

## Scope – Muri and Titikaveka Flood Management Works

Muri and Titikaveka – Flood Management		
1	Client	Asian Development Bank
2	Executing Agency	Ministry of Finance and Economic Management (MFEM)
3	Implementing Agency	Infrastructure Cook Islands (ICI)
8	Scope description	<p>Refer to the attached plans:</p> <ul style="list-style-type: none"> <li>- Muri scope outline Rev 1</li> <li>- Titikaveka Scope Outline Rev 1</li> </ul> <p><b><u>Muri catchment (locations referenced on plans)</u></b></p> <p>Progress ‘Option A’ from the ‘<i>Muri Catchment Feasibility Study for Stormwater Management, Tonkin and Taylor August 2019</i>’:</p> <ul style="list-style-type: none"> <li>- Enhancement of multiple existing areas to provide flood attenuation and sediment treatment, except: <ul style="list-style-type: none"> <li>o Works already implemented by ICI.</li> <li>o 5m buffer on the road corridor margin for biofiltration and infiltration (not practical due to land constraints).</li> </ul> </li> <li>- Parengaru Stream <ul style="list-style-type: none"> <li>o Recommended for inclusion in the design.</li> <li>o Muri Environmental Care (MEC) is rehabilitating a section using nature-based solutions.</li> <li>o Important to National Environment Service (NES) and Ministry of Marine Resources (MMR) for water quality.</li> <li>o Flood prone with an existing wetland / swamp area.</li> </ul> </li> </ul> <p>The Muri catchment scope of work proposed to be taken through feasibility studies and due diligence is summarised as follows:</p> <ol style="list-style-type: none"> <li>1. Rehabilitation of Parengaru, Aremango, Areiti and Nukupure Streams: <ol style="list-style-type: none"> <li>a. Stream rehabilitation, riparian planting and stabilisation.</li> <li>b. Erosion protection at identified erosion prone areas.</li> <li>c. Form swales and capture selected obstructed flow paths.</li> </ol> </li> <li>2. Enhance selected existing natural swamp / wetland area to allow for controlled storage and treatment of stormwater at the locations as follows: <ol style="list-style-type: none"> <li>a. Parengaru stream wetland upstream of Ara Tapu (main road).</li> <li>b. Aremango swamp behind Te Ara Cook Islands Museum.</li> <li>c. Areiti swamp behind commercial premises on north side of Ara Tapu (main road) opposite Pacific Resort.</li> <li>d. Other identified small swamp / wetland areas on Parengaru, Aremango, Areiti and Nukupure Streams.</li> </ol> </li> <li>3. Stabilisation / definition / protection of stream outlet at the following locations: <ol style="list-style-type: none"> <li>a. Parengaru Stream</li> <li>b. Aremango Stream (including new overland flow path to beach)</li> <li>c. Areiti Stream</li> <li>d. Nukupure Stream</li> <li>e. Aroko Stream</li> <li>f. Major culverts</li> </ol> </li> </ol> <p><b><u>Titikaveka catchment (locations referenced on Scope plans)</u></b></p> <ol style="list-style-type: none"> <li>4. Turoa stream <ol style="list-style-type: none"> <li>a. Erosion protection at identified erosion prone stream extents.</li> </ol> </li> </ol>

	<ul style="list-style-type: none"> <li>b. Stream rehabilitation, riparian planting and stabilisation.</li> </ul>
	<ul style="list-style-type: none"> <li>5. Papaaroa school sub catchment                             <ul style="list-style-type: none"> <li>a. Improve selected overland flow paths and drainage in northern part of catchment near private properties and roads.</li> <li>b. Enhance part of natural swamp / wetland north of Papaaroa School for controlled storage and treatment of stormwater.</li> <li>c. Stream rehabilitation, riparian planting and stabilisation between Papaaroa School wetland and Turoa Stream (west).</li> </ul> </li> <li>6. Kent Hall sub catchment                             <ul style="list-style-type: none"> <li>a. Stabilise watercourses around the Titikaveka Playing Field (west, south and north perimeters) and Titikaveka College.</li> <li>b. Reinforce the confluence zone at the west end of the Titikaveka Playing Field.</li> <li>c. Stream rehabilitation, riparian planting and stabilisation between Papaaroa School wetland and the Titikaveka Playing Field (east).</li> </ul> </li> <li>7. Akapua stream                             <ul style="list-style-type: none"> <li>a. Erosion protection at identified erosion prone stream extents.</li> <li>b. Stream rehabilitation, riparian planting and stabilisation.</li> </ul> </li> <li>8. Enea Manea Hall sub catchment                             <ul style="list-style-type: none"> <li>a. Manage flow conveyed along road west of Turoa Retreat, along Ara Metua (back road) and down Akapua Road to the natural swamp / wetland area.</li> <li>b. Remove abandoned (collapsed) bridge immediately upstream of Ara Tapu (main road) culvert.</li> <li>c. Re-establish flow path and outlet at Tikioki Beach to reduce flood load on wetland area to the west.</li> </ul> </li> <li>9. Stabilisation of stream outlet at the following locations:                             <ul style="list-style-type: none"> <li>a. 'Unknown name' stream at Palm Grove / Liputa Road</li> <li>b. Taipara Stream</li> <li>c. Totokoitu Stream</li> <li>d. Turoa Stream (Sea Change Villas)</li> <li>e. Kent Hall</li> <li>f. Akapua Stream (Little Polynesian)</li> <li>g. 'Unknown name' stream west of Enea Manea Hall</li> <li>h. 'Unknown name' stream at Tikioki Beach (Waterfall Spa and Reflections Villa)</li> <li>i. Moana Sands (on north side of the Ara Tapu).</li> <li>j. Other identified major culverts.</li> </ul> </li> </ul>
	<p><b><u>General – applicable to both catchments (specific locations not referenced on Scope Outline plans at this stage)</u></b></p> <ul style="list-style-type: none"> <li>10. Reinforce branch road embankments where road acting as stopbank e.g. Angaroa Road.</li> <li>11. Replace or upgrade damaged / undersized culverts on the ICI asset database, including those under Ara Metua (back road) and Ara Tapu (main road) – some are shown on Scope Outline plans.</li> <li>12. Incorporate debris management features in streams / flow paths.</li> <li>13. Provide maintenance access for stormwater / flood management assets.</li> </ul>

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		<ul style="list-style-type: none"><li>14. Add local road drainage for stormwater and flood management at flood prone areas.</li><li>15. Include community / educational features at constructed wetland sites (e.g. boardwalks, information boards etc).</li><li>16. Repair / replace failing and/or non-compliant sanitation infrastructure at properties adjacent to the stormwater / flood management project locations i.e. properties that have the potential to adversely impact the watercourses, wetlands and flow paths being enhanced by the investment activities.</li></ul>
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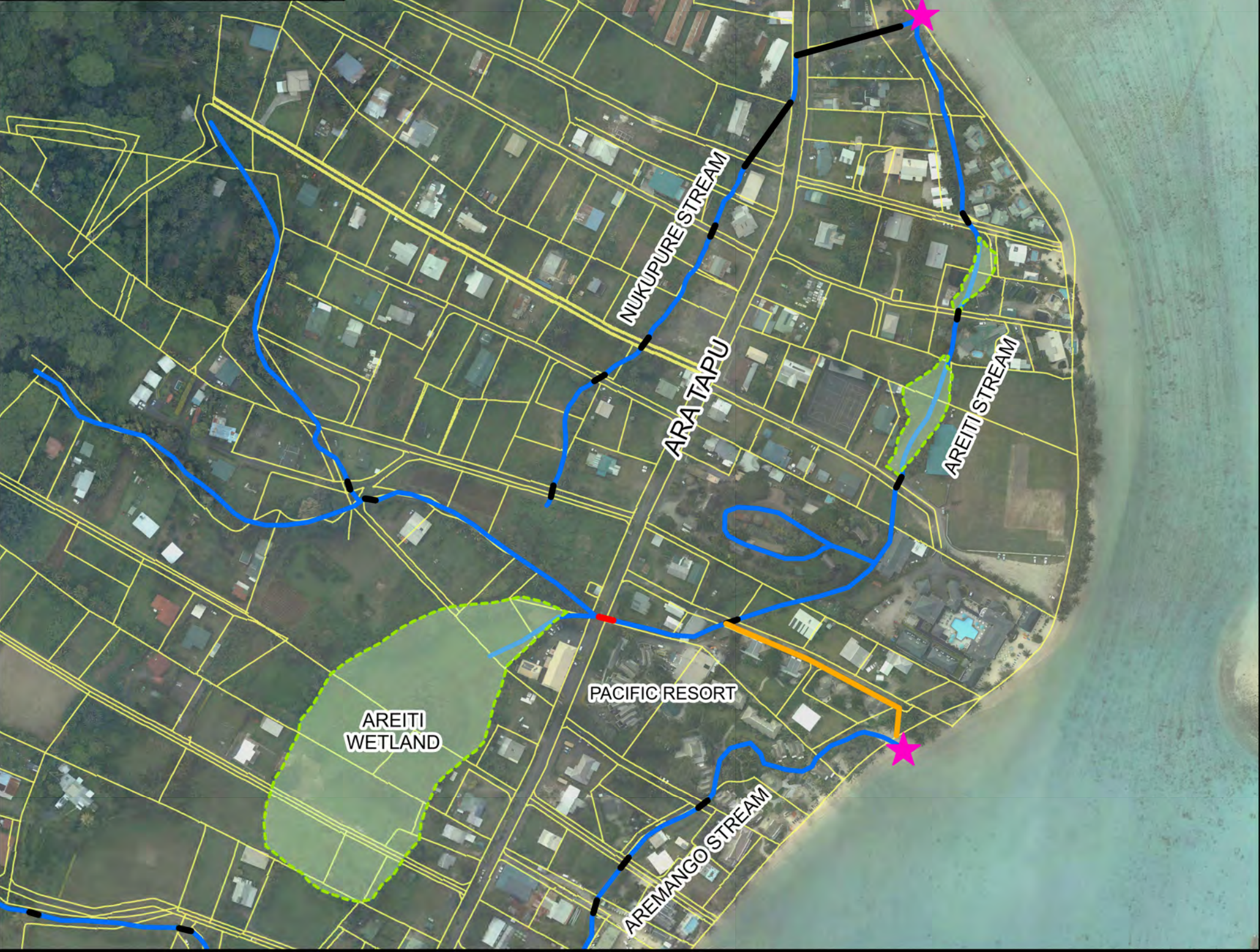
**Legend**

- Property Boundaries
- Streams

**Muri Flood Management**

- Engineered Wetland
- Culvert - Existing
- Culvert - New
- Overland Flowpath - New
- Stream / Watercourse Outlet Upgrade

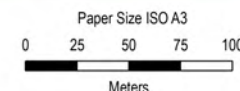
- Other potential works not shown on the drawing for clarity includes:**
  - General stream rehabilitation, riparian planting and stabilisation at selected watercourses.
  - Reinforce road embankments where road acting as stopbank.
  - Replace or upgrade damaged / undersized culverts.
  - Debris management features in streams / flow paths.
  - Maintenance access for stormwater / flood management assets.
  - Local road drainage at flood prone areas.
  - Community / educational features at constructed wetland sites (e.g. boardwalks, information boards etc).
  - Repair / replace selected sanitation infrastructure at properties adjacent to the key stormwater / flood management project locations.











**CREIC**  
**TITIKAVEKA FLOOD MANAGEMENT**  
**OVERVIEW (1 OF 3)**

Project No. 12558738  
Revision No. 1  
Date 01/05/2025

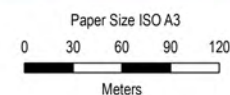
**FIGURE 1**



- Legend**
- Property Boundaries
  - Streams
  - Titikaveka Flood Management**
    - Engineered Wetland
    - Culvert - Existing
    - Culvert - New
    - Stabilisation / Erosion Protection
    - Stream / Watercourse Outlet Upgrade



- Other potential works not shown on the drawing for clarity includes:**
1. General stream rehabilitation, riparian planting and stabilisation at selected watercourses.
  2. Reinforce road embankments where road acting as stopbank.
  3. Replace or upgrade damaged / undersized culverts.
  4. Debris management features in streams / flow paths.
  5. Maintenance access for stormwater / flood management assets.
  6. Local road drainage at flood prone areas.
  7. Community / educational features at constructed wetland sites (e.g. boardwalks, information boards etc).
  8. Repair / replace selected sanitation infrastructure at properties adjacent to the key stormwater / flood management project locations.



**CREIC**

**TITIKAVEKA FLOOD MANAGEMENT**

**OVERVIEW (2 OF 3)**

Project No. 12558738  
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**FIGURE 2**



**Legend**

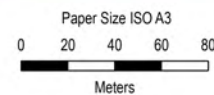
- Property Boundaries
- Streams

**Titikaveka Flood Management**

- Engineered Wetland
- Culvert - Existing
- Stream / Watercourse Outlet Upgrade



- Other potential works not shown on the drawing for clarity includes:**
1. General stream rehabilitation, riparian planting and stabilisation at selected watercourses.
  2. Reinforce road embankments where road acting as stopbank.
  3. Replace or upgrade damaged / undersized culverts.
  4. Debris management features in streams / flow paths.
  5. Maintenance access for stormwater / flood management assets.
  6. Local road drainage at flood prone areas.
  7. Community / educational features at constructed wetland sites (e.g. boardwalks, information boards etc).
  8. Repair / replace selected sanitation infrastructure at properties adjacent to the key stormwater / flood management project locations.



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**FIGURE 3**