

## Honolulu Traffic Congestion – Part 2: Up-shift to Overdrive by Removing another One Third of Honolulu Traffic Congestion for Less Than \$5 Billion

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Can we solve Honolulu's pervasive traffic problem? Yes! There are several specific projects that mitigate congestion that if one could magically install half of them overnight, Honolulu's congestion level would be so low that traffic congestion would be erased from people's list of worries. That would be a great thing for quality of life on Oahu and a booster to our tourism and the overall local economy.

Two articles summarize these solutions. Part 1 gives some background on congestion (did you know that some congestion is a good thing?) and presents low cost and shorter term traffic congestions solutions. **Part 2** presents longer term, high cost traffic congestion solutions.

Here's how we up-shift to overdrive!

### **LARGE AND LONG TERM PROJECTS**

**HOT Lanes (Cost: approx. \$1 Billion)** The proposed HOT Lanes is a 9 mile elevated reversible three-lane highway from the merge of the H-1 and H-2 Freeways to Honolulu Airport. Beyond the airport the HOT Lanes continue to Iwilei as the Nimitz Viaduct; see below. The term HOT Lanes stands for High Occupancy and Tolled Lanes. It is a class of federally supported express lanes. HOT Lanes are in operation in many large cities on the mainland including the nation's capital.

For Oahu, buses and vehicles with 5 passengers or more would travel for free on the HOT Lanes at an average speed of 60 mph (vs. rail's average 25 mph). Unused capacity on HOT lanes is made available to low occupancy vehicles via a congestion-calibrated toll which adjusts the price to keep lanes busy but free flowing. The average toll price during peak commute times is estimated to be \$3.50 per vehicle. An electronic tag in the car makes the



payment automatically at freeway speeds when the car passes under a toll gantry, as in this picture from Florida. There are no toll booths. A vehicle's monthly toll bill is received at home and is itemized much like a cell phone bill.

The toll price is actually "congestion insurance" because those who choose to pay it will commute from Waipahu or Waikele to Iwilei in 12 minutes in the middle of rush hour. Existing freeways remain toll-free so there is always a choice between toll and free lanes.



HOT Lanes will reduce H-1 Freeway congestion by 35%. The greatest benefit of HOT Lanes accrues to those who do not use them; they pay no added taxes or tolls but experience substantially reduced congestion. HOT Lanes can accommodate ultra-high capacity buses.

HOT Lanes need low or no tax subsidy compared to other transportation projects. Several HOT Lanes across the nation were developed as public-private partnerships or PPP with significant investment by mutual, infrastructure and retirement funds.

Tampa, Florida developed and delivered a project similar to the one recommended for Honolulu (see Figure.) It was done as a county project and it opened in 2007. It cost about \$350 million in total, which is less than Honolulu rail's studies and promotion.



Here are two sample quotes about actual HOT Lane projects:

"U.S. DOT Secretary LaHood inaugurated the second HOT Lane project in the twin cities. This is Minnesota's second highway with HOT Lanes. The I-394 express lanes opened in 2005. Prices range from 25 cents per trip when traffic is light to as much as \$8 during heavy peak-period traffic. MnDOT's goal is to keep traffic in the express lanes moving at a minimum of 50 mph."

"The Florida DOT has claimed victory against chronic traffic congestion on Interstate 95 northbound thanks to the new toll express lanes. Motorists who use the two variable-toll

express lanes now travel at an average speed of 56 mph during rush hour -- 36 mph faster than before the lanes opened. Even drivers who use the free lanes are traveling faster at peak times, the report said -- 42 mph instead of 20 mph.”

**Nimitz Viaduct (Cost: approx. \$0.6 Billion)** This is almost a “shovel ready” project having been subjected to design and environmental review in the mid 1990s. This 3-lane elevated reversible project brings the HOT Lanes to Pier 31 with ramps at Lagoon Drive and Waiakamilo Street. Because this project can go to bid within a couple years, roughly 20% of the HOT Lanes can go into construction soon. This 2 mile project will alone provide substantial relief and extensions of it facilitate express ramps to Fort Street Transit Mall and free-flowing underpass left turns to Alakea Street and Halekauwila Street.

The state DOT under the Lingle administration included this project in the Highways Modernization Plan but the 2008 recession mothballed the whole plan. At that time the state DOT considered this as a tolled and public/private financed project but in my opinion this project stand alone is too small for going through the trouble of PPP and toll collection. It should be done as a state/federal project with 80% federal funding for it.

**Pearl Harbor Tunnel (Cost: \$3-5 Billion)** This is a reversible 2-lane tunnel starting near Iroquois Point, going under the entrance of Pearl Harbor and continuing as a cut-and cover tunnel through the golf course in Honolulu Airport. This underground highway would surface at Lagoon Drive and connect with a ramp to the Nimitz Viaduct.

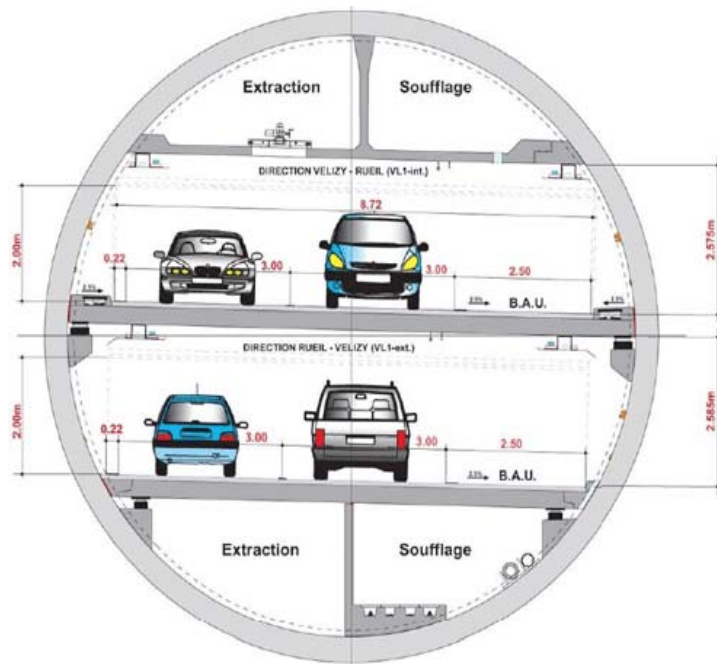
There are several civilian tunnels near or under major US military installations on the mainland so the alleged “U.S. Navy objection” is not based on engineering and military risk analysis. The tunnel should be limited to light duty vehicles and buses only, thus minimizing risks of accidents with trucks and their potentially hazardous cargo.

Drive times from the Ewa area to downtown through this route would be reduced from 65 to 15 minutes and the traffic load reduction on the H-1 Freeway would bring those commuter times down from 65 to 40 minutes. The toll would have to be at least three times higher than for the HOT Lanes to pay for the large cost of this option so having this as a PPP and tolled project is less likely because the high toll price may curb its effectiveness to divert traffic.

This project is listed here not as a recommendation to build it but as a suggestion to study it because its actual cost and risk may be substantially lower than the preliminary estimates above. For example, the Port of Miami undersea tunnel currently under construction is 0.75 miles long and has a budget of \$1 Billion. The Pearl Harbor Tunnel was dismissed in a couple

lines in the 2006 Rail Alternatives Analysis. Although we are now willing to entertain projects costing well above \$5 Billion to connect the Ewa plains with Honolulu, this time saving direct connection has never been afforded a serious investigation.

**UH to Pali Highway Tunnel (Cost: \$1-3 Billion)** The core part of the H-1 Freeway between Pali Highway and University Avenue is congested for nearly 10 hours per day on one direction or the other. There is no long term solution to this extensive and permanent bottleneck other than adding capacity which means adding lanes. Expanding sideways is not an option. Expanding by some form of double-decking is doubly undesirable: (1) Construction would require the closure of the freeway which is an unmitigatable impact for over 18 months, and (2) Project impacts to the abutting neighborhoods will be debilitating during construction and after completion due to blight and noise. There is only one option left: An underground highway tunnel between Pali Highway and University Avenue. Major advantages of this tunnel include its small surface footprint and construction impact. It may also be done as a PPP project.



Tunneling has become substantially faster, simpler, more compact, more reliable and cheaper compared to the tunneling of H-3 Freeway. Recent tunnels in Paris and Miami have shown this. Only one tunnel is needed (see Figure). It provides two new lanes per direction in separate decks inside one bore.

Ewa-bound the tunnel will have feeder lanes near the Old Waiālae ramp to take traffic from East Honolulu, Waikiki, Manoa, Kaimuki and UH to Nuuanu and the windward side with an off-ramp in the median of Pali Highway. Koko Head-bound the tunnel will have single feeder lanes on Pali Highway median and the westbound Vineyard Boulevard ramp.

This long term project has been subjected to preliminary traffic simulation analysis in a 2 mile (Alexander Street to Pali Highway) and 3 mile configuration (Old Waiālae Avenue to Pali Highway), both with promising results. A full feasibility and planning analysis is needed.

**H-1 Freeway Improvements between UH and Pali Highway (Cost: \$150-350 million).** A number of smaller improvements are also possible for our aging freeway. These were the result of state DOT funded research performed by my research team at the UH:

**Eastbound H-1 Freeway** between Liliha Street on-ramp and King Street off-ramp:

1. Add a lane between the Liliha Street on ramp and the Pali Highway off-ramp. This inexpensive restriping was done in 2009, about five years after it was proposed.
2. Control the inflow of the Vineyard Boulevard with ramp-metering (green/red traffic signals) which allow for 2 cars to enter the freeway every 5 seconds instead of today's operation when 50 or so cars are released by the signal at Punchbowl Street every two minutes and try to merge onto the freeway all at once.
3. Temporary closure of the Ward Avenue on-ramp (e.g., with a police car) between 6:30 AM and 8:00 AM on weekdays because at that time the freeway cannot handle more volume of traffic. The rerouted traffic can be accommodated by King Street.
4. Permanently relieve the Vineyard Boulevard and Ward Avenue on-ramp bottleneck by modifying the viaduct between this merge and Piikoi Street from 3 lanes-plus-shoulder to four narrower lanes. The four through lanes can be managed so that all four lanes are used during busy times, but the rest of the time the rightmost lane will be closed and serve as a shoulder. The active lane management of freeways is a routine mission of modern DOTs.
5. Various improvements to the safety deficient University Avenue ramps. The details are omitted because these fixes target safety rather than congestion.

**Westbound H-1 Freeway** between Old Waialae Avenue on-ramp and Middle Street:

1. Add an auxiliary lane between Old Waialae Avenue and University Avenue off-ramp to ease the friction at this slow merge.
2. Divert the Lunalilo Street on ramp traffic to Vineyard Boulevard and from there to the Punchbowl Street on-ramp, on weekday mornings. This mitigation is being done for several years but the manual delineator placement and poor signal phasing take away a part of the benefits. Expensive permanent ramps that remove the crisscrossing action have been studied by a local engineering firm.
3. Add a lane under the Kalihi Street overpass to relieve the 3-lane bottleneck under it.

The making of the **Second City** into a real Second City instead of the typical suburb that it is now is also essential. With increasing employment in Kapolei, Campbell Industrial Park, and Ko'Olina the need to commute to Honolulu will continue to lessen. This was the Second City plan to begin with. But the plan now is to add a \$5.3 Billion rail tether between the First and the Second city. Why?