0	14.3	26.3	284.1	285.6	1.6	2000W X 2000H BOX CULVERT	3	71	1.9%	3.7	BOX CULVERT BEDDING IN ACCORDANCE WITH AS1597.1 2010	SWIMMERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL AND DEBRIS RACK	RIPRAP APRON	16	550	4A
CU-08A	8670	3.8	0.2	0.5	297.8	300.6	2.8	900 Ø	1	101	5.7%	5.4	RCRRJ PIPE HS2 SUPPORT, CLASS 6	CLIMBERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1050)	RIPRAP APRON	4	125	4A
CU-09	8740	10.7	1.0	2.2	296.8	302.6	5.8	1200 Ø	1	106	3.0%	7.3	RCRRJ PIPE HS2 SUPPORT, CLASS 6	CLIMBERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1350)	RIPRAP APRON	5	125	4C
CU-10	8980	16.6	1.0	2.2	300.5	306.0	5.5	1350 Ø	1	98	0.9%	7.6	RCRRJ PIPE HS2 SUPPORT, CLASS 4	CLIMBERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1350)	RIPRAP APRON	5.4	125	4D
CU-11	9140	1.8	0.2	0.4	308.2	309.1	0.8	900 Ø	1	59	5.5%	2.8	RCRRJ PIPE HS2 SUPPORT, CLASS 4	NO FISH PASSAGE REQUIRED	N/A	HEADWALL (WW1050)	RIPRAP APRON	3.6	125	4A
CU-12	9270	8.9	0.8	1.8	309.7	311.4	1.7	1050 Ø	1	86	3.0%	5.3	RCRRJ PIPE HS2 SUPPORT, CLASS 6	CLIMBERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1050) AND SECONDARY INLET	RIPRAP APRON	4	125	4E
CU-13	9530	3.0	0.3	0.6	316.1	317.2	1.0	750 Ø	1	76	6.3%	5.2	RCRRJ PIPE HS2 SUPPORT, CLASS 4	CLIMBERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1050) AND SECONDARY INLET	RIPRAP APRON	3.0	125	4F
CU-14	9970	2.3	0.2	0.5	309.1	316.5	7.4	900 Ø	1	112	11.6%	13.0	RCRRJ PIPE HS3 SUPPORT, CLASS 6	NO FISH PASSAGE REQUIRED	N/A	HEADWALL (WW1050) AND DEBRIS RACK	RIPRAP APRON	4	125	3A
CU-15	10200	5.2	0.5	1.0	287.9	306.0	18.1	1200 Ø	1	127	2.9%	18.6	RCRRJ PIPE HS3 SUPPORT, CLASS 6	CLIMBERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1350) AND DEBRIS RACK	RIPRAP APRON	5	125	3A
CU-16	10950	1.9	0.2	0.4	242.3	245.2	2.9	750 Ø	1	88	7.0%	6.0	RCRRJ PIPE HS2 SUPPORT, CLASS 4	NO FISH PASSAGE REQUIRED	N/A	SCRUFFY DOME	RIPRAP APRON	3.0	125	3B
CU-17	11600	5.5	0.5	1.1	183.7	188.8	5.1	1200 Ø	1	130	15.2%	11.5	RCRRJ PIPE HS2 SUPPORT, CLASS 6	CLIMBERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1350)	RIPRAP BASIN	5	150	2C
CU-17A	13050	123.2	5.1	8.5	84.4	87.2	2.8	900 Ø	1	56	0.9%	2.6	RCRRJ PIPE HS2 SUPPORT, CLASS 4	SWIMMERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1050)	RIPRAP APRON	7.2	550	2B
CU-17B	13570	6.5	0.3	0.7	81.2	84.8	3.6	900 Ø	1	44	1.0%	1.2	RCRRJ PIPE HS2 SUPPORT, CLASS 4	SWIMMERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1050)	RIPRAP APRON	4	125	1B
CU-18	13750	55.0	3.2	5.8	82.5	84.0	1.5	1500 Ø	2	52	0.5%	1.8	RCRRJ PIPE HS2 SUPPORT, CLASS 4	SWIMMERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1800)	RIPRAP APRON	9.0	350	1B
CU-18A	WOODVILLE ROUNDABOUT	56.7	3.2	5.8	81.7	82.5	0.8	1500 Ø	2	35	0.5%	1.2	RCRRJ PIPE HS2 SUPPORT, CLASS 4	SWIMMERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1800)	RIPRAP APRON	9.0	350	1B
CU-18B	WOODVILLE ROUNDABOUT	10.3	0.5	1.1	80.9	81.6	0.7	1050 Ø	1	25	0.4%	0.7	RCRRJ PIPE HS2 SUPPORT, CLASS 4	SWIMMERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1050)	RIPRAP APRON	4.2	125	1A
CU-19	WOODVILLE ROUNDABOUT	9.4	0.5	1.0	81.7	83.1	1.4	1050 Ø	1	31	0.6%	1.2	RCRRJ PIPE HS2 SUPPORT, CLASS 4	SWIMMERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1050)	RIPRAP APRON	4.2	125	1A
CU-20	WOODVILLE ROUNDABOUT	35.8	1.0	2.2	83.4	84.4	1.0	1350 Ø	1	30	0.8%	1.4	RCRRJ PIPE HS2 SUPPORT, CLASS 4	SWIMMERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1350) AND DEBRIS RACK	RIPRAP APRON	5.4	150	1A

ACCESS TRACK CULVERTS

CULVERT ID	CHAINAGE (m)	CATCHMENT AREA (ha)	DESIGN FLOWS AND FREEBOARD					CULVERT CHARACTERISTICS							OUTLET AND ENERGY DISSIPATION				STREAM CATCHMENT	
			10% AEP FLOW (m³/s)	1% AEP FLOW (m³/s)	10% AEP HEADWATER LEVEL (mRL)	MIN ROAD LEVEL AT INLET (mRL)	FREEBOARD (10% AEP)	SIZE (mm)	NO. OF BARRELS	LENGTH (m)	GRADIENT (%)	MAXIMUM COVER FROM SOFFIT (m)	PIPE MATERIAL	FISH SPECIES	FISH PASSAGE TREATMENT REQUIRED	INLET CONFIGURATION	OUTLET STRUCTURE	STRUCTURE LENGTH (m)		D50 (mm)
ACU-01	RHS 3220 (UNDERPASS ACCESS TRACK)	7.4	0.7	1.5	75.5	76.8	1.3	750 Ø	1	12	7.3%	1.9	RCRRJ PIPE HS2 SUPPORT, CLASS 4	CLIMBERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1050)	RIPRAP APRON	3.8	250	8A
ACU-03	RHS 6920 (MERIDIAN ACCESS TRACK)	31.3	2.9	6.3	247.3	255.2	7.9	1200 Ø	1	89	5.1%	10.2	RCRRJ PIPE HS2 SUPPORT, CLASS 6	CLIMBERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1350)	RIPRAP BASIN	9.2	150	5B
ACU-04	RHS 6980 (MERIDIAN ACCESS TRACK)	4.4	0.4	0.9	254.9	262.1	7.2	750 Ø	1	80	5.6%	8.5	RCRRJ PIPE HS2 SUPPORT, CLASS 6	NO FISH PASSAGE REQUIRED	N/A	HEADWALL (WW1050)	RIPRAP APRON	3.0	125	5B
ACU-05	RHS 7750 (MERIDIAN ACCESS TRACK)	347.7	14.5	26.7	280.9	281.5	0.6	2000W X 2000H BOX CULVERT	2	26	0.4%	0.7	BOX CULVERT BEDDING IN ACCORDANCE WITH AS1597.1 2010	SWIMMERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL	RIPRAP APRON	16.0	550	4A
ACU-05A	RHS 7990 (MERIDIAN ACCESS TRACK)	32.9	1.8	3.9	286.5	286.9	0.4	1050 Ø	1	28	3.1%	1.3	RCRRJ PIPE HS2 SUPPORT, CLASS 4	CLIMBERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1050)	RIPRAP APRON	5.3	250	4B
ACU-06	RHS 8230 (COOK ROAD ACCESS TRACK)	19.0	1.8	3.8	291.0	291.7	0.7	1050 Ø	1	32	1.1%	0.6	RCRRJ PIPE HS2 SUPPORT, CLASS 4	CLIMBERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1050)	RIPRAP APRON	5.3	250	4b
ACU-07	RHS 10230 (AG RESEARCH ACCESS TRACK)	19.2	1.2	2.5	285.7	288.5	2.8	1350 Ø	1	27	5.5%	4.1	RCRRJ PIPE HS2 SUPPORT, CLASS 6	CLIMBERS	EMBEDMENT (25% OF PIPE DIAMETER)	HEADWALL (WW1350)	RIPRAP APRON	5.4	125	3A
ACU-08	LHS 10220 (AG RESEARCH ACCESS TRACK)	0.4	0.0	0.1	295.7	297.1	1.4	600 Ø	1	13	13.2%	1.4	RCRRJ PIPE HS2 SUPPORT, CLASS 4	NO FISH PASSAGE REQUIRED	N/A	SCRUFFY DOME	USBR VI IMPACT BASIN	2.0	N/A	3A

NOTES

- THE DETAILS AND DIMENSIONS SHOWN ARE INDICATIVE AND WILL BE REFINED AS THE DETAIL DESIGN IS DEVELOPED.
- A MINIMUM PIPE CLASS OF 4 HAS BEEN ALLOWED FOR ALL RCRRJ PIPES.
- A MINIMUM PIPE SIZE OF 750mm DIAMETER HAS BEEN ASSUMED FOR PIPE CULVERTS UNDER THE STATE HIGHWAY IN ACCORDANCE WITH AUSTROADS PART 5B. THIS IS TO MITIGATE POTENTIAL BLOCKAGE AND PROVIDE IMPROVED SAFETY FOR MAINTENANCE ACTIVITIES.
- A MINIMUM BEDDING TYPE OF HS2 WILL BE PROVIDED FOR CIRCULAR PIPE CULVERTS, WHERE BEDDING CLASS HS3 WILL BE CONSIDERED FOR FILL HEIGHTS GREATER THAN 8m.
- BEDDING FOR BOX CULVERTS WILL BE IN ACCORDANCE WITH AS1597.1 2010.
- WHERE CULVERT LENGTHS EXCEED 120m AND FISH PASSAGE IS REQUIRED, A MINIMUM PIPE SIZE OF 1200mm DIAMETER HAS BEEN PROVIDED FOR IMPROVED ACCESS FOR MAINTENANCE ACTIVITIES.
- WHERE CULVERTS REQUIRE EMBEDMENT FOR FISH PASSAGE, 25% OF CULVERT DIAMETER HAS BEEN ASSUMED TO BE EMBEDDED IN ACCORDANCE WITH NEW ZEALAND FISH PASSAGE GUIDELINES 2018.
- ENERGY DISSIPATION STRUCTURES / OUTLETS HAVE BEEN SPECIFIED AND DESIGNED IN ACCORDANCE WITH HEC-14 FOR THE 1% AEP EVENT.
- DEBRIS POTENTIAL OF CULVERTS ARE BASED ON HEC-9 GUIDELINES AND DEBRIS CONTROL MEASURES HAVE BEEN SIZED IN ACCORDANCE WITH HEC-9 FOR THE 1% AEP EVENT.
- ALL ACCESS TRACK CULVERTS HAVE BEEN DESIGNED TO CONVEY THE 10% AEP STORM EVENT AND A PRELIMINARY ASSESSMENT HAS BEEN UNDERTAKEN TO ENSURE NO FLOODING UPSTREAM OR DOWNSTREAM OF THE CULVERTS WILL OCCUR IN ALL EVENTS, WHERE IT HAS BEEN DEEMED ACCEPTABLE FOR ACCESS TRACKS TO OVERTOP IN EVENTS EXCEEDING 10% AEP. MEASURES WILL BE PROVIDED TO MITIGATE POTENTIAL EROSION / PAVEMENT IMPACTS.



CLIENT

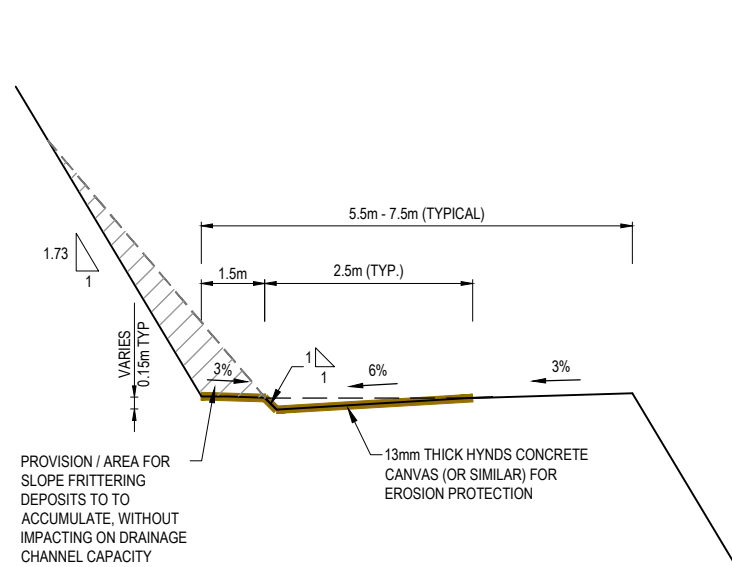
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B	19/11/2019	ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH
A	18/10/2019	CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH

SCALE	SIZE
NOT TO SCALE	A1
DRAWN	D. LOW
DESIGNED	J. IRVINE
REVIEWED	D. HUGHES

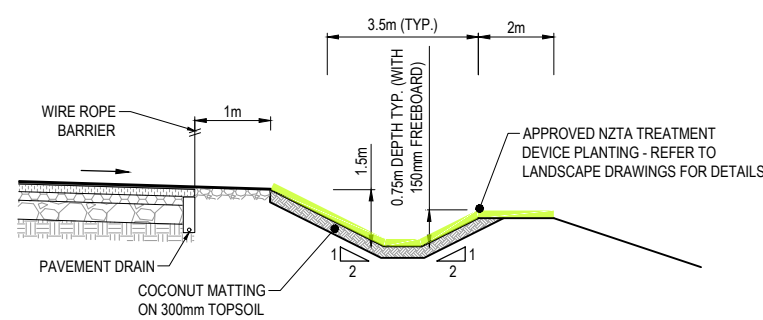
CONSENT NOT FOR CONSTRUCTION	
APPROVED	DATE 24/02/2020
T. WATTERSON	
T. WATTERSON	

PROJECT	TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY												
TITLE	CROSS CULVERTS SCHEDULE												
DRAWING No.	TAT	PROJECT No.	3	PHASE	DG	TYPE	H	DISC		NUMBER	1441	REV	C

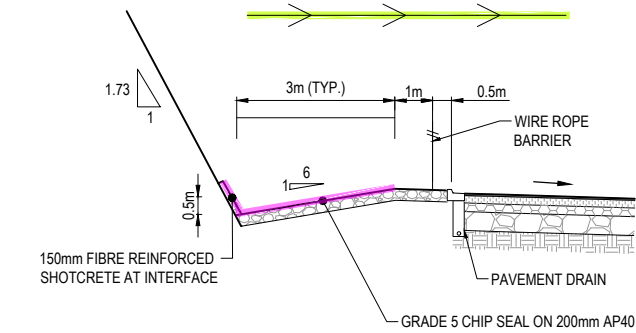
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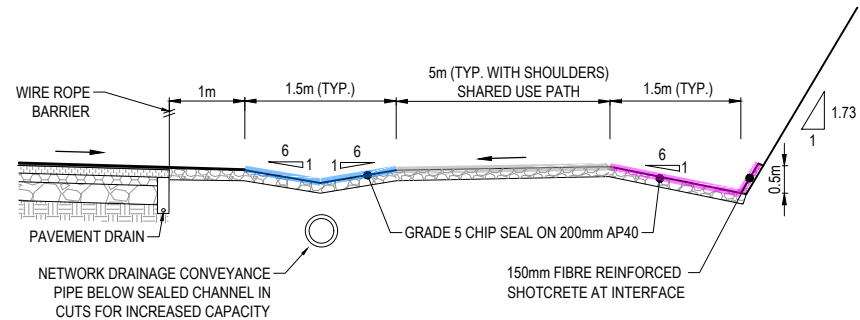
CONCRETE CANVAS BENCH CHANNEL DETAIL



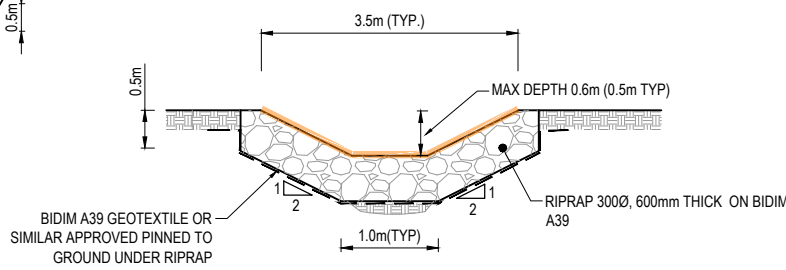
PLANTED CONVEYANCE CHANNEL / PLANTED TREATMENT SWALE DETAIL



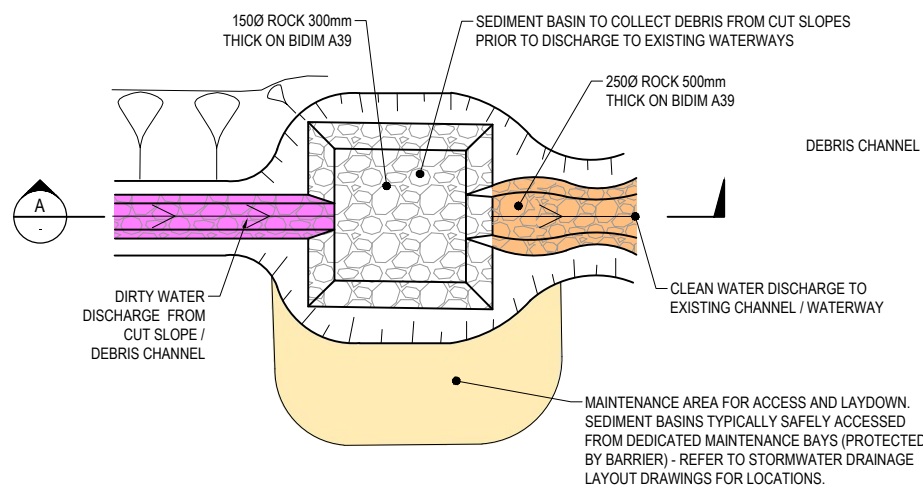
SEALED CUT SLOPE DEBRIS CHANNEL DETAIL



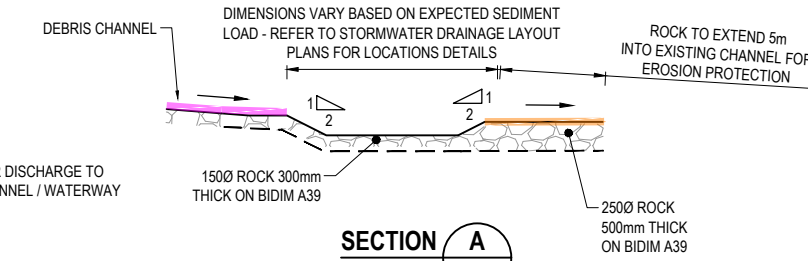
SEALED CONVEYANCE CHANNEL AND CUT SLOPE DEBRIS CHANNEL DETAIL BEHIND BARRIER (WITH SUP)



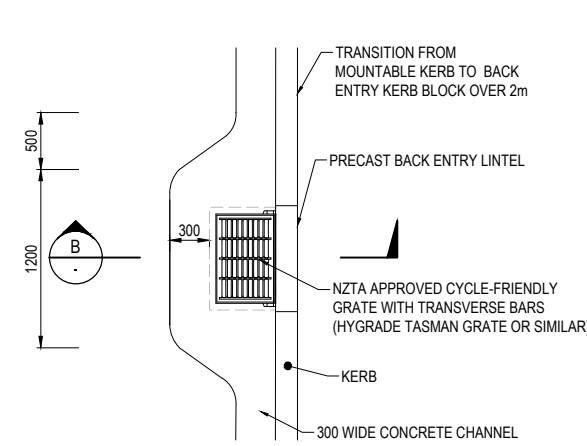
ROCK CONVEYANCE CHANNEL DETAIL



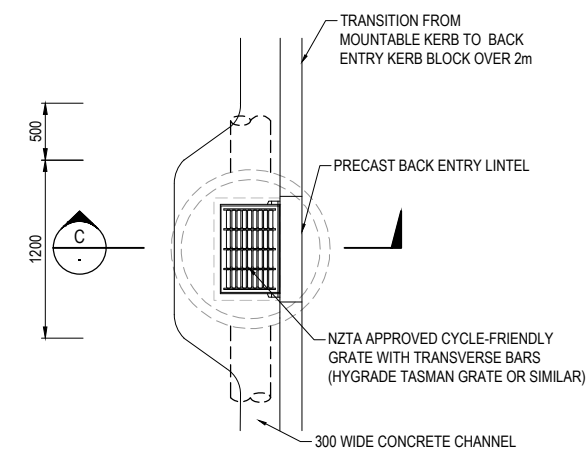
PLAN - SEDIMENT BASIN DETAIL



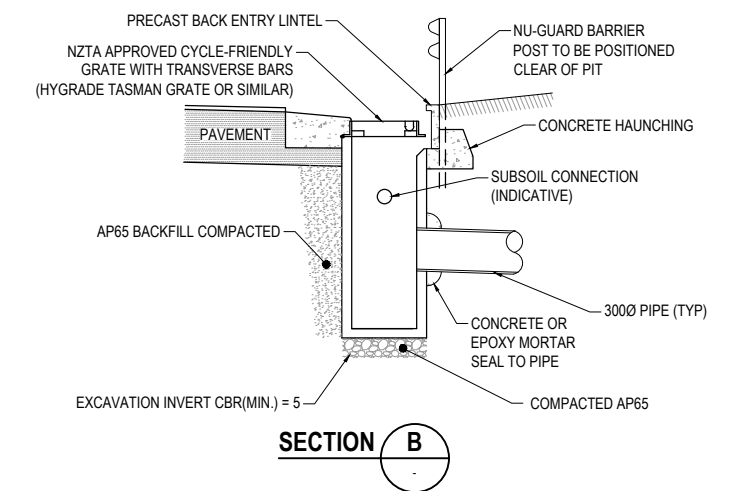
SECTION A - SEDIMENT BASIN - TYPICAL SECTION



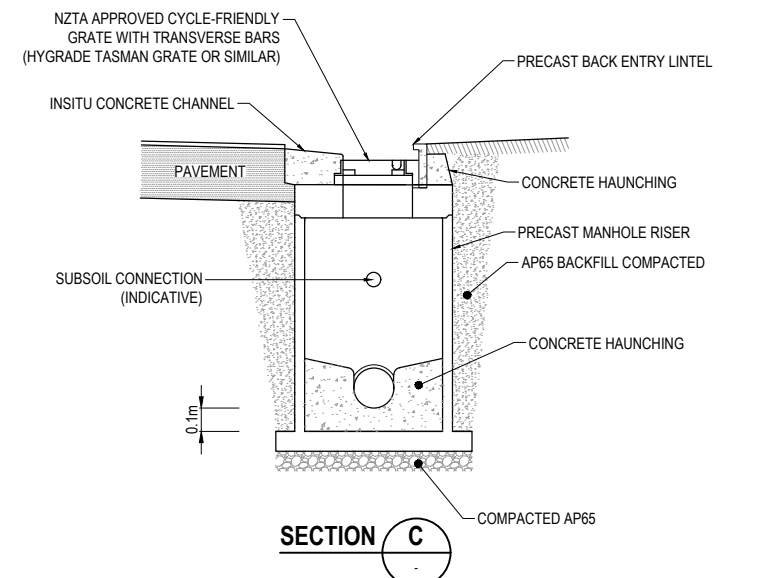
PLAN - SINGLE CATCHPIT AND KERB



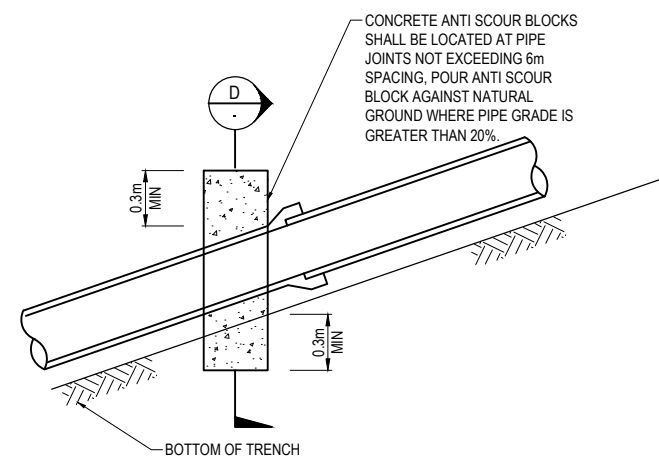
PLAN - CATCHPIT MANHOLE AND KERB



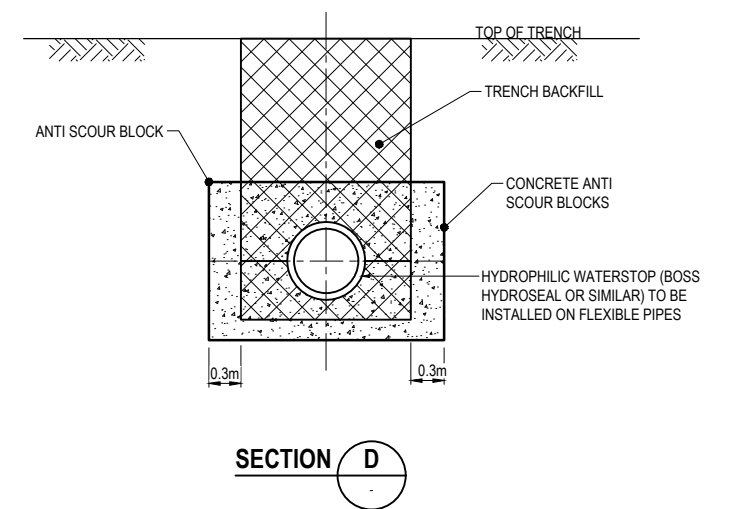
SECTION B - SINGLE CATCHPIT AND KERB



SECTION C - CATCHPIT MANHOLE AND KERB



ANCHOR BLOCK DETAIL FOR PIPES (GRADE > 10%)



ANCHOR BLOCK DETAIL FOR PIPES (GRADE > 10%)

Project: ZIMANAWATU TARARUA HIGHWAY PHASE 3 TECHNICAL - DESIGN WORKING REGULATORY DESIGN DRAWING. DRAWING: CONCEPT AND CONSULTING (A1.3) 2024-1460.DWG
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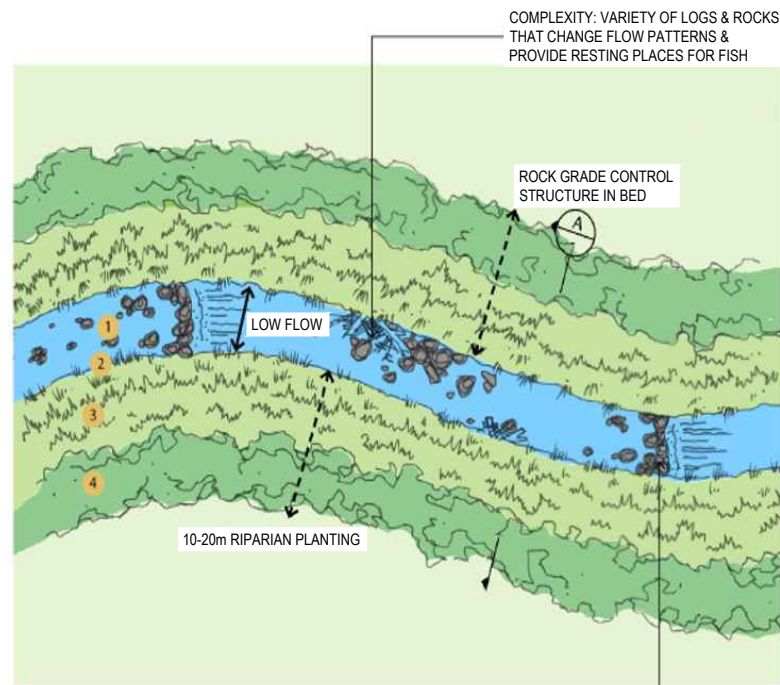


REV	DATE	REVISION DETAILS	APPROVED
C	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN
B	19/11/2019	ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH
A	18/10/2019	CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH

SCALE	SIZE
NOT TO SCALE	A1
DRAWN	D. LOW
DESIGNED	C. CHAN
REVIEWED	D. HUGHES

CONSENT	APPROVED
NOT FOR CONSTRUCTION	T. WATTERSON
	T. WATTERSON

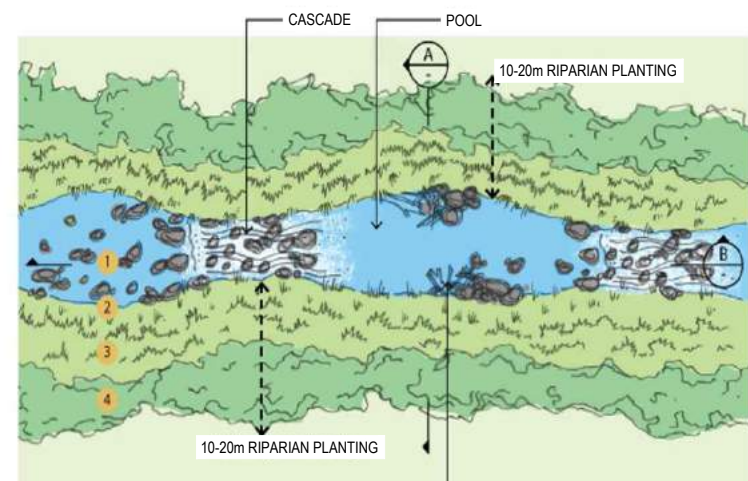
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DRAWING No. TAT	PROJECT No. 3
	PHASE 3
	TYPE DG
	DISC H
	NUMBER 1450
	REV C



REFER TO LANDSCAPE DRAWINGS FOR PLANTING DETAILS AND SCHEDULES

ROCK GRADE CONTROL STRUCTURE IN BED

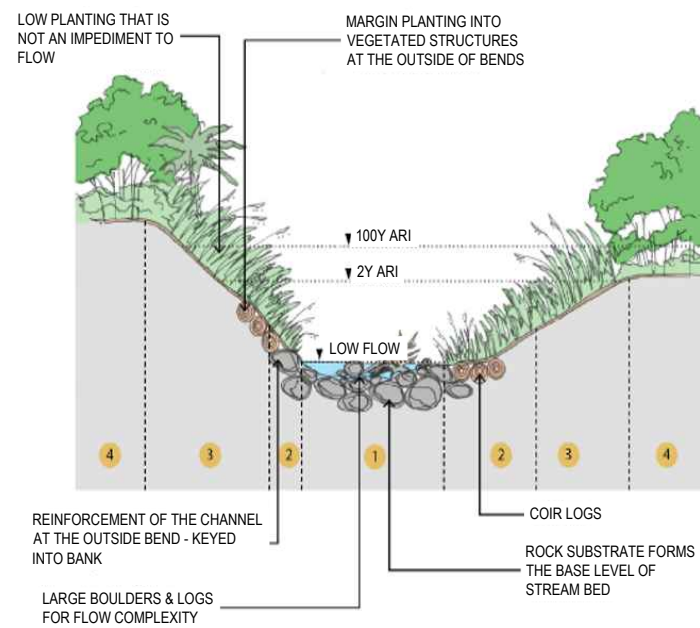
LOWLAND STREAM DIVERSION - TYPE 1



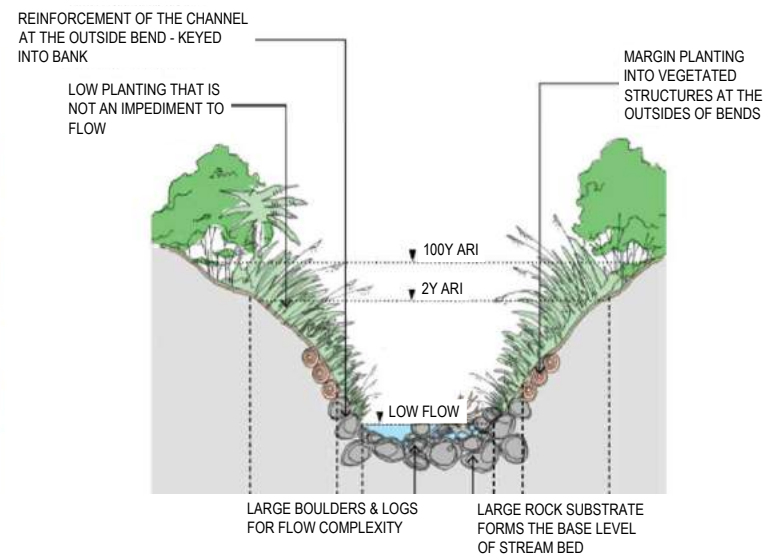
REFER TO LANDSCAPE DRAWINGS FOR PLANTING DETAILS AND SCHEDULES

COMPLEXITY

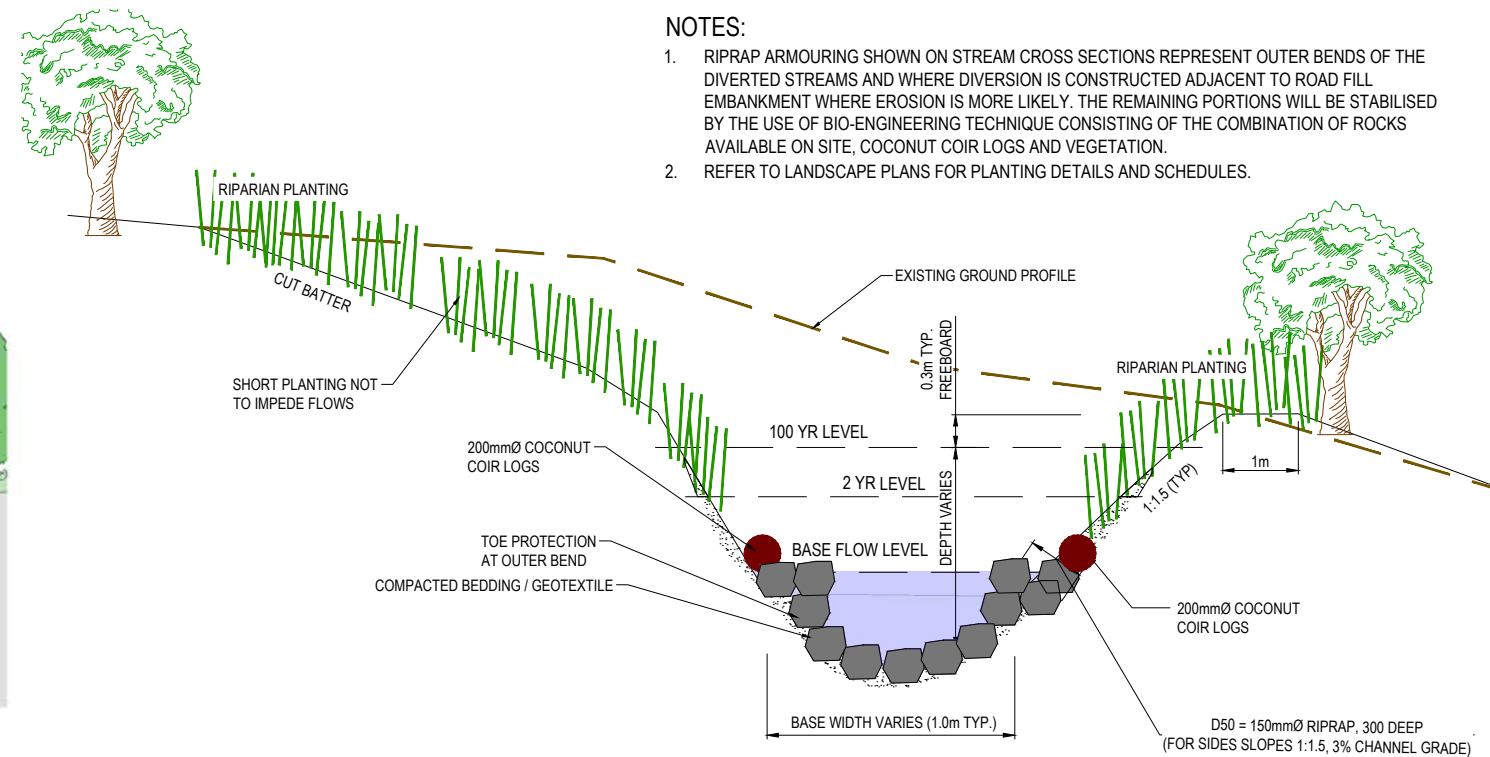
STEEP STREAM DIVERSION - TYPE 2



SECTION A



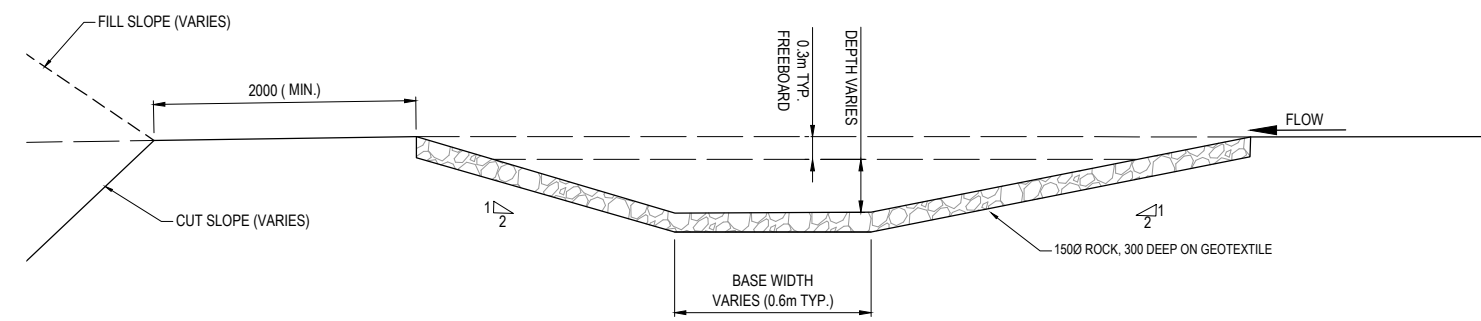
SECTION A



STREAM DIVERSION TYPE 3 - TYPICAL CROSS SECTION

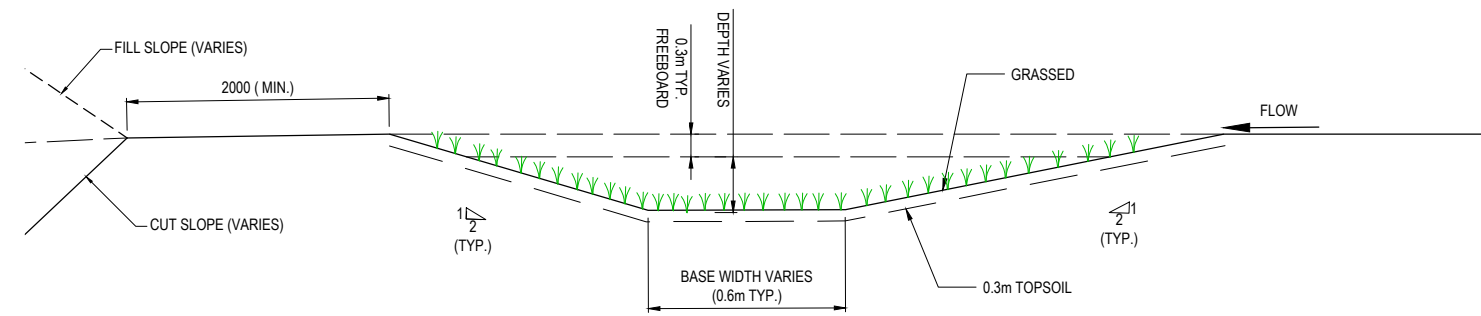


REFER TO LANDSCAPE DRAWINGS FOR PLANTING DETAILS AND SCHEDULES



TYPICAL CUT-OFF DRAIN (ROCK LINED)

(VELOCITY > 2.0 m/s)



TYPICAL CUT-OFF DRAIN (GRASSED)

(VELOCITY ≤ 2.0m/s)



NOTES:

1. RIPRAP ARMOURING SHOWN ON STREAM CROSS SECTIONS REPRESENT OUTER BENDS OF THE DIVERTED STREAMS AND WHERE DIVERSION IS CONSTRUCTED ADJACENT TO ROAD FILL EMBANKMENT WHERE EROSION IS MORE LIKELY. THE REMAINING PORTIONS WILL BE STABILISED BY THE USE OF BIO-ENGINEERING TECHNIQUE CONSISTING OF THE COMBINATION OF ROCKS AVAILABLE ON SITE, COCONUT COIR LOGS AND VEGETATION.
2. REFER TO LANDSCAPE PLANS FOR PLANTING DETAILS AND SCHEDULES.

Project: 2020/08 15:52:30
 Client: AUCI
 Designer: ZAMANA WATU TARARUA HIGHWAY PHASE 3/3 TECHNICAL - DESIGN WORKING REGULATORY DESIGN DRAWING, DRAWINGS, CONCEPT AND CONSENTING (A1, 3044-1461.DWG)



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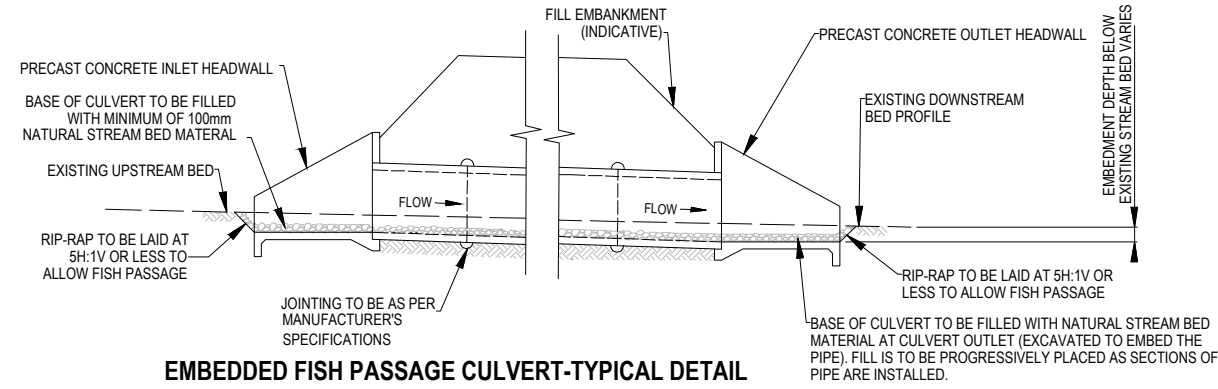
REV	DATE	REVISION DETAILS	APPROVED
C	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN
B	19/11/2019	ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH
A	18/10/2019	CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH

SCALE	SIZE
NOT TO SCALE	A1
DRAWN D. LOW	
DESIGNED J. IRVINE	
REVIEWED D. HUGHES	

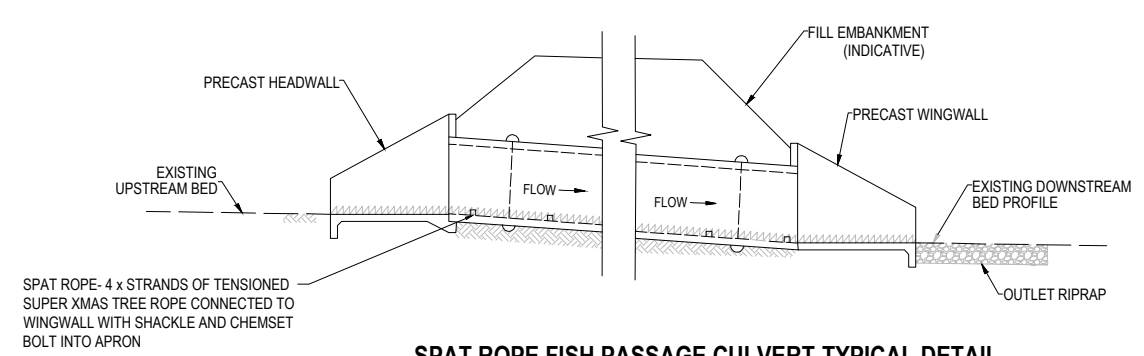
CONSENT	APPROVED
NOT FOR CONSTRUCTION	
	DATE 24/02/2020
T. WATTERSON	
T. WATTERSON	

PROJECT	TITLE
TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY	TYPICAL STORMWATER DRAINAGE DETAILS STREAM DIVERSIONS AND CUT-OFF DRAINS

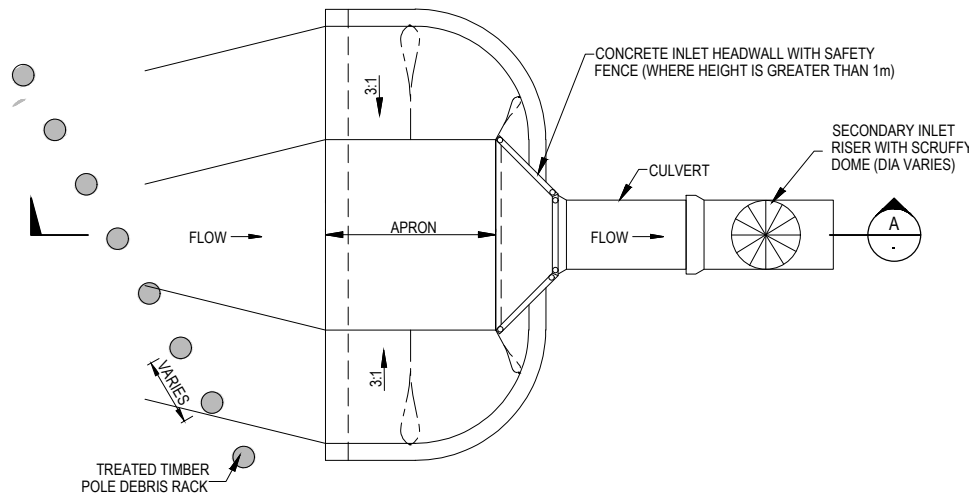
DRAWING No.	PROJECT No.	PHASE	TYPE	DISC	NUMBER	REV
TAT		3	DG	H	1451	C



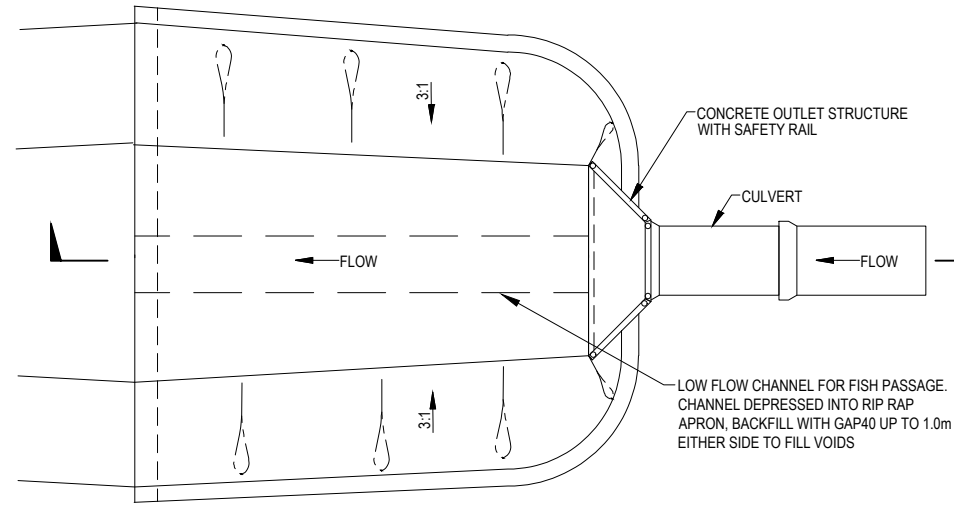
EMBEDDED FISH PASSAGE CULVERT-TYPICAL DETAIL



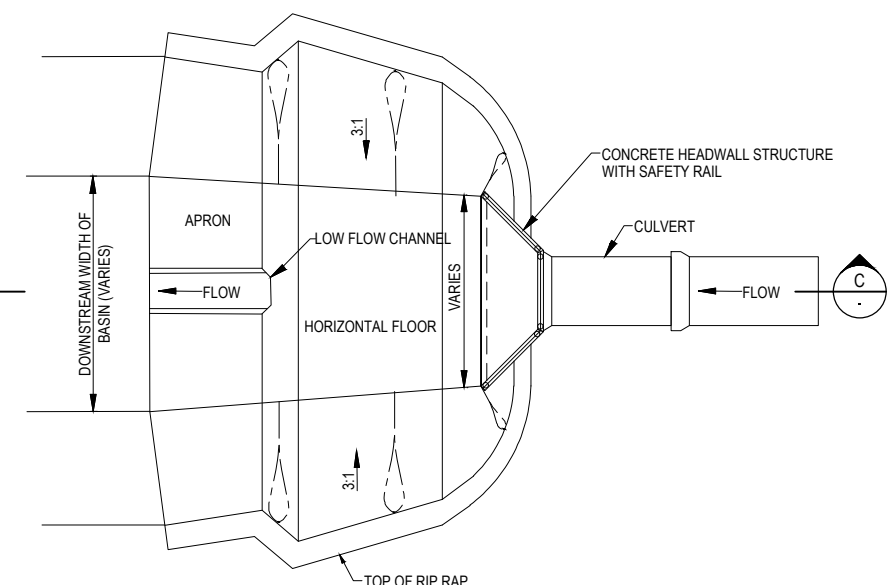
SPAT ROPE FISH PASSAGE CULVERT-TYPICAL DETAIL



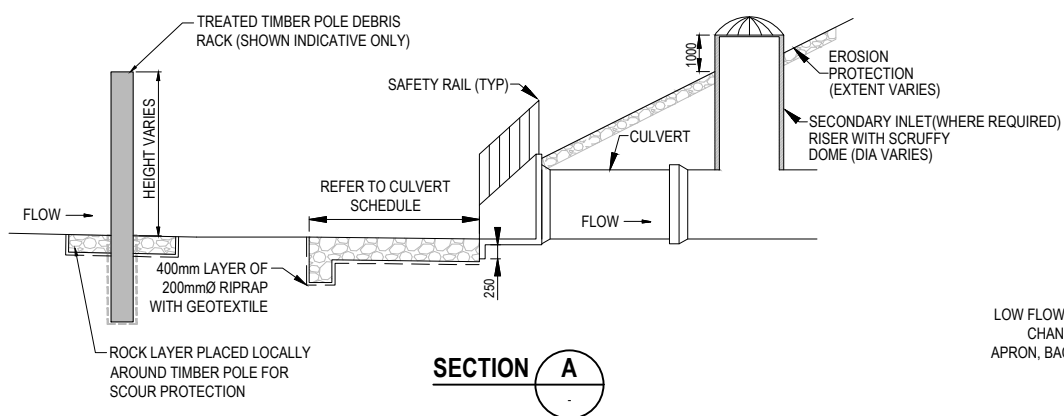
TYPICAL CULVERT INLET (WITH RELIEF INLET AND DEBRIS RACK) - PLAN VIEW



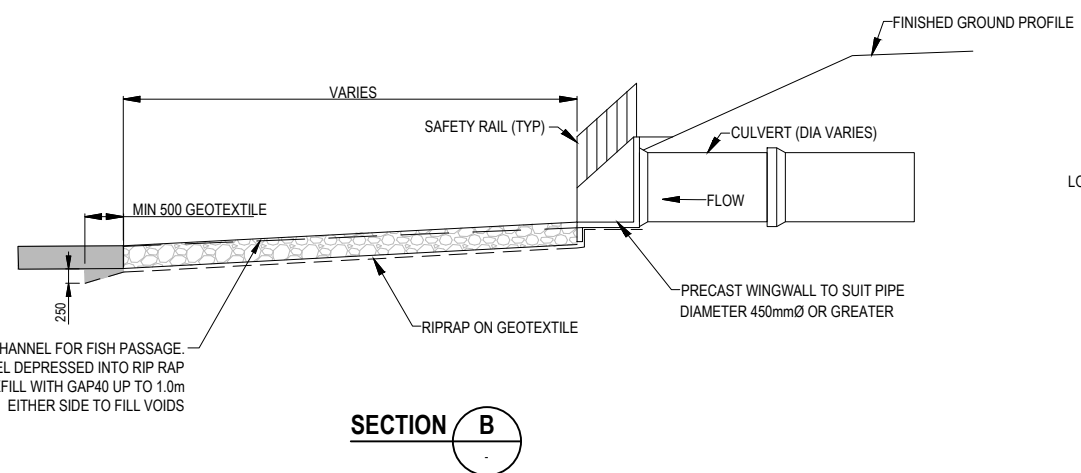
TYPICAL CULVERT OUTLET (RIPRAP APRON) - PLAN VIEW



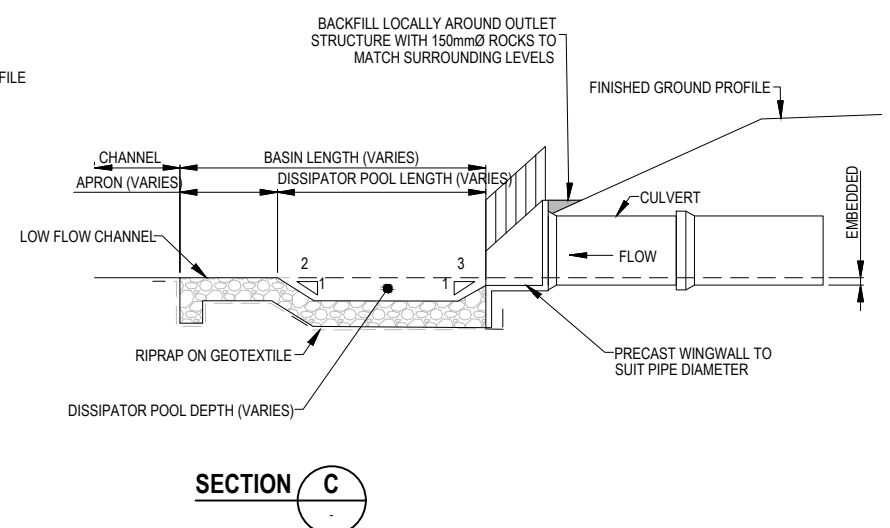
TYPICAL CULVERT OUTLET (RIPRAP BASIN) - PLAN VIEW



TYPICAL CULVERT INLET WITH FLOOD PROTECTION AND MITIGATION - DEBRIS RACK AND SECONDARY INLET



TYPICAL CULVERT OUTLET (RIPRAP APRON)



TYPICAL CULVERT OUTLET (RIPRAP BASIN)

Ptd Date: 2020/08/18 15:52:31
 Client: AUCI
 Engineer: ZAMANWATU TARARUA HIGHWAY PHASE 1 TECHNICAL - DESIGN WORKING (REGULATED/REGISTERED ENGINEER DESIGN DRAWING, DRAWINGS, CONCEPT AND CONSENTING) TA13/2019-1492.DWG

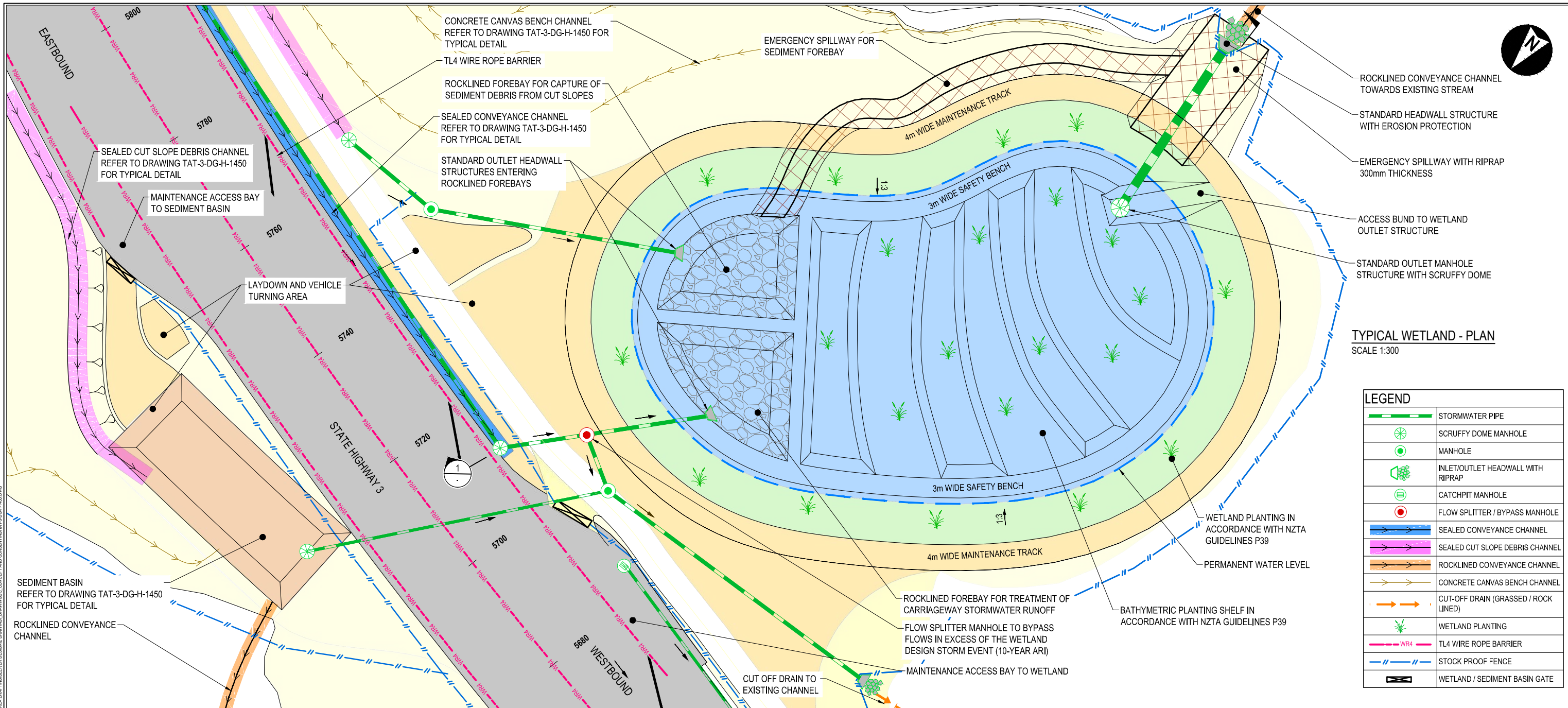


REV	DATE	REVISION DETAILS	APPROVED
C	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN
B	19/11/2019	ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH
A	18/10/2019	CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH

SCALE	NOT TO SCALE
SIZE	A1
DRAWN	D. LOW
DESIGNED	J. IRVINE
REVIEWED	D. HUGHES

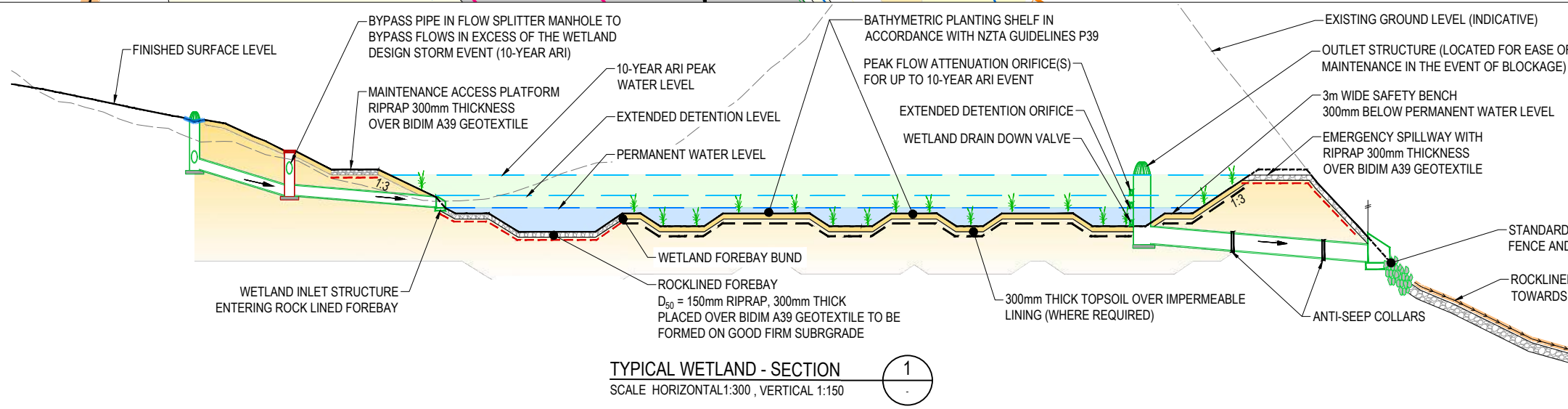
CONSENT	NOT FOR CONSTRUCTION
APPROVED	T. WATTERSON
DATE	24/02/2020

CLIENT	TE AHU A TURANGA: MANAWATU TARARUA HIGHWAY
PROJECT	TE AHU A TURANGA: MANAWATU TARARUA HIGHWAY
TITLE	TYPICAL STORMWATER DRAINAGE DETAILS CROSS CULVERTS
DRAWING No.	TAT - 3 - DG - H - 1452 - C



TYPICAL WETLAND - PLAN
SCALE 1:300

LEGEND	
	STORMWATER PIPE
	SCRUFFY DOME MANHOLE
	MANHOLE
	INLET/OUTLET HEADWALL WITH RIPRAP
	CATCHPIT MANHOLE
	FLOW SPLITTER / BYPASS MANHOLE
	SEALED CONVEYANCE CHANNEL
	SEALED CUT SLOPE DEBRIS CHANNEL
	ROCKLINED CONVEYANCE CHANNEL
	CONCRETE CANVAS BENCH CHANNEL
	CUT-OFF DRAIN (GRASSED / ROCK LINED)
	WETLAND PLANTING
	TL4 WIRE ROPE BARRIER
	STOCK PROOF FENCE
	WETLAND / SEDIMENT BASIN GATE



TYPICAL WETLAND - SECTION
SCALE HORIZONTAL 1:300, VERTICAL 1:150

- NOTES**
1. PLANTING TO BE IN ACCORDANCE WITH NZTA GUIDELINES P39.
 2. ALL WETLAND VOLUMES HAVE BEEN CALCULATED IN ACCORDANCE WITH NZTA STORMWATER TREATMENT STANDARD 2010.

Ptd Date: 2020/02/08 15:52:11
 Client: AUCI
 Engineer: ZAMAWATU TARARUA HIGHWAY/PAK PHASE/3/3/TECHNICAL - DESIGN WORKING REGULATORY/DESIGN DRAWING - CONCEPT AND CONSENTING/TAT-3-DG-H-1453.DWG



Te Ahu a Turanga
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REV	DATE	REVISION DETAILS	APPROVED
C	24/02/2020	ISSUED FOR REGIONAL CONSENT	D. MCGAHAN
B	19/11/2019	ISSUED FOR CONCEPT DESIGN	D. MACKINTOSH
A	18/10/2019	CONCEPT DESIGN - DRAFT REVIEW	D. MACKINTOSH

SCALE	SIZE
AS SHOWN	A1
DRAWN	D. LOW
DESIGNED	D. HUGHES
REVIEWED	D. HUGHES

CONCEPT	APPROVED
NOT FOR CONSTRUCTION	T. WATTERSON
	T. WATTERSON

PROJECT	TITLE
TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY	TYPICAL STORMWATER DRAINAGE DETAILS TYPICAL WETLAND GENERAL ARRANGEMENT
DRAWING No. TAT - 3 - DG - H - 1453 - C	