

Dec 13th, 3:40 PM - 5:20 PM

# A trap-and-haul fishway for multi-species upstream fish passage at a challenging site

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O'Brien, Steve; Harris, John; Mefford, Brent; and Roberts, David, "A trap-and-haul fishway for multi-species upstream fish passage at a challenging site" (2018). *International Conference on Engineering and Ecohydrology for Fish Passage*. 21.  
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An aerial photograph of a large dam and reservoir. The dam is a long, grey concrete structure extending from the left towards the center. To the right of the dam is a large, deep blue reservoir. In the foreground, there is a landscaped area with a parking lot, a circular green lawn, and some buildings. The background shows a dense forest of green trees, and in the far distance, a city skyline is visible under a clear blue sky.

# A trap-and-haul fishway for multi-species upstream fish passage at a challenging site

Steve O'Brien, John Harris, Brent Mefford and David Roberts



# Hinze Dam Stage 3

Raise Main Embankment  
By 15m

Raise and Modify  
Spillway

Spillway Chute







Existing Spillway

Existing Environmental  
Flow Outlet

Existing River Channel



# Upstream of Hinze Dam

## Little Nerang River



## Nerang River





# Downstream of Hinze Dam

Environmental Flow 7.25ML/day





# Upstream Fish Passage Requirements

- Upstream fish passage be implemented to rehabilitate the Nerang River's biological diversity and fisheries values
- All non-spilling flows (7.25ML/d) are available for fish transfer.
- The fishway's design and operation are to be flexible to accommodate variation in biomass.
- Fish passage to be available in floods up to the 1 in 20 AEP flood.



# Downstream Fish Passage Requirements

- Continuous downstream fish passage is not required beyond spill events.
- Not enough flow in Nerang River downstream of the dam
- Minimal attraction flows to guide fish
- More likely to be transferring stocked fish
- Spillway design is to consider opportunities to minimise adverse effects on fish during and immediately after spill events.



# Upstream Passage Options Considered

- Fishlift
- Series of Locks
- Fish Ladder
- **Trap and Haul**





Fishway Location







Fishway

Approach Pool

Barrier Weir













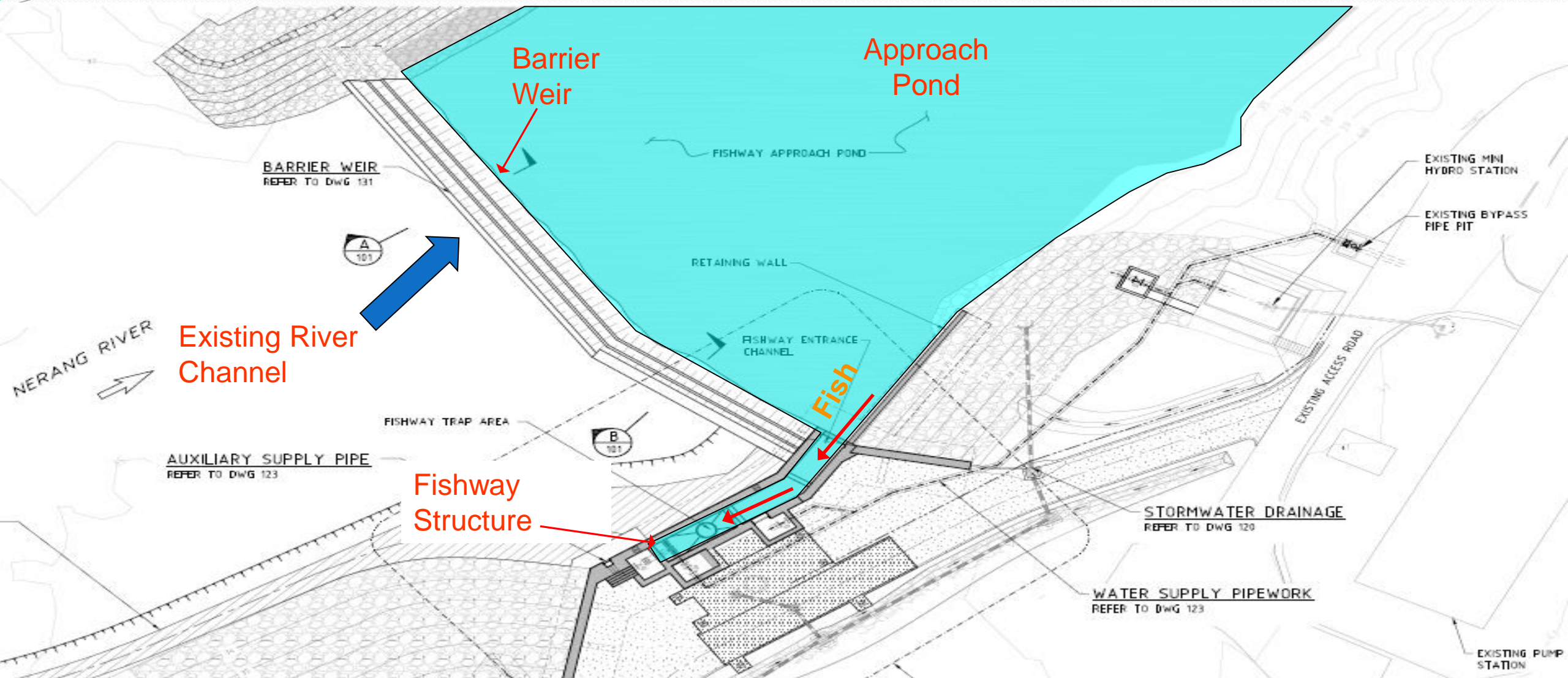
R12 R12  
DO NOT  
OVERLAKE  
TURNING VEHICLE  
Without Tracks  
Assembly Stops  
QDS  
Without Tracks  
Assembly Stops  
QDS

500 lb  
500 lb

REST STOP  
FIRE

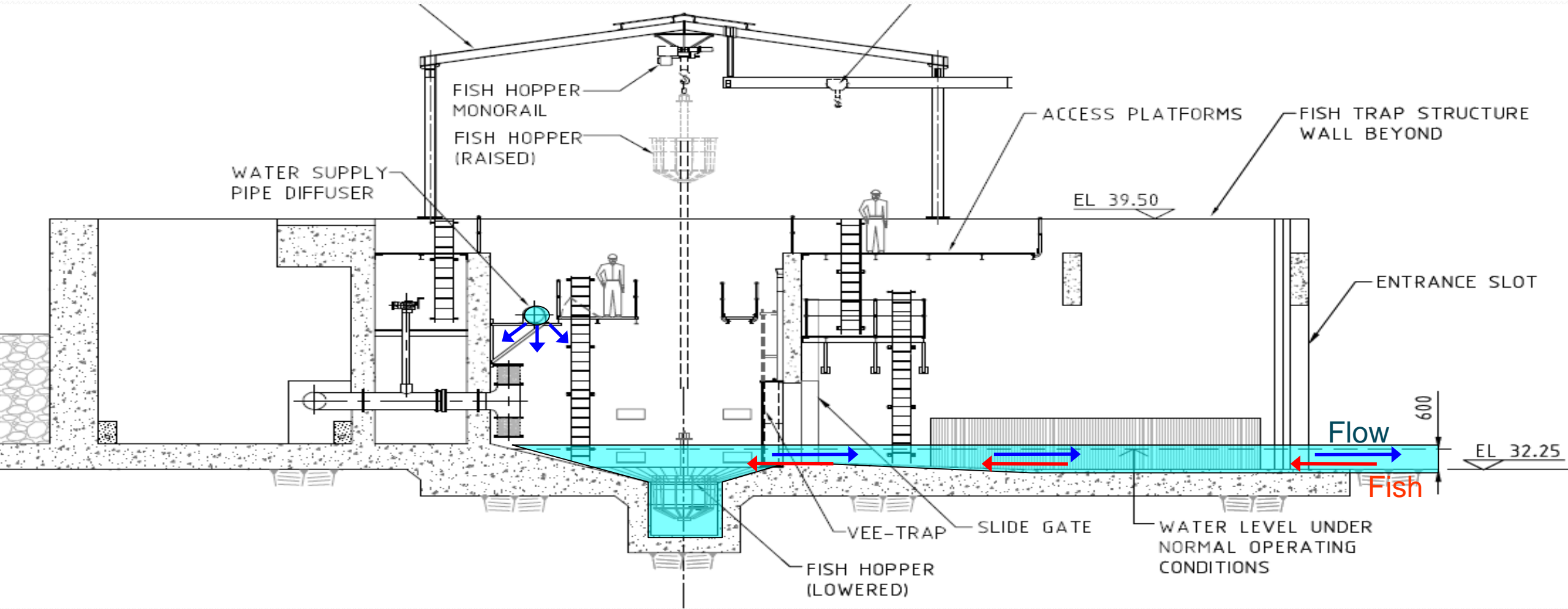


# Fishway Design – Plan View



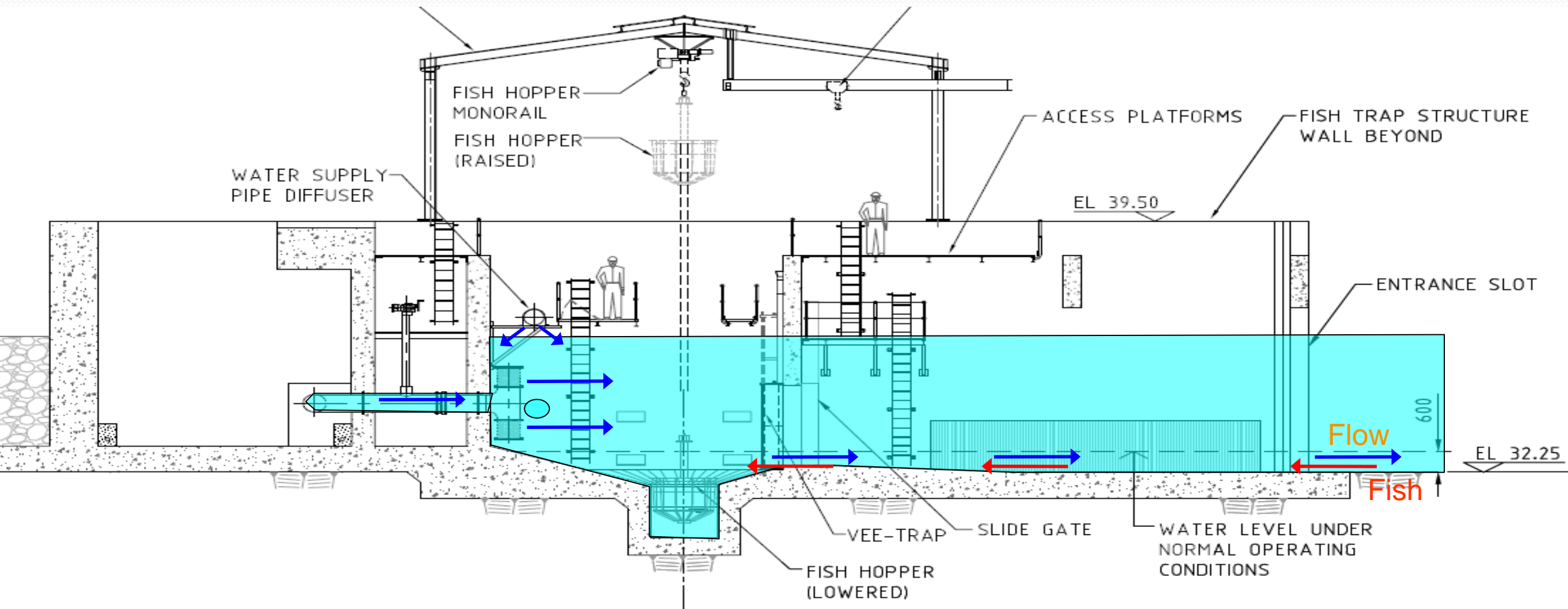


# Section Through Fishway – Normal Operations

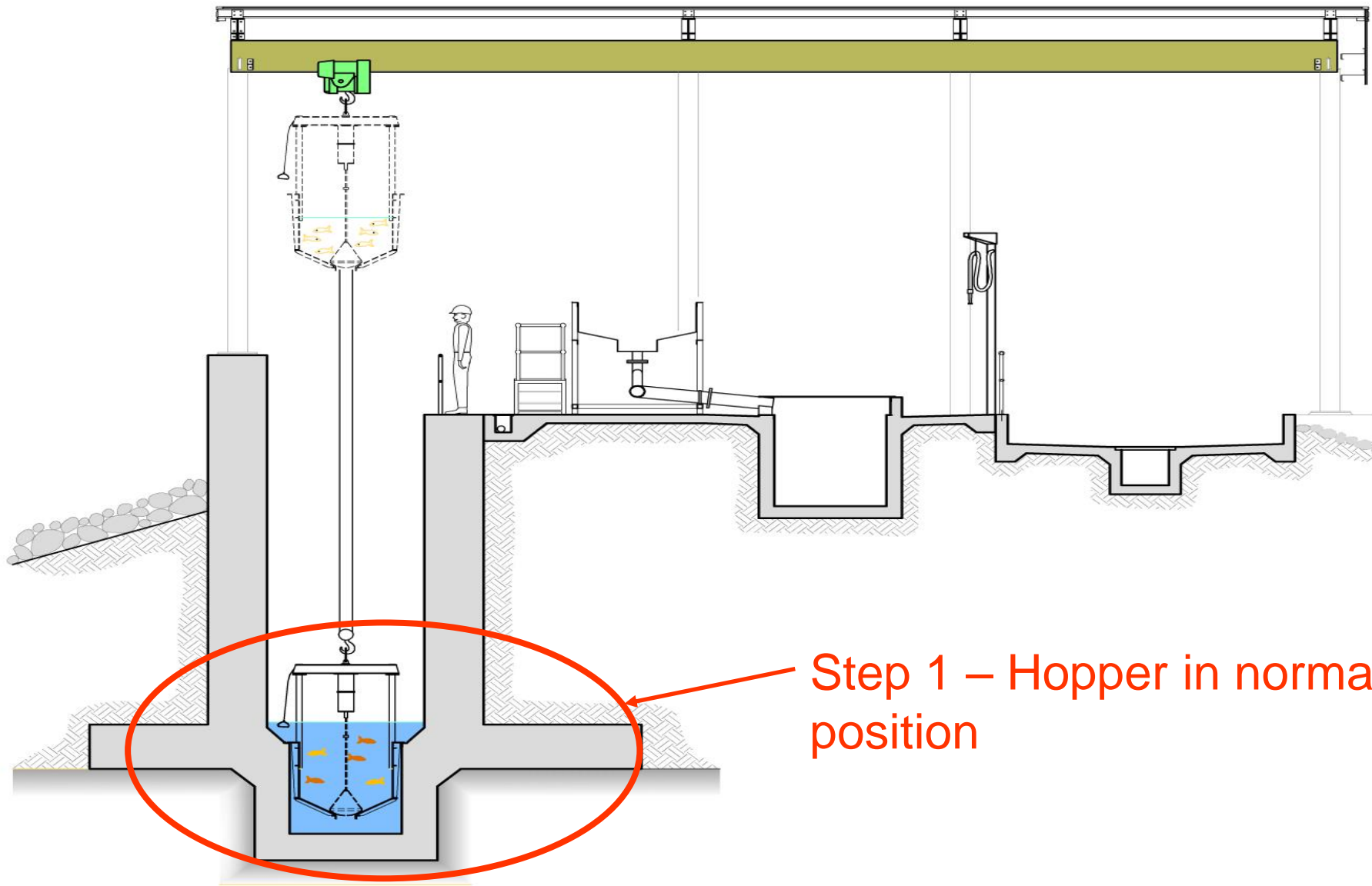




# Section Through Fishway – Spill Events

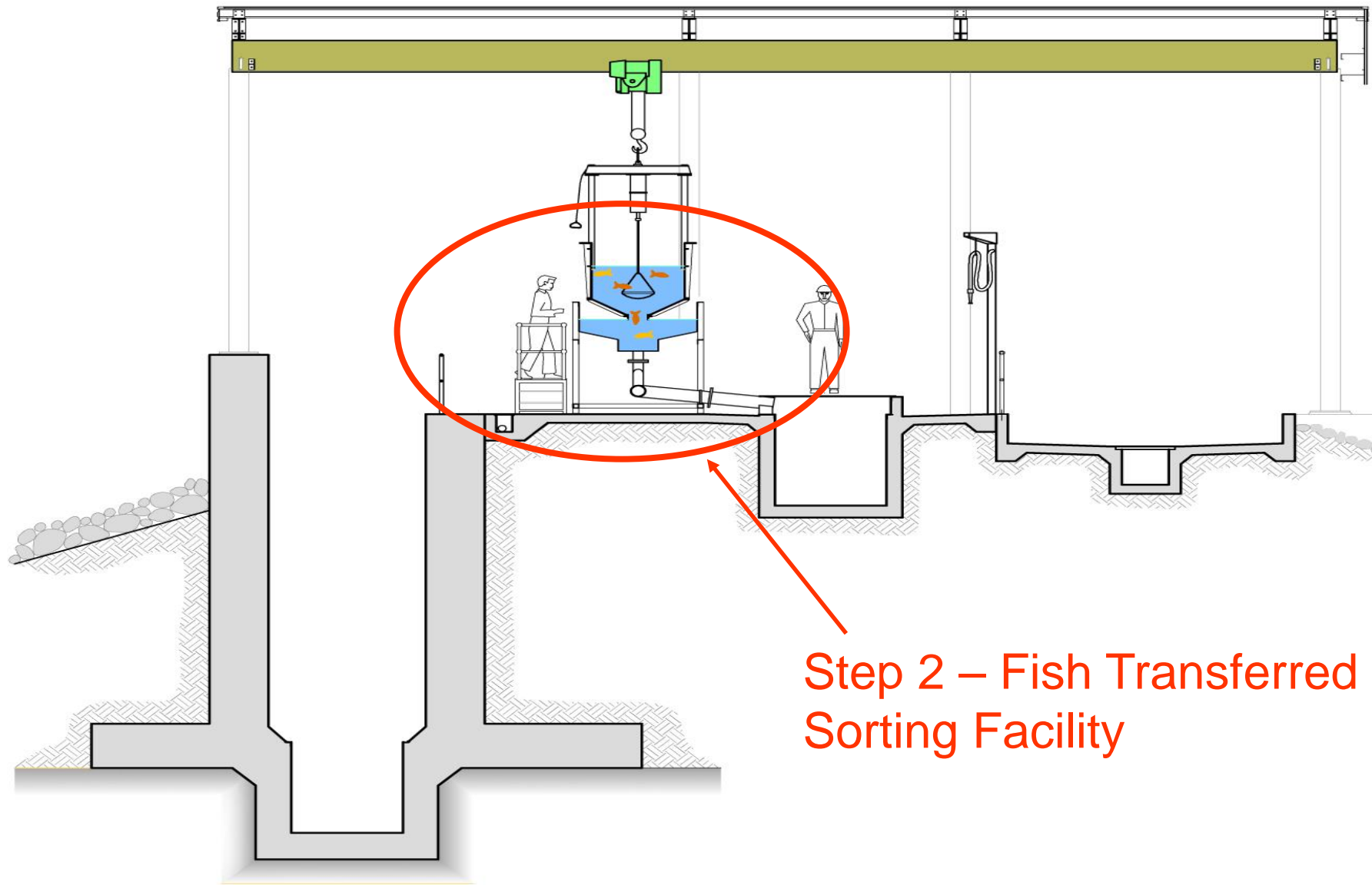






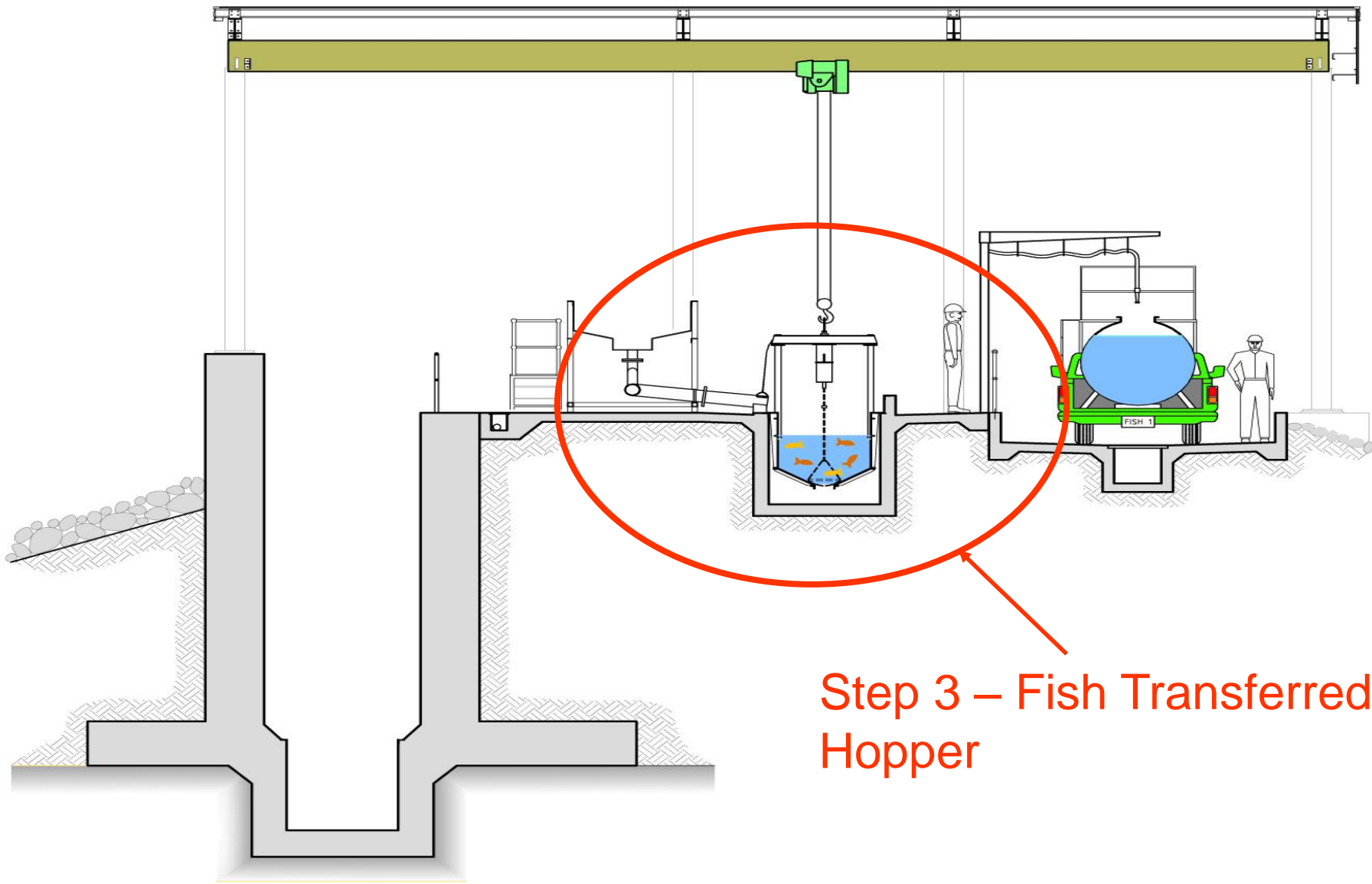
Step 1 – Hopper in normal operating position





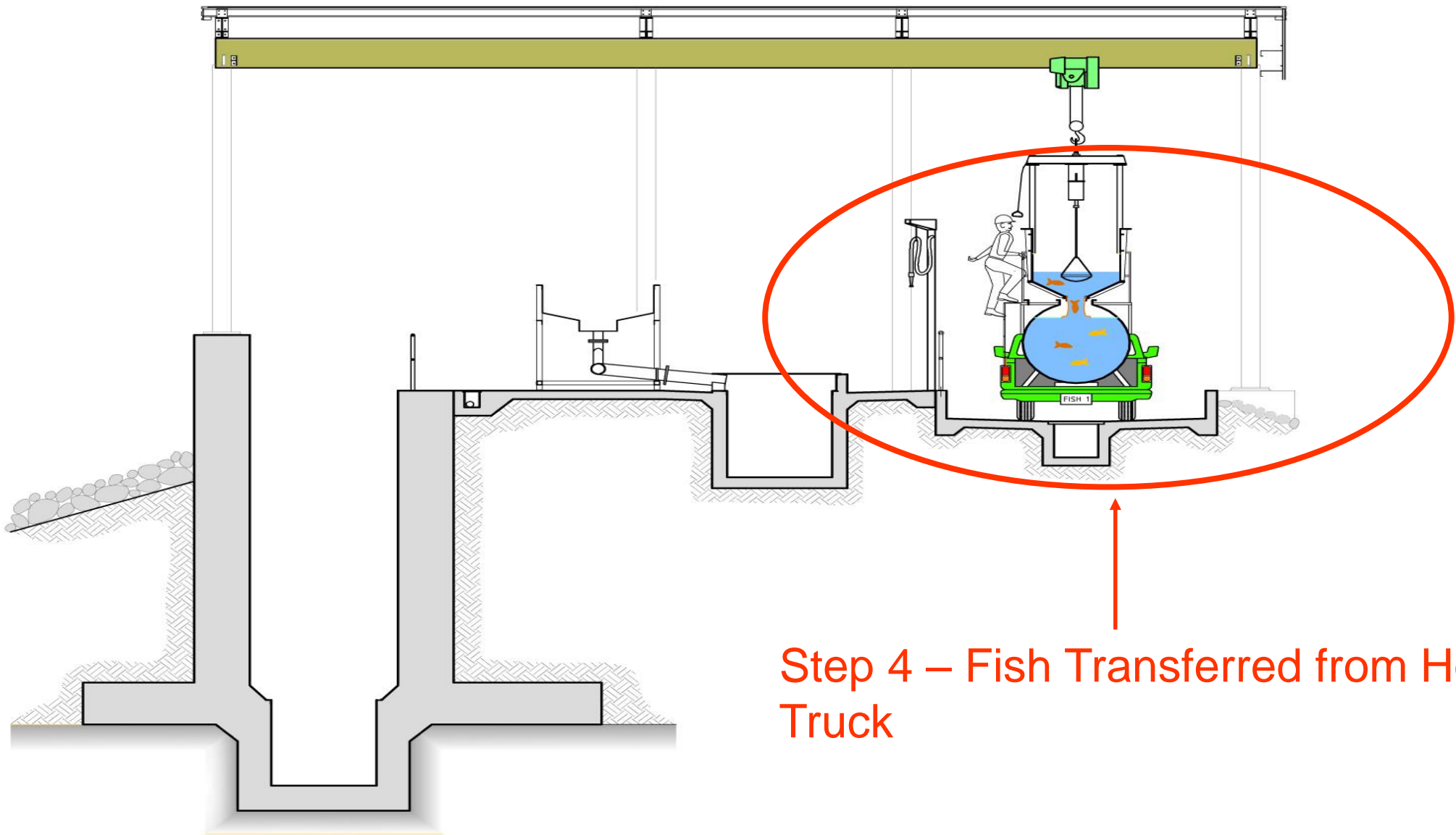
Step 2 – Fish Transferred from Hopper to Sorting Facility





Step 3 – Fish Transferred back into Hopper





Step 4 – Fish Transferred from Hopper to Truck





























13000 **Belco**

SONIC

**AQUASONIC**

MAX LOAD 3500KG  
RADIAL  
MAX SPEED 120KM/H  
MAX PRESSURE 3.5MPa

MAX LOAD 3500KG  
RADIAL  
MAX SPEED 120KM/H  
MAX PRESSURE 3.5MPa











# Fishway Operation

- Can be operated by a single person
- Non Spill periods: operates between 1 to 4 times a week
- Spill periods: Up to 4 times per day.





# Fishway Statistics

- Commissioned 2011
- Transferred 185,000 fish
- 23 fish species plus turtles
- Removed 45,000 pest species
- Highest 24hr catch of 13,700 fish





# Successes

- Design and Construction
  - Fishway type suited the site conditions
  - Economical
  - Independent of the dam and upgrade works
  - Could be constructed and commissioned early in the project
  - Allows multiple release sites to manage predation



# Successes

- Operation
  - Simple system with minimal maintenance requirements
  - Suitable for the full range of fish sizes and species
  - Flexible operation
  - Buy-in of operators
  - Operated up to 1 in 20 AEP flows



# Improvements / Learnings

- Implemented:
  - New Cone-Trap arrangement
  - Minor modifications to the sorting facility





# Improvements / Learnings

- Future:
  - Low flows reduce the effectiveness of attraction flows under normal operating conditions
  - Limited ability to increase flows – would be good to revisit release requirements
  - Upgrade of intake pipework could allow ‘flow banking’



# Conclusions

- Developed an innovative trap and haul system that:
  - Meet all the key project requirements
  - Is an economical solution
  - Suits site conditions
  - Operates from standard low flow conditions up to 1 in 20 AEP flood
  - Provides flexibility
  - Ability to manage pest species
  - Capacity to manage predation
  - Future improvements could be provide by increasing flow capacity

