PALLIKARANAI MARSH: A RAMSAR SITE UNDER THREAT

Blockage of Pallikaranai Marsh Vital Waterways

Okkiyam Maduvu & Perumbakkam Outlet

Chennai, Tamil Nadu, India | May - June 2026 | Reference: PAL_RAM_JUN102026

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Water Resources Department (WRD)
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Department of Environment and Climate Change
Tamil Nadu Pollution Control Board (TNPCB)
Ministry of Environment, Climate Change & Forests Department, Government of Tamil Nadu
Mudhalvarin Mugavari Department (CM Cell)

EXECUTIVE SUMMARY

Pallikaranai Marsh is one of Chennai's last surviving natural wetlands, designated a Ramsar Site in 2022 and a Reserved Forest under Tamil Nadu law. It is the primary flood buffer for south Chennai.

This report documents the active blockage of two critical drainage waterways within this system, Okkiyam Maduvu at Old Mahabalipuram Road and the Perumbakkam northern outlet, confirmed through GPS-tagged field observations in May and June 2026, independent satellite measurements, and IMD rainfall records. Both blockages are anthropogenic, active, and worsening.

The report examines two categories of concern. The first is the immediate ecological harm being caused right now: water hyacinth proliferation, sewage impoundment, loss of tidal exchange, and the documented absence of flamingos and shorebirds from Pallikaranai in 2026. The second is the permanent and irreversible risk posed by Metro viaduct pillars being installed within the active waterway, which will reduce flood discharge capacity long after construction is complete.

The concerned authorities are respectfully requested to consider the specific demands set out in Section 5, which address the restoration of both waterways, the review of Metro pillar placement, and an engineering approach that protects the waterway while supporting the Metro project. These measures represent an opportunity to deliver infrastructure and ecological protection as complementary goals, building south Chennai into a city resilient to flood and climate risk for generations to come.

This report is submitted with respect and in the public interest. It is not a challenge to the Chennai Metro project or anyone. It is a sincere request that one of Chennai's last remaining natural wetlands, and the people of south Chennai who depend on it, receive the protection and consideration they deserve.

1. PALLIKARANAI MARSH

Pallikaranai Marsh is a predominantly freshwater natural wetland located on the coastal plain of south Chennai, with partial saline influence at its eastern margin through Okkiyam Maduvu. It has been notified as a Reserved Forest under Tamil Nadu Forest Act, 1882 and was designated a Wetland of International Importance under the Ramsar Convention in 2022 (Ramsar Site No. 2481) [1,2]. The marsh plays a critical role as a natural floodplain for South Chennai and serves as an important freshwater aquifer recharge zone. It supports rich biodiversity, including more than 200 bird species such as flamingos, spot-billed pelican, Eurasian spoonbill, Pied Avocet, Great knot, Harriers, Eagles, numerous migratory ducks and waders[3,14]. Overall 625+ species of flora and fauna[35]. The ecological character of the marsh is shaped by its seasonal hydrology, freshwater levels, water flow and its tidal influence from the Bay of Bengal through the Muttukadu estuarine system near Kovalam - Buckingham Canal - Okkiyam Maduvu. This report examines the **changes in the hydrological flow** of the Pallikaranai Ramsar Site caused by the **blockage of two critical waterways** and assesses their implications for the wetland's ecological and hydrological integrity, **urges** the concerned officials for **immediate remedial action**, and requests to ensure that **no such disruption occurs** within this marsh in the future.

2. TWO CRITICAL WATERWAYS BLOCKED

Map 1: Overview map showing the locations of both documented blockages within the Pallikaranai Marsh waterway. Blockage 1 — Okkiyam Maduvu at OMR (centre right); Blockage 2 — Perumbakkam northern outlet (lower centre). Source: Google Earth, © 2026 Airbus. Map: Suzhal Arivom, May–June 2026.

Blockage 1 — Okkiyam Maduvu, Old Mahabalipuram Road (OMR)

First Field Observation — 6 May 2026

Earthworks carried inside Okkiyam Maduvu under the Old Mahabalipuram Road bridge (near Thangavel College) have severely constricted the sole principal outlet of Pallikaranai Marsh which drains the approximately 230 km² catchment area spanning from Guindy to Siruseri[4,5]. This primary outlet channel of the Pallikaranai Marsh has been reduced to less than 10 metres in width now, compared to its pre-construction width of 83.73 metres (Google Earth/Airbus, 7 March 2024). The present narrowing appears to be associated with the construction of Chennai Metro Rail pillars.

Map 2: Watershed delineation for the Okkiyam Maduvu principal outlet (Blockage 1). The Global Watersheds tool, delineated at outlet coordinates 12.923°N, 80.232°E, identifies the full Pallikaranai catchment at approximately 230 km², consistent with the Ramsar Information Sheet for Site 2481 (231 km²). The catchment extends from Old Pallavaram and Madipakkam in the north to Madambakkam and Siruseri in the south, draining through Okkiyam Maduvu as its principal outlet to the Bay of Bengal. Source: Global Watersheds Tool; Basemap

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Restriction at this single outlet chokepoint has system-wide implications. It reduces freshwater discharge and restricts the outflow of both treated and untreated sewage from South Chennai into the Bay, obstructs tidal saline ingress essential for maintaining brackish biodiversity, and critically diminishes the conveyance capacity required to manage heavy rainfall events.

If the channel is not restored to its pre-construction channel width and flow capacity, it is likely to cause substantial backflow and increase water stagnation level across the upstream catchment which is evident now. During extreme rainfall events, the reduced conveyance capacity at this critical outlet is expected to cause upstream water accumulation, prolong water stagnation, and substantially elevate flood risk across surrounding residential areas, including Velachery, Pallikaranai, Medavakkam, Perumbakkam, Sholinganallur, and Karapakkam localities that experienced severe inundation during the 2015 Chennai floods[6,7].

Both the Okkiyam Maduvu and the surrounding land at this location form part of a region directly tied and coupled with the Pallikaranai Reserved Forest, notified under G.O.Ms.No.52 dated 9 April 2007 and subsequent Government Orders, and formally consolidated as 697.96 hectares under G.O.(MS).No.62 dated 10.05.2018, and now designated a Ramsar Wetland of International Importance (Site No. 2481). The blockage documented here falls within the officially designated Ramsar boundary[20].

Fig 1 — Blockage made under the road Okkiyam Maduvu (06-05-2026)

Fig 2 — Dense hyacinth mat direct indicator of stagnation from blocked flow (06-05-2026)

Second Field Observation — 18 May 2026

Twelve days after the initial field study, the blockage at Okkiyam Maduvu remains unaddressed. Ongoing bridge construction and associated earthworks continue to severely restrict the channel. Notably, water hyacinth (*Eichhornia crassipes*) has now proliferated across both upstream and downstream sections of the obstruction, confirming the complete cessation of tidal flushing. The channel that once connected the marsh to the Bay of Bengal has effectively transformed into a stagnant retention pond.

Fig 3 — Okkiyam Maduvu bridge blockage, 18-05-2026. GPS: 12.922953, 80.231012

Fig 4 — Dense mat confirms complete cessation of tidal flow and can see mud dumping. GPS: 12.92307, 80.230853

Satellite Evidence - Verified Channel Width Comparison (Google Earth / Airbus)

Independent satellite imagery confirms the change in channel width. Measurements taken with the Google Earth ruler tool on Airbus imagery at GPS coordinates 12.923422°N, 80.230155°E show the Okkiyam Maduvu inlet channel at its pre-construction width of 83.73 metres in March 2024, and at a constricted width of 7.89 metres recently in April 2026. This represents an approximate 91% reduction in width. Both dates were selected based on the available satellite image dataset.

Fig 5 — Before: Okkiyam Maduvu, March 2024. Pre-construction channel width: 83.73 m. Imagery: © 2024 Airbus / Google Earth.

Fig 6 — After: Okkiyam Maduvu, April 2026. Current constricted width: 7.89 m (about 91% of width lost). Imagery: © 2026 Airbus / Google Earth.

Note: Both measurements were made using Google Earth Pro ruler tool on Airbus satellite imagery at the same GPS coordinates. The imagery dates (7 March 2024 and 26 April 2026) are as displayed by Google Earth and attributed to Airbus. These measurements are consistent with the third field observation documented on 26 May 2026 (Figs 7–10).

Note on figures: The 83.73-metre pre-construction width and the 7.89-metre current constriction are both measured at GPS 12.923422°N, 80.230155°E, a point in the natural approach channel south of the bridge structure where the current obstruction is located. The channel widths at the bridge crossing itself (C = 140.11 m, D = 150.77 m, E = 200.02 m in the channel profile table) are measured at different GPS coordinates at the bridge structure and reflect the designed dimensions of the newly widened crossing. Natural channel width varies along the 2.8 km length as documented across all ten measurement points. All figures are internally consistent and drawn from the same Airbus imagery dataset

Third Field Observation — 26 May 2026

Field observation on 26 May 2026 documents active construction of Chennai Metro Rail Limited pillars within the Okkiyam Maduvu channel in-between the OMR bridge. The wider flow of channel has been severely restricted to a narrow canal of less than 10 metres. This construction is consistent with Chennai Metro Phase 2 Corridor-3 elevated viaduct works, installing permanent pier columns within the waterway. The date on which the constriction reached its current extent is not known.

Two distinct concerns arise:

(i) Temporary risk during construction: During the construction phase, if heavy rainfall, extreme downpours, or cloudburst events occur while the cofferdam, earthworks, and temporary bunds remain

in place, the channel's ability to drain stormwater from South Chennai will be severely obstructed. This obstruction would cause widespread water stagnation across urban settlements, recreating the flood like conditions documented during Cyclone Michaung in December 2023[10].

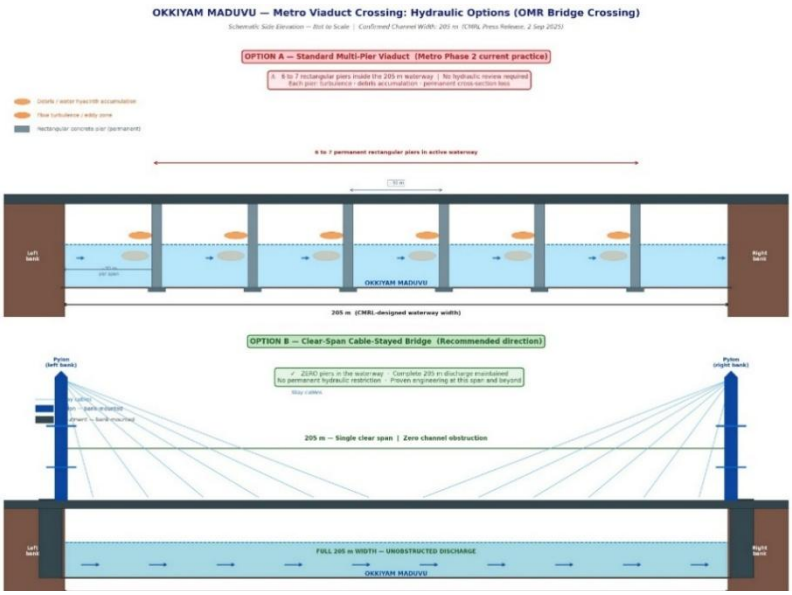
(ii) Permanent risk post-construction: Field observations conducted in May 2026 confirm three to four permanent foundation pits for Chennai Metro Phase 2 Corridor 3 viaduct pillars actively under excavation within the hydraulic cross-section of Okkiyam Maduvu. Each pillar installed within this cross-section constitutes a permanent and irreversible restriction on the channel's flood discharge capacity at the primary drainage outlet of Pallikaranai marsh. The direct consequences are a reduced discharge cross-section, extended floodwater recession time, and higher and more prolonged inundation of surrounding areas during every subsequent extreme rainfall event.

It may be argued that the current cofferdam, earthworks, and earth bund within the channel are temporary construction measures that will be removed once the Metro viaduct is operational. This reasoning addresses only part of the concern and does not resolve either risk.

The temporary obstruction is causing immediate, ongoing ecological harm. Tidal and drainage flow through Okkiyam Maduvu has been reduced to a fraction of its natural volume, triggering explosive water hyacinth proliferation across the channel, depleting dissolved oxygen, and contributing to the documented absence of flamingos and shorebirds from Pallikaranai in 2026. At Perumbakkam, the simultaneous blockage of the southern outlet has left sewage from the southern sub-catchment with no viable exit, causing abnormal inundation across the Sholinganallur and Perumbakkam marshlands during the dry season, confirmed by IMD zero-rainfall data. May and June are the active breeding season for resident waterbirds; every additional day of obstruction compounds ecological damage that cannot be undone. Both construction obstructions must be removed immediately and natural flow through both waterways restored without delay, ahead of the Northeast Monsoon.

The permanent risk is separate and distinct. Metro viaduct pillars installed within the waterway will remain after all temporary works are removed, and each pillar placed is irreversible. This risk is addressed in full in the hydraulic analysis that follows and is the subject of Demand Row 5.

Fig 22 below presents a conceptual illustration of the clear-span engineering principle as a directional reference, not a prescribed design. The appropriate solution must be determined through the independent hydraulic review demanded in Row 5.



Reference precedents (confirmed): (1) Øresund Fixed Link, Denmark–Sweden (2000) — cable-stayed, 490 m main span; carries Øresundsbanen railway and E20 motorway. (2) Chenab Rail Bridge, Jammu and Kashmir (2024) — steel arch, 467 m main span; carries Udhampur–Srinagar railway. Both exceed the 205 m Okkiyam Maduvu span requirement. Channel width 205 m: CMRL Press Release, 2 September 2025. Span module approximately 35 m: L&T–CMRL Phase 2 contract, Okkiyampet–Karapakkam section, January 2024

Fig 22 — Okkiyam Maduvu OMR crossing: Current multi-pier Metro viaduct practice (Option A) vs. recommended clear-span cable-stayed bridge (Option B).

Option A, the current approach, involves constructing three to four permanent circular piers within the Okkiyam Maduvu, without any independent hydraulic assessment.

In contrast, Option B demonstrates the engineering principle of a clear-span bridge, which avoids mid-channel obstructions and preserves the full channel width.

This is presented as a directional concept rather than a prescribed design. Contemporary sustainable bridge engineering offers multiple proven clear-span solutions for spans of this scale and beyond.

The most appropriate solution must be determined through an independent hydraulic review and a best-available sustainable engineering evaluation before any permanent structure is introduced into this waterway, as highlighted in Demand Row 5.

Fig 7 View from beneath existing road bridge: flow cross-section reduced to 7.89 metres (Google Earth / Airbus, 26 April 2026).

Fig 8 Construction works inside Okkiyam Maduvu; pre-construction channel width significantly constricted.

Fig 9 — Under-bridge view and work carried inside the Okkiyam Maduvu

Fig 10 — Wide-angle view showing scale of earthwork inside the waterway.

Operational note: The existing cofferdam, earthworks, and earth bund within Okkiyam Maduvu may require an estimated 2–3 working days of mechanised excavation and removal. Consequently, during an intense rainfall event, it would be practically impossible to restore the channel's full carrying capacity within a few hours, thereby increasing the risk of prolonged water stagnation and flooding.

Hydraulic Impact of the Okkiyam Maduvu Crossing: Why the Widening Has Not Resolved the Flood Risk

Cyclone Michaung in December 2023 identified Okkiyam Maduvu as a critical failure point: the Tamil Nadu Chief Secretary publicly stated that obstruction at this crossing caused the delayed drainage of south Chennai during the event.[10] The original bridge carried a waterway span of approximately 90 metres. In response, the Water Resources Department commissioned a replacement structure, completed in 2025, widening the waterway through three 40-metre steel spans with 1.5 metres of additional vertical clearance, explicitly described as a flood-mitigation investment.[37] The widened waterway measures 140.11 metres at the inlet face where floodwater first enters the crossing, and 200.02 metres at the outlet face, the point from which CMRL cites the figure of 205 metres. The observations in this submission concern permanent Metro viaduct pillars now being installed within that same widened waterway, directly undermining the purpose for which the public investment was made.

Channel profile: Ten measured points from marsh to canal

The table below documents the channel width at ten successive points along the full 2.8 km length of Okkiyam Maduvu, from its origin at the Pallikaranai marsh to its confluence with the Buckingham Canal. Measurements were taken using the Google Earth Pro ruler tool on Airbus imagery dated April 2026. Points C, D and E are independently confirmed with the ruler tool at GPS coordinates 12°55′32.17″N / 80°13′41.76″E, 12°55′27.48″N / 80°13′50.76″E and 12°55′31.80″N / 80°13′38.88″E respectively. All widths are measured at channel water surface.

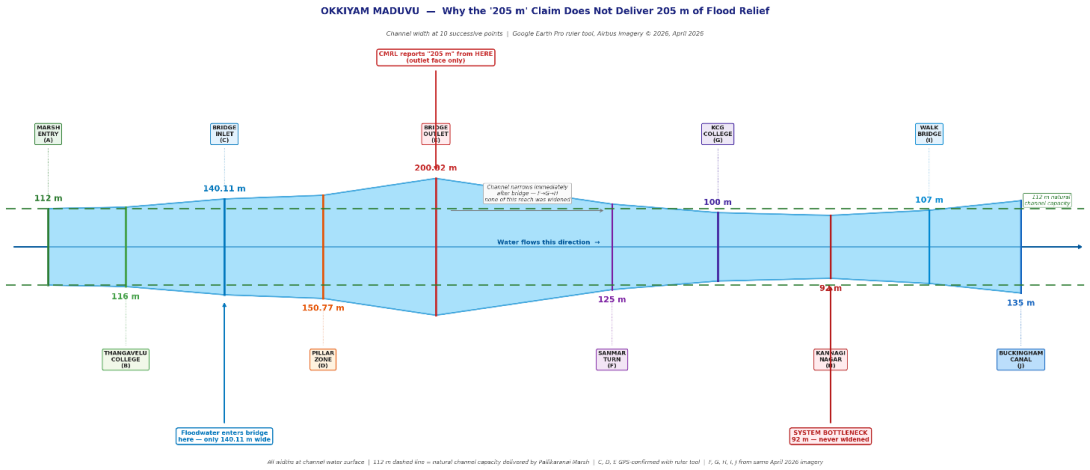


Fig 23 — Okkiyam Maduvu: measured channel width at ten successive points, Pallikaranai Marsh to Buckingham Canal. Source: Google Earth Pro ruler tool, Airbus imagery © 2026, April 2026.

Point	Width (m)	Location	Note
A	112	First entry from Pallikaranai marsh	Natural upstream channel
B	116	Thangavelu College	Natural channel
C	140.11	Bridge inlet	Floodwater enters bridge here
D	150.77	Bridge pillar zone	Metro construction zone
E	200.02	Bridge outlet	CMRL measures "205 m" here
F	125	Sanmar Turn	Narrows immediately post-bridge
G	100	KCG College Road	Continues narrowing
H	92	Kannagi Nagar	System bottleneck: governs entire catchment discharge
I	107	Kannagi Nagar Walk Bridge	Slight recovery
J	**135**	Buckingham Canal confluence	End of channel

The data reveals a fundamental hydraulic reality that the single "205 metre" figure obscures. CMRL's figure is measured at the outlet face (E = 200.02 m), the widest point of the crossing and downstream of all in-channel structures. Floodwater from the Pallikaranai marsh enters the crossing at the inlet face (C = 140.11 m), approached by a natural channel of only 112 to 116 metres. Downstream of the bridge, the channel narrows immediately and progressively: 125 m at Sanmar Turn (F), 100 m at KCG College Road (G), and 92 m at Kannagi Nagar (H). This last figure is the binding hydraulic constraint of the entire 230 km² catchment. The system can only discharge water as fast as its narrowest section permits, and H = 92 metres has never been addressed by any widening or remediation programme. The widening investment addressed only points C to E. The constraint that governs flood outcomes lies at H, unaddressed and unacknowledged.

Permanent structures being installed within the widened waterway

The table above and Fig 23 together map the measured channel widths against the three rows of permanent structures within the crossing. Three road bridge pillars are in place at the narrower inlet face (C = 140.11 m, where floodwater first enters the crossing) and four road bridge pillars at the wider outlet face (E = 200.02 m), seven road bridge pillars in total. Three to four Metro viaduct foundation pits are under active installation in the central pillar zone (D = 150.77 m), and a further three to four independent elevated road columns are committed within the same waterway alignment under a separate future construction phase. The cumulative effect of **thirteen to fifteen permanent pillars** and their bed-level pile cap foundations is an effective hydraulic opening that progressively approaches the approximately 90-metre width of the original bridge, the very restriction the widening was undertaken to remedy. This erosion of the widening's benefit is most acute at the inlet face: it is at C = 140.11 m, not at the 200-metre outlet, that the hydraulic capacity of the entire crossing is ultimately determined.

Why these structures are not a minor obstruction

It may be contended that three to four Metro viaduct foundations, with approximately 35 metres between adjacent foundation pit edges, represent only a limited physical obstruction within the widened waterway. This reasoning does not hold under hydraulic examination.

Okkiyam Maduvu drains a **flat coastal plain** where the gradient driving water toward the Buckingham Canal is minimal. In flat coastal terrain, even modest in-channel structures create afflux, a rise in upstream water level, whose effect is disproportionate to their physical size, because there is insufficient driving head to push water through the reduced opening at the required rate. The obstruction here is not one structure: three road bridge pillars at the inlet, three to four Metro viaduct foundations in the pillar zone, and four road bridge pillars at the outlet create three sequential rows of permanent resistance. Each row compounds the last: turbulence generated by upstream structures amplifies the hydraulic resistance of every downstream row, producing a combined obstruction far greater than the sum of individual pier dimensions.

At Okkiyam Maduvu, three road bridge hammerhead pillars at the inlet face, three to four Metro foundation pits in the central pillar zone, and four road bridge hammerhead pillars at the outlet face form three successive transverse rows within the single bridge crossing zone. A further three to four independent elevated road columns, confirmed under a separate future construction phase per CMRL's own EIA, will be placed within the same waterway alignment, each structurally independent from the Metro columns and each adding permanent obstruction to the rows already in place. The critical question during a flood event is not whether water eventually passes through: it is how fast. The 230 km² catchment generates peak discharge over a 6 to 12 hour window; every reduction in discharge rate during that window raises flood levels directly across south Chennai's affected localities.

Three hydraulic effects make pier resistance worse at peak flood, not better. First, hydraulic drag on each pier is proportional to the square of flow velocity ($F = \frac{1}{2}C_d\rho V^2A$); as flood velocities rise, pier drag increases disproportionately, and the structures become more obstructive as the flood intensifies, not less. Second, the wide rectangular hammerhead pier caps sit above normal water level but engage fully as flood water rises: the rectangular cross-section carries a drag coefficient up to 80 per cent greater than the circular Metro column beneath it, per pier shape coefficients established in Yarnell (1934)[38] and incorporated in IRC:89[39]. Third, floating debris and water hyacinth, already visibly accumulating against construction works during the dry season, pile against upstream pier faces at flood stage, progressively reducing the effective waterway between structures beyond what structural dimensions alone suggest.

Foundation excavation pits confirmed at approximately 12 metres at each Metro pillar location indicate a foundation scale substantially larger than the 1.5 to 1.7 metre column diameter specified in the CMRL Phase II DPR. The precise permanent hydraulic footprint at channel bed level cannot be confirmed without design drawings, which have not been publicly disclosed.

With the downstream bottleneck at H = 92 metres already constraining the system, and thirteen to fifteen permanent pier structures compounding resistance across the crossing, the considerable public investment made to widen this bridge risks being systematically undermined before it delivers a single flood season of benefit.

The installation of Metro viaduct pillars within Okkiyam Maduvu is not an engineering inevitability. CMRL's own Phase II DPR provides special long-span configurations of up to 75+105+75 metres for wide canal crossings, recognising that standard spans are unsuitable for waterways of this type. An integrated clear-span structure, as illustrated in Fig 22 Option B, would carry both the Metro rail line and the future elevated road with abutments on the channel banks and zero pillars within the active waterway.

The Øresund Fixed Link between Denmark and Sweden (road and rail on two independent levels, 490 metres, commissioned 2000) and the Chenab Rail Bridge in Jammu and Kashmir (467 metres, Indian Railways, commissioned 2024) confirm that integrated multi-function structures of the scale required at Okkiyam Maduvu are proven, operational engineering. CMRL has the engineering capability and the DPR provision to adopt the clear-span alternative. Doing so would not only protect the flood mitigation investment already made at this crossing but would position Chennai Metro as a model for climate-resilient urban infrastructure, delivering mobility and flood safety together for the people of south Chennai.

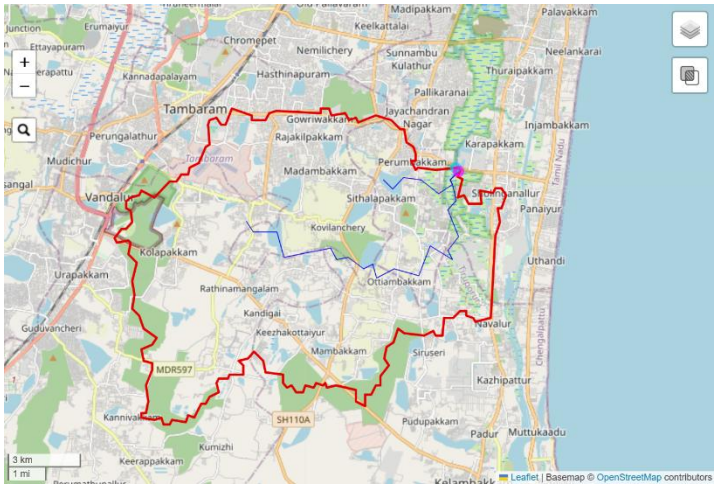
An independent hydraulic assessment under IRC:5 and IRC:89 is the only means of quantifying the combined effect of these rows, present and planned, on peak flood discharge rate before further permanent structures are placed within this waterway.

We respectfully submit that CMRL should immediately pause pillar installation within Okkiyam Maduvu and adopt the integrated clear-span alternative, as formally demanded in Row 5 of the Demands Table below.

Blockage 2 — Perumbakkam Outlet (Southern Sub-basin)

First Field Observation — 14 May 2026

The Perumbakkam outlet is the principal drainage pathway for the southern part of the Pallikaranai marsh complex. The seasonal water, sewage, and freshwater flow from south catchment area marked in below map flow through this Perumbakkam outlet into Okkiyam Maduvu[4].



Map 3: *Watershed delineation for the Perumbakkam northern outlet (Blockage 2). The Global Watersheds tool, delineated at outlet coordinates 12.902°N, 80.214°E, identifies a sub-catchment of approximately 140 km² draining to this outlet. This represents the southern sub-basin of the Pallikaranai catchment. Source: Global Watersheds Tool.*
Basemap © OpenStreetMap contributors.

This channel has been blocked by construction debris, demolition rubble, and structural filling. With the drainage capacity of the southern sub-basin effectively cut off, impounded water has no viable outlet, resulting in the unusual dry-season flooding observed within the Sholinganallur and Perumbakkam protected marshlands9. Refer below Section 3. The Perumbakkam northern outlet is a region directly tied and coupled with the Pallikaranai Reserved Forest and falls within the officially designated Ramsar boundary (Site No. 2481).

Fig 11 Perumbakkam outlet blockage; construction fill has severed the northward drainage channel (14-05-2026)

Fig 12 Heavily restricted remaining water way (14-05-2026)

Second Field Observation — 18 May 2026

Conditions within the Perumbakkam–Sholinganallur Marsh have deteriorated further. Despite mid-May typically being the dry period of the year, large areas of the marsh interior continue to retain standing water with no observable signs of recession. The waterway traversing the marsh is now completely covered by dense algal growth and aquatic vegetation, indicating prolonged water stagnation and severely restricted water movement. The persistent blockage at the northern outlet near Perumbakkam continues to impound water within the marsh, leaving it without an effective drainage pathway. As a consequence, visible invasive aquatic vegetation is increasingly spreading into the marsh interior, further degrading the ecological health and hydrological functioning of this critical wetland ecosystem.

Fig 13 — Perumbakkam blockage site, 18-05-2026. Due to blockage invasive Water Hyacinth has extensively grown.

Fig 14 — Marsh interior, Perumbakkam, 18-05-2026. Standing water and invasive aquatic cover persist in mid-May

3. GROUND EVIDENCE — MARSH IN DISTRESS

Southern Sector – Sholinganallur & Perumbakkam Marsh (6 May 2026 & 18 May 2026)

May is typically the drying month in the Pallikaranai marsh - mudflats dominate and water is minimal. Photographs taken on 6 May 2026 confirmed by IMD Regional Meteorological Centre Chennai as falling within a zero-rainfall week for Chennai district (Week 30 April–6 May 2026: Chennai - No Rain; Chengalpattu - Largely Deficient; IMD Weekly Weather Report dated 6 May 2026)[26] show the marsh abnormally inundated under dry ambient conditions. This is not rainwater. It is accumulated sewage run-off with no exit, trapped by the Perumbakkam blockage.

Fig 15 Sholinganallur Perumbakkam marsh, May 06, 2026. Abnormal water retention in the dry season. GPS: 12.901115, 80.221933 [9]

Fig 16 Same site May 18, 2026 Water logged where dry-season mudflats should exist; no recent rainfall confirms anthropogenic inundation caused by the blocked Perumbakkam outlet.

Northern Sector — Pallikaranai Marsh near Perungudi Dumpyard (30 May 2026)

On 30 May 2026, field observations recorded abnormal waterlogging in the northern sector of Pallikaranai Marsh, opposite the Perungudi dumpyard — an area typically used by flamingos for foraging at this time of year. Large portions of the marsh surface were covered by dense mats of invasive water hyacinth (*Eichhornia crassipes*) (Figs. 18, 20). The sustained inundation during the peak dry season is consistent with the closure of Okkiyam Maduvu, which has blocked northward drainage. This condition is further exacerbated by continuous sewage inflows and leachate seepage from the adjacent Perungudi dumpyard, an unlined municipal solid waste site where untreated leachate has been documented discharging directly into the marshland.[19]

Fig 17 — Northern Pallikaranai marsh holding more polluted water in peak dry season consistent with blocked northward drainage at Okkiyam Maduvu. 30 May 2026

Fig 18 — Northern marsh, 30 May 2026. Water hyacinth and reeds covering standing water; open water channel visible. GPS: 12.949507, 80.225937

Fig 19 — Northern marsh, Exposed mudflat with visible black effluent consistent with leachate seepage from adjacent Perungudi dumpyard 30 May 2026

Fig 20 — Explosive growth of invasive water hyacinth in the northern marsh waterway. 30 May 2026

4. ECOLOGICAL CONSEQUENCES

4.1 Loss of Seasonal Mudflat Habitat

The prolonged inundation has eliminated dry-season mudflats which are critical and irreplaceable foraging habitats for return migratory shorebirds returning along the Central Asian Flyway, as well as breeding grounds for resident ground-nesting waterbirds such as stilts, plovers, lapwings, jacanas, snipes, and several duck species.

4.2 Tidal Exchange & Brackish-water Biodiversity

Okkiyam Maduvu serves as the sole brackish-water link between the Pallikaranai Marsh and the Bay of Bengal at Muttukadu. This 2.8 km channel delivers a saline pulse into the marsh, maintaining the brackish conditions that characterize the wetland near its outlet[12]. Disruption of this tidal exchange progressively degrades the marsh's brackish-water ecology. These brackish conditions make Pallikaranai one of the very few urban wetlands in India known to support both the Greater Flamingo and Lesser Flamingo. These flamingos depend on shallow saline-to-brackish waters that sustain cyanobacteria, brine shrimp, and other specialised food resources.

This year (January 01 to June 15, 2026), no flamingos have been recorded in any part of Pallikaranai Marsh, based on both our field surveys and confirming records from eBird hotspot observations. The complete absence of flamingos in Pallikaranai Marsh this year highlights a critical disruption of the marsh’s brackish ecology, signaling severe habitat stress and loss of ecological function[29]

4.3 Stagnation and Water Quality Degradation

Impounded sewage run-off with no outlet degrades water quality rapidly - depleting dissolved oxygen and rendering the marsh hostile to the very species it is mandated to protect.

4.4 Water Hyacinth & Invasive Catfish Proliferation

Stagnant, sewage-enriched conditions across Okkiyam Maduvu and the Perumbakkam marshland, caused by blockage, have triggered explosive proliferation of invasive **water hyacinth (*Eichhornia crassipes*).** This species suppresses native aquatic vegetation, blocks sunlight, depletes oxygen, and creates hypoxic dead zones. The same conditions favour the invasive non-native **African catfish (*Clarias gariepinus*),** bottom-dwelling predators highly tolerant of low-oxygen, sewage-laden waters. These catfish prey on native fish, their eggs, amphibians, and invertebrate fauna critical to sustaining bird populations. While seasonal drying of marshes normally limits their survival, persistent stagnation now enables a prolific increase of this invasive species, undermining natural ecological regulation..

4.5 Loss of Flood-Buffering Capacity

Chennai receives nearly 50% of its annual rainfall during the Northeast Monsoon (October–December)[13]. The Pallikaranai marsh is the primary flood buffer for an approximately 230 km² catchment, and Okkiyam Maduvu is its sole principal outlet[4,5,6]. With this outlet currently obstructed, the system loses its capacity to absorb and discharge monsoon runoff. The hydrological importance of Okkiyam Maduvu is established in the State Government's own record:

- December 2023 — The Tamil Nadu Chief Secretary, on the record during Cyclone Michaung, stated that delay in draining south Chennai was caused by obstruction in Okkiyam Maduvu, the main canal for areas including Pallikaranai, Velachery, and Madipakkam[10].
- August 2025 — The Chief Secretary inspected ongoing deepening works at Okkiyam Maduvu aimed at increasing rainwater storage and flood mitigation capacity[15].
- Official Ramsar RIS (Site No. 2481, 2022) — Roads and Railroads listed as a **High Impact** threat under Transportation and Service Corridors: “Development of transportation facilities all along the drainage systems has aggravated and impaired the rain water carrying capacity of the few existing waterways around the marsh.”[2]

If the present obstructions are not cleared before the Northeast Monsoon, the marsh cannot perform its flood-buffering function during the most critical rainfall period of the year. The Perumbakkam blockage additionally prevents the southern sub-basin from draining into Okkiyam Maduvu, further loading an already compromised system. *A strong El Niño warning at this time must also be taken into account[34].*

When the primary discharge outlet of an approximately 230 km² catchment is reduced to 7.89 metres approximately 4% of the 200 metre discharge width that CMRL and the Water Resources Department formally designed to prevent Michaung-class flooding, discharge capacity collapses proportionally.

During an intense rainfall event accumulated runoff from south Chennai’s catchment cannot exit the system at the required rate. The water has no alternative pathway: it backs up into the marsh, overflows into feeder drains, and inundates streets, underpasses, and ground-floor structures across the nearby urban settlements - Velachery, Pallikaranai, Medavakkam, Perumbakkam, Sholinganallur, and Karapakkam.

The counter-argument that water will ‘drain slowly’ misrepresents the hydraulic reality: flood discharge is time-critical. The storm does not slow to accommodate a blocked outlet. South Chennai’s flood resilience depends on the Okkiyam Maduvu discharging at full capacity during the storm, not after it.

4.6 Ramsar Violation and Bird Population Loss

Media reports from May 2026 confirm the disappearance of waders and other shore birds from the marsh directly linked to altered water levels [8]. This constitutes a measurable, documented deterioration of the ecological character of a Ramsar Site - a violation of India's obligations under the Ramsar Convention (1971) [2]. The State's own Ramsar Information Sheet records hydrology management/restoration as already implemented and identifies no need for a site restoration plan[2] - entries directly contradicted by the approximately 91% channel constriction and dry-season inundation documented in this report.

பள்ளிக்கரணை சதுப்பு நிலத்தில் நீர்மட்டம் திடீர் உயர்வு: உள்ளான் பறவைகள் மாயம்

Fig 21 — Tamil newspaper, May 2026:

Rise in water levels at Pallikaranai wetland causing disappearance of waders and shore birds - ecosystem disrupted by altered hydrology[8]

4.7 Disruption of Ground-Nesting Bird Breeding

Prolonged inundation during May – June, the natural breeding season for resident ground-nesting and marsh-vegetation-nesting species has removed the dry mudflats, low islands, and exposed sandbars that normally serve as ground nesting sites. As a result, critical substrates required for successful breeding are unavailable, directly threatening reproductive success and population resilience.

Pallikaranai is a documented breeding ground for resident species including Black-winged Stilt (*Himantopus himantopus),* Red-wattled Lapwing (*Vanellus indicus*), Pheasant-tailed Jacana (*Hydrophasianus chirurgus*), Bronze-winged Jacana (*Metopidius indicus*), Little Ringed Plover (*Charadrius dubius*), Greater Painted-snipe (*Rostratula benghalensis*), White-breasted Waterhen (*Amaurornis phoenicurus*), Grey headed swamphen (*Porphyrio poliocephalus*), Eurasian Moorhen (*Gallinula chloropus*), Eurasian Coot (*Fulica atra*), and various duck species[14,18]. When water flows are disrupted during the breeding season, bird populations face severe reproductive setbacks that can persist for years. This loss of breeding creates a cascading void, leaving upcoming migratory raptors without the prey base and ecological support they depend on. The current ecological degradation, habitat destruction coupled with construction noise and vibrations, will severely affect the birds' breeding behavior and may push them into substandard habitats, worsening their survival prospects.

4.8 Risk of Inclusion in the Ramsar Montreux Record

Under Article 3.2 of the Ramsar Convention, India is obliged to notify the Ramsar Secretariat of any change in the ecological character of a designated site arising from human interference. The documented hydrological alteration of Pallikaranai supported by the field evidence presented in this report and by independent media reporting of bird population decline[8] constitutes such a change. The significance at stake is considerable: Pallikaranai qualifies under seven Ramsar criteria (1, 2, 3, 4, 6, 7 and 8), supports eight waterbird species at more than 1% of their regional populations, and hosts 18 species of international conservation significance[2]. Continued alteration may invite consideration of the site for inclusion in the Montreux Record, Ramsar's register of wetlands where changes in ecological character have occurred, are occurring, or are likely to occur[17].

4.9 Legal and Regulatory Violations

The construction activities documented in this report violate multiple independent legal principles and international obligations.

Wetlands (Conservation and Management) Rules, 2017, notified under the Environment (Protection) Act, 1986 prohibits encroachment of any kind, conversion to non-wetland use, and any construction activities that threaten the ecological character of wetlands (Rule 4(2)). This prohibition strictly applies to designated 'Wetlands of International Importance' under the Ramsar Convention (Rule 3a). As a notified Ramsar Site (No. 2481), the Pallikaranai marsh falls under these protections. Consequently, the placement of permanent Metro viaduct pillars within the primary discharge outlet of this site constitutes a direct encroachment and permanent construction within the wetland's hydraulic zone of influence.

Indian courts and tribunals have consistently upheld protection of Ramsar wetlands. In December 2024, the Supreme Court directed all High Courts to initiate conservation proceedings for Ramsar sites nationwide. The National Green Tribunal Southern Bench, in September 2025, restrained CMDA from issuing building approvals in and around Pallikaranai pending scientific boundary determination. These interventions confirm that permanent obstruction of a Ramsar site's primary drainage outlet is subject to judicial scrutiny and corrective action under Indian environmental law.

The Madras High Court has established that structures placed inside active waterways by any agency, including government infrastructure bodies, constitute encroachments that must be removed. In V. Kanagasundaram v. State of Tamil Nadu (June 2025), the court ordered removal of all structures across the Adyar Creek within eight weeks and held the Secretary of Water Resources Department and the Commissioner of Greater Chennai Corporation personally responsible for compliance. In a connected matter, the court directed demarcation of the Buckingham Canal and explicitly identified MRTS stations and government structures within the canal as encroachments that have disabled its flood moderating function. Okkiyam Maduvu discharges directly into that same canal system. The principle is established: government transport infrastructure placed inside a waterway is an encroachment regardless of the agency responsible.

In O.A. No.91 of 2023 (SZ), the National Green Tribunal Southern Bench, in its judgment dated 24 September 2025, registered the case specifically to prevent permanent structures within the Pallikaranai wetland and its zone of influence. The Tribunal's own judgment identifies Okkiyam Maduvu as the drainage terminus of the marsh system, and TNSWA's submissions before the Tribunal place it within the zone of influence by the State's own definition. The Tribunal directed that WRD, TNSWA and CMDA shall not grant any approvals that may alter the character of the marshland until the Integrated Management Plan is completed. The IMP has not been completed. Permanent pier construction within Okkiyam Maduvu, documented in May and June 2026, is precisely the category of intervention the Tribunal's proceedings were registered to prevent.[32]

By Office Order No.07/2025, effective 06.10.2025, the Chennai Metropolitan Development Authority directed all its divisions not to grant any approval, sanction or permission for developments within the Ramsar Site boundary and its one-kilometre zone of influence. The official map enclosed with that order places the Okkiyam Maduvu channel within the Ramsar Site boundary itself. Permanent foundation pit excavation and pillar construction within that channel, documented in May and June 2026, took place seven to eight months after this order came into effect. We recognise that construction approvals for some of these works may have been obtained prior to this order or the underlying Tribunal directions. However, a prior approval does not exempt ongoing construction activities from the obligations created by subsequent judicial and regulatory orders. We respectfully request the Tamil Nadu Forest Department, TNSWA, CMDA, and all other responsible bodies to cross-check and re-validate the current construction activities at Okkiyam Maduvu against the CMDA Office Order No.07/2025, the NGT directions in O.A. No.91 of 2023, and all applicable statutory obligations, and to confirm in writing whether the ongoing works are consistent with each of these instruments.[33]

Ramsar Convention, Article 3.2. India has been a Contracting Party since 1 February 1982. Article 3.2 requires India to inform the Ramsar Secretariat when the ecological character of a designated site has changed, is changing, or is likely to change as a result of human interference. The progressive constriction of the primary outlet of Pallikaranai Ramsar Site and the permanent placement of viaduct pillars within that outlet constitutes a change in ecological character. No such notification to the Ramsar Secretariat has been made.

Gaps in CMRL EIA:

The Corridor-3 EIA report publicly available from CMRL confirms it was prepared for Multilateral Development Bank financing conditions, not Indian regulatory compliance. It nonetheless misclassifies Pallikaranai as "not a protected ecosensitive area" using a stated distance of 3 km from the alignment, while its own avifauna section places the alignment within 0.5 km of the same wetland disregarding Pallikaranai's Reserved Forest status dating from 2007, fifteen years before the EIA was finalised and consolidated as 697.96 hectares under G.O.(MS).No.62 in 2018; dismisses flood risk by citing the marsh's water storage capacity while assessing construction that blocks its primary drainage outlet; and was finalised on 6 April 2022, two days before the Ramsar designation, with no subsequent reassessment. No hydraulic impact assessment of the Okkiyam Maduvu crossing exists in either document.

CMRL's own EIA for Corridor 3 confirms that the Metro viaduct at this location is a two-level structure, with the Metro rail line on the upper level and space reserved for a future elevated road below. That future elevated road will require its own structurally independent column set within the same waterway alignment, substantially increasing the permanent in-channel structure count beyond what is currently under construction. Across three independent construction phases, road bridge, Metro viaduct and future elevated road, permanent obstruction within Okkiyam Maduvu will grow progressively, each phase compounding the last and each irreversible. No independent hydraulic assessment has been conducted for any of the three phases.

5. DEMANDS — IMMEDIATE ACTION REQUIRED

The closure of these waterways is ecologically unacceptable and unjustifiable. Pallikaranai Marsh, designated as a Ramsar Site and also classified as Reserved Forest, cannot have its ecological and hydrological character altered without holistic assessment across the full Okkiyam Maduvu channel and its ramifications on broader Pallikaranai Marsh ecosystem. Such actions may constitute a breach of India's statutory obligations and international commitments for wetland protection.

The following demands are addressed to: Tamil Nadu State Wetland Authority (TNSWA), Greater Chennai Corporation (GCC), Tamil Nadu Public Works Department (TNPWD), Tamil Nadu Forest Department, Chennai Metro Rail Limited (CMRL), Chennai Metropolitan Development Authority (CMDA), Tamil Nadu State Disaster Management Authority and the Ministry of Environment, Forest and Climate Change (MoEFCC). We respectfully request the Tamil Nadu State Wetland Authority (TNSWA) to take ownership of the follow-up actions and initiate the necessary measures to safeguard the Pallikaranai Marsh — a Ramsar Site and the ecological pride of Chennai.

Note: Physical clearing of the current cofferdam, earthworks and earth bund from inside Okkiyam Maduvu is estimated to require 2–3 working days of mechanised work.

#	ACTION	LOCATION	WHAT MUST BE DONE	RESPONSIBLE AGENCY	TIMELINE
1	**RESTORE OKKIYAM MADUVU CROSS-SECTION (REMOVE BLOCKAGE 1)**	Okkiyam Maduvu under OMR (near Thangavel College / SANMAR compound)	Clear all temporary cofferdam, earthwork, and any newly constructed temporary structure inside the channel. All construction-related obstructions to be removed.	CMRL / WRD / TNPWD / TNSWA	**Immediate**
2	**RESTORE PERUMBAKKAM OUTLET (REMOVE BLOCKAGE 2)**	Perumbakkam outlet (Southern Part of Pallikaranai)	Excavate all construction debris, demolition fill, and structural obstruction to reinstate natural drainage from Sholinganallur and Perumbakkam Marsh.	GCC / TNPWD / CMRL	**Immediate**
3	**REMOVE TEMPORARY EARTH BUND**	Okkiyam Maduvu adjacent to SANMAR outer compound wall	Review and remove the temporary earth bund constructed inside the waterway and restore the channel to its full natural cross-section.	WRD / Chennai Metro Rail Limited (CMRL) / TNPWD	**Immediate**
4	**CLEAR WATER HYACINTH**	Okkiyam Maduvu and Perumbakkam waterways	Remove all accumulated water hyacinth (Eichhornia crassipes) from both sites	WRD / GCC / TNPWD / Tamil Nadu Forest Department	**Within 15 days**
5	**REVIEW METRO PILLAR DESIGN**	Okkiyam Maduvu	Pause Metro Phase 2 Corridor 3 viaduct pillar installation within the Okkiyam Maduvu channel. Each pillar placed irreversibly reduces the channel's flood discharge capacity. Independent hydraulic review to be done and findings to be published in the public domain before any further pillar installation proceeds. See Fig 22 for the conceptual engineering alternative that eliminates this risk entirely.	CMRL / TNPWD / TNSWA / WRD / Independent reviewer	**Immediate**
6	**BAN NEW CONSTRUCTION INSIDE OKKIYAM MADUVU**	Okkiyam Maduvu (full 2.8 km channel)	No new permanent or temporary structure shall be permitted inside the waterway beyond projects that have completed.	WRD / TNSWA / TNFD / CMRL / TNPWD	**Policy**
7	**PUBLIC INFORMATION BOARD**	Both blockage sites	If statutory permissions have already been issued for these works, requesting the concerned authority to erect a clearly visible public information board at each site stating: (i) nature of work; (ii) authorising agency and approval reference number; (iii) start and expected completion dates; (iv) project proponent and contractor; (v) contact details of the responsible officer.	CMRL / WRD / Project proponent / Authorising agency	**Immediate**

#	ACTION	LOCATION	WHAT MUST BE DONE	RESPONSIBLE AGENCY	TIMELINE
8	**IMPLEMENT CARE EARTH REVISED INTEGRATED MANAGEMENT PLAN**	Entire Pallikaranai Ramsar Site	Formally adopt and implement the Integrated Management Plan for Pallikaranai Marsh prepared by Care Earth Trust[16] - the expert-prepared blueprint already submitted to the State Wetland Authority as part of the Ramsar designation report.	TNSWA / TN Forest Department / GCC / PWD / MoEFCC	**Within 6 months**

We request written acknowledgement of receipt of this report from each addressed authority within 15 working days of submission. We further request written confirmation of action taken, or reasons for non-action, on each demand within the timelines specified above. Responses may be directed to suzhalarivom@gmail.com. This report will be updated to reflect the actions taken, and the revised version will be shared with all relevant authorities as well as made available in the public domain. Our field inspections and scientific observations conducted over the past five years clearly demonstrate that the marshland is undergoing rapid and severe deterioration. It is critical that together we take collective action and concerted efforts to conserve and protect Pallikaranai one of the last remaining natural wetlands and ecological hotspots of Chennai.

The Pallikaranai Marsh has survived millennia of natural cycles.
It must not perish due to avoidable construction decisions that can still be corrected.
Restore the waterways. Restore the marsh.

Verification Field Survey: 12 June 2026

A verification field survey was conducted on 12 June 2026, immediately prior to the finalisation of this document, to confirm that the conditions documented in May 2026 remain unchanged. Both blockages, Okkiyam Maduvu at OMR and the Perumbakkam northern outlet, remain fully unaddressed. No remediation, clearance, or restoration work has been carried out at either site. The obstructions, earthworks, and construction activities documented in this report are ongoing. Photographic documentation from the 12 June 2026 survey is available at: [drive link]

End Note

This report has been prepared by Suzhal Arivom in the interest of conserving Pallikaranai Marsh and strengthening South Chennai's long-term climate resilience. It is ecological, scientific, and fact-based, drawing on verified field observations, GPS-tagged photographic evidence, and site records from May 2026. The team has been engaged in Pallikaranai conservation since 2015, contributing a decade of dedicated work. Claude was used solely for document structuring. We request all stakeholders and readers to receive this report in the spirit of ecological responsibility and act decisively to protect Pallikaranai Marsh and secure South Chennai's climate resilience.

For communication: suzhalarivom@gmail.com

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