
Comments on the Berkeley Pier-Ferry DraftEIR

From Paul Kamen <pk@well.com>

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 1 attachment (351 KB)

Collected Comments on DEIR.docx;

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BCDC: I've consolidated all my recent comments relating to the Berkeley Pier-Ferry project into one large file. Please take a look, and feel free to contact me by email if you would like to discuss further. The file is attached.

Also check out comments on the Berkeley Waterfront Community Coalition site:

<https://drive.google.com/file/d/1x1wSMqmlCAbdEceVf4NjCjo11Fjq3MXc/view?usp=sharing>

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Subject: comments on WETA ferry draft EIR

The EIR is deficient in that it does not address the effect of various TDM (Transportation Demand Management) strategies on the environment. More specifically, it does not provide the detail required to assess where ferry passengers will park when demand exceeds the dedicated lot for ferry passengers. Also, the EIR does not include the environmental effects of using fast ferries to partially compensate for excessive time required to find a parking space.

Of particular interest to boat berthers (who provide about 2/3 of Marina Fund revenue) is how guests, crew and family will be differentiated from ferry passengers who have strong incentives to use the lots intended for boat berthers. We assume that boat berthers will be issued parking permits in some form that will exempt them from time-of-day or elapsed time restrictions. But boats are rarely used by the owner alone. My 25 ft sailboat, for example, usually sails with a total crew of five, so four additional parking spaces are needed in the O-Dock lot. None of my crew live near a direct bus line, and they all bring a heavy sea bag and personal safety gear. That, and distance make bike access infeasible. Crew and guests have the same time-of-day requirements as ferry passengers: Early arrival and all-day, and sometimes overnight, use of the parking space. Larger boats may sail with ten crew or more. Boats that go fishing for the day have similar requirements for guest parking.

How will this be handled? Will all crew or guests have to stop by the marina office to get a temporary pass? Does the economic forecast allow for keeping the marina office open on Sunday mornings? Adding cost, whether monetary or transactional (e.g. time wasted) reduces the marketability of berths on the south side of the harbor and will reduce berther revenue.

There will be unintended consequences. For example, a ferry commuter might buy an inexpensive (or even a semi-derelect) boat for the sole purpose of obtaining a parking pass. Note that some of the berther parking lots are closer to the proposed ferry terminal than the designated ferry passenger log. At \$300/month (typical for a 25 ft berth) this is only \$10/day, a bargain for a reliable and convenient space. This use would be a clear violation of tideland public trust (see 1913 tideland grant and 1962 amendments...) It's a non-maritime and non-recreational use.

A related but often ignored environmental effect of insufficient parking: When passengers have to spend time finding a legal parking space, it increases the required speed and carbon footprint of the ferries in order to meet a door-to-door transit time.

Various studies have shown that when missing a boat, train or carpool has serious consequences, e.g. being very late for work, most commuters will allow two standard deviations of time margin. Example: If parking is adequate and easy to find (see Richmond ferry terminal) the process of parking and walking back to the boarding gangway only takes about two minutes with a standard deviation of about one minute at most. So arriving five minutes before scheduled departure is a reliable strategy. But what if it takes 15 minutes to find a more distant parking space, searching in several lots or cruising for the closest on-street parking possibility, then at least five minutes to walk back to the ferry. Standard deviation perhaps 5 minutes. The average commuter will allow the 20 (15+5) minutes average delay, plus two sigma or ten minutes (2x5) margin to be sure not to miss the boat. This adds 25 minutes to the door-to-door commute time, compared to a scenario with ample parking.

For our short route to SF, the ferry has to be very much faster to provide the same commute time, door-to-door. Remember that required power is proportional to speed cubed -- so the environmental impact of the ferry system is much reduced if sufficient parking is part of the system. It's cheaper and greener to provide the parking and slow down the boats.

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Successful ski resorts offer a variety of difficulty levels: There's a "bunny slope," some intermediate runs, and the expert black diamond slopes. A ski resort needs all three.

Windsurfing and beginner sailing in the South Cove have the same requirements: A popular site needs to provide conditions for a wide range of skill levels.

One of the features that make the South Cove so desirable and popular for small boat sailing and windsurfing (and related wind-powered activities) is that it offers wind and waves at all levels of skill.

The "inner sailing area," with wind moderated by the land mass and the trees on Hs. Lordships peninsula, is of particular importance for the novice area. There are about 40 trees slated to be removed in order to increase the capacity of the Hs. Lordships parking lot from approx. 250 to 400. This will likely change the wind environment of the inner South Cove. More wind, more difficulty for novice sailors, more demands on the rescue skiff for both Cal Sailing Club and Cal Adventures. And less continued use by the more skilled sailors, if they had to go elsewhere to learn.

The South Cove site is unique among windsurfing sites for its skill level variety. Removing wind-attenuating trees will cause an environmental impact not mentioned in the EIR that will be difficult to undo. It will compromise access and safety. This needs to be analyzed in detail.

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Comment: There is no analysis of economic feasibility, the true per-ride subsidy level, and realistic funding sources.

Here's the 'published 24-'25 WETA budget:

<https://weta.bynder.com/share/85AFA60B-3C3F-43B9-A69010245CFBEC9D/>

"The FY 2024/25 operating budget is made up of two primary components: a \$69.2 million Ferry Service Operating Budget and a \$5.5 million Planning and Administration budget. Together those two components result in a total Operating Budget of \$74.7 million."

From Table 2: Fares = \$14.1M; Ridership (projected) = 2.6M
Operating cost per ride = \$74.4M / 2.6M = \$28.8 per ride
Fare revenue per ride \$14.1M / 2.6M = \$5.4 per ride
Subsidy per ride = operating cost per ride - revenue per ride = \$28.8 - \$5.4 = \$23.4 per ride

But omitting the capital budget is not a valid estimate of actual subsidy level. Boats need to be replaced, terminals need to be maintained, maintenance dredging is required. Capital expense from the '24-35 budget is \$83M.

With capital budget included, the actual cost per one-way trip is \$60.68.

The DEIR needs to justify this level of subsidy in the context of other public transportation modes that are far less expensive and have much greater impact on VMT and congestion.

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The Draft Environment Impact Report is deficient in its evaluation of carbon impacts because it considers the ferry as an isolated transportation link rather than a part of an integrated system. The Draft EIR must consider the door-to-door commute rather than the water-borne time in isolation.

For the anticipated primary commuter service, the "last mile" is adequately addressed by multiple public transit options near the SF Ferry Building (and the density of destinations within walking distance)

But the "first mile" is problematic. Dedicated ferry passenger parking in the Berkeley Marina is estimated to be only about one-third to one-quarter of anticipated demand. After the dedicated parking area fills, commuters will need to spend much additional time finding a place to park, legally or otherwise. Or walking back to the ferry terminal from a distant parking space. This extra time needs to be considered in the design of the system. Time spent parking adds to the target door-to-door commute time.

When there is uncertainty in the time required to complete the first mile, studies have shown that commuters will usually allow two standard deviations based on the variable extra time to ensure reaching their destination on schedule. In simple language, insufficient convenient parking requires faster boats. Required ferry propulsion power is approximately proportional to speed cubed, so for the short route from Berkeley to SF, time spent finding parking, plus two times the variation in this additional time will add many extra minutes to the commute. This translates to additional required boat speed with an exaggerated effect on both first cost and carbon footprint.

We note that even after electrification, there is still a significant remote carbon footprint proportional to the energy used to generate the electricity. This will be true far into the future, until the grid is entirely supplied by renewable power generation.

The Draft EIR also assumes an unrealistic first mile mode split not justified by applicable data. Typical parking requirement is 0.6 spaces per ferry passenger, and this will not be provided by the planned parking scheme. The result is wasted time, requiring faster boats if the ferry is to remain marketable to commuters.

An efficient system requires more parking, smaller ferries, or a massive expansion of local bus routes. The effect of the ferry service on vehicle miles driven must also be considered. Without more study, it's difficult to show that the ferry will not pull passengers away from their nearby BART station for a drive to the more distant ferry terminal.

We also note that the catchment area for bus service, where it exists at all, is patently impractical except for the minority of ferry passengers living near a marina bus line that serves the marina without a transfer.

The point is, the environmental impact of a ferry service must be evaluated as a multi-modal system, and not in isolation as the Draft EIR appears to assume.

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Please see the attached article. It's an editorial published in the July 2023 issue of the regional sailing magazine Latitude 38. I'd like to enter it into the record of comments on the "Pier-Ferry" project Draft EIR.

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Attachment:

This parody article first appeared in the July 2023 issue of the regional sailing magazine Latitude 38. It is copied here with permission. All persons and events described herein are fictional. But the analysis is real .

max ebb

to the guillotine

“The trouble with democracy is that there are never enough weekday evenings.”

I'm not sure who first said that, but it rings true. My local Harbor Commission, Planning Commission, Transportation Commission, and City Council

all expect citizens to exercise their right to participate in City government at evening sessions that fill up the calendar and usually run late.

Despite this state of affairs, there was a surprisingly good turn-out at the last Harbor Commission meeting. After I filled out a speaker's card and turned around to find a seat, I was surprised to see Lee Helm in the front row.

"Like, what brings you here?" she asked as I took the empty seat next to her. It seems that even when a meeting room is crowded, people tend to avoid that front row. But I like it, and so does Lee.

"Rate hikes in the marina," I said. "Someone needs to tell these people that if they're going to raise our fees, the least they can do is fix the broken docks. But Lee, you don't even have a boat, why are you here?"

"This is way more important than a few more pesos on your monthly marina bill," she answered. "It like, threatens the waterfront as we know it. We have a whole coalition mobilized to oppose this train wreck."

"What train wreck?" I asked. "And why don't I know about it?"

"The ferry terminal," she sighed. "Don't you read the comments in the local online paper?"

Before Lee had a chance to explain what was so terrible about a new ferry terminal, the meeting came to order and small talk was cut off. After some formalities, the first speaker, Armanda Legg, was called to the lectern.

"The Ferry Authority says this is about equity," the young man began his commentary. "They say that it will open up the downtown job market to people in the non-wealthy neighborhoods near the harbor. That's pure fantasy. By the Ferry Authority's own data, 90% of their passengers earn above median income, and 40% are above two hundred K."

"I could have told them that," I whispered to Lee. "It's not the same crowd that rides the bus."

"Look at the per-ride subsidy level." Armanda continued. "The operating subsidy alone is 33 dollars per ride. That's per one-way ride. Every time some tech bro commutes to the City and back, it's like they get a check for 66 bucks. And that's just operating subsidy – crank in the capitalization of a 120 million dollar terminal, two fast diesel ferries at 30 million apiece, and about 15 million the City is expected to pay for shoreside improvements. Depending on the interest rate you choose, the total subsidy could top a Franklin each day. It's nuts. It's as far from equity as public policy could ever be. Especially when transit ridership all over the state is in trouble."

"But we need to reduce congestion on the bridges," one of the Commissioners interrupted, making a gesture with her hands that seemed to say "what else can we do?"

"Do what they did in New York," replied the speaker. "They changed one lane of the Holland Tunnel to Busses and carpool only, and peak throughput increased by 20,000 commuters per hour on that one lane. Think how many ferries it would take to do that! Want equity? Spend the money where it's needed and where it does some good, on buses and rail. Want poor folk to have a way to get out

on the water? Fix the fishing pier. Don't choke off access to the pier and the low-cost boating clubs with a parking crunch. That will ruin water access for everyone who's not a ferry passenger. Thank you."

"We built a six million dollar bike overpass," remarked one of the Commissioners before the next speaker reached the microphone. "And there's excellent bus service to the Marina."

Lee was called up next.

This is, like, all about carbon," Lee began. "A typical modern fast ferry, the ones run by our Ferry Authority, uses fuel at a rate of about 2300 BTU per passenger-mile. For liquid petroleum fuels, carbon footprint is about proportional to fuel consumed, 2300 BTU per passenger mile," Lee repeated, then introduced herself to the Commission as a naval architect who loves ships, loves ferries, and can do this kind of math.

"Pop quiz," she challenged the Commissioners. "What do you think is the fossil fuel energy per mile for a transbay commuter bus? Anyone?"

The Commissioners were not used to having quizzes sprung on them during public comment sessions, but eventually one of them tried to answer.

"Probably less than half what the ferry burns," he conjectured thoughtfully. "If the ferry is at 2300, I'll say a thousand BTUs per passenger-mile for the bus."

"Too high," said Lee.

"Five hundred?" suggested another public servant. "That's closer to a fifth what a ferry uses."

"Still too high," Lee said. "The number is just 130 BTU per passenger-mile. And like, the new ferries on order, with two already delivered, have twin 2557 horsepower diesels and carry 320 passengers at 36 knots. Works out to 2719 BTU per passenger-mile. That's, like, 21 times the carbon footprint, per passenger, compared to the bus. Then there's rail transit at 68. Per passenger-mile, the ferry emits 38 times as much CO₂ as a commuter train."

The numbers seemed exaggerated, but I was pretty sure Lee could back them up.

"How long do you think we'll be running these carbon-spewing beasts?" Lee continued. "A ferry has a useful life of like, 30-40 years. Can you think not-so-far into the future?" she asked the Commission. "Do you think in just 12 years when half of all cars sold in the state are supposed to be electric, or in 27 years when the state is supposed to be carbon-neutral, do you think those diesel boats will be anything but an embarrassment?"

"Now wait a minute," said the interrupting Commissioner. "The new boats have 'Tier 4' emission controls, the highest standard. And the Ferry Authority has promised electric boats on this route, not diesels."

"But all their projections for like, cost, performance, speed, and ridership are based on the diesel ferries. They refuse to do the math for electric, because they know it would require scaling things back a lot and in the short run cost more. Electric is not consistent with the big shiny new terminal and 300 passengers every half hour; It's what I call the 'Edifice Complex' that's driving this project. For sure,

Tier 4 removes most of the particulates, but does nada about CO2. Our City is about to prove to the world that it can't follow its own stated climate priorities."

Lee was not done with them, but she was almost out of time.

"And now, like, the worst part of this: There's this parking problem. They project 2,000 passengers a day, but only have 250 designated spaces for ferry passengers."

She was cut short by the bell that indicated her comment time was up, and as with other speakers who seemed to take an adversarial position, a Commissioner had to get in the last word: "People will just have to take the bus," he said.

Lee did not seem pleased when she returned to her seat. "I never got to the good stuff, about CEQA rules being bypassed and no viable alternatives considered, no feasibility study presented, no unified planning process. Or the a plan for the parking thing, which is, like the real reason we're here."

Next up was an older man named Cesar Kalm, who said he fishes from the shoreline. He brought props: Fishing rods, a tackle box, and an ice chest full of ice and a fresh-caught halibut, which he held up to show the Commission. "I often fish right where they want to put the ferry terminal," Cesar explained. "I need all this gear – it's important to keep fish cold after it's caught. I also need to park nearby. Tell me, where am I supposed to park when nine hundred ferry passengers are fighting for 250 spaces?"

A woman from the back of the public seating area cut in: "That's an old number," she shouted. "Now they say it's going to be two thousand passengers per day, but the City, for reasons we can guess, uses less than five hundred passengers in their parking analysis..."

"Please, no interruptions," scolded the Commission Chair.

The fisherman continued: "There's talk of time limits on all the other parking areas, to keep the ferry passengers out. Doesn't work for me, I fish all day. Doesn't work for people who go out on the charter fish boats, doesn't work for when I get an invite on a private fishing boat for the day. People need to park to use the park."

"There's always the bus," one of the Commissioners repeated.

I was called up next, but by this time I had completely forgotten my complaint about berth fees. Instead I pointed out that the yacht club has all-day events that require all-day parking. And that while the club makes some money with commercial rentals, there are deep discounts for non-profits and charitable organizations that meet at the club on a regular basis. Even City departments get to use the club at rock-bottom prices for daytime events, and virtually everyone attending these events has to find a parking space.

"That big retirement party you had last week, during business hours? I suppose you could have chartered a bus to go from City Hall and all the other City offices to the marina... but that would have tripled your cost. "

If Lee had to leave out parking, the next speaker more than made up for it. Roxanne Scholes was called up next.

“I hate cars too,” she began, “but this is the most popular park in the City, and it’s not a park in a neighborhood that people can easily walk to. There are parents with small children who come here for picnics, there are people with big dogs who come for the dog park, there are kayakers, windsurfers and kiteboarders with their equipment, there are guests and crew on private boats. They want to manage it with restricted parking areas, time limits and time-of-day-restrictions. Okay, maybe the boat owners will get parking passes, maybe guest passes too. Think of the black market in parking passes, or other ways to game these rules. If I had a fancy job in the City and needed to avoid the traffic jam on the bridge, I’d just put a small boat in the harbor and use my boat owner parking pass. Problem solved for about ten dollars a day. Maybe the whole thing is just a scheme to fill up those vacant small boat slips.”

“I have to repeat again,” said the Commissioner who likes to interrupt, after the “time’s up” bell rang. “there’s a bike overpass and pretty good bus service.”

“You and Marie Antoinette,” said the speaker. “Remember Marie Antoinette? When told that the peasants had no bread, she said ‘let them eat cake.’ Now those of us who can’t bring our fishing gear on a bike, or are a little too old to pedal back up the hill, or have a big dog to run in the off-leash dog park, or have medical issues, or who don’t happen live along the marina bus route and might have to take two busses when the schedule is infrequent and it would take an hour or more each way, now you’re telling us to just ‘take the bus’ or bike. It’s just as clueless and as detached from reality as old Marie A. telling the peasants to eat cake when they have no bread. Anyone remember what eventually happened to her?”

“The French revolutionaries sent her to the guillotine,” volunteered one of the Commissioners.

“Correct,” confirmed Roxanne. “Please everyone, tell the Councilmembers who appointed you that this thing needs to be scaled back. Back up and start a valid planning process, not hijacked by the Ferry Authority. Don’t let our City Council put their heads on the block next to Marie Antoinette’s. It’s not a good look.”

max ebb



This all-electric fast ferry is in service in Norway, carrying 147 passengers at 23 knots. Electric ferry projects, designed for routes similar to the new proposed transbay routes, are springing up all over the world. Yet our local ferry authority still insists on ordering new diesel boats that will be spewing high levels of CO2 for decades.

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Ever since my first year on the Berkeley Waterfront Commission, in 1999, I have been pointing out to the Commission and to Marina Staff that in-car viewing of the Bay from the west-facing parking spaces along Seawall Drive is a perfectly legitimate form of waterfront recreation. It's usually cold and windy at our shoreline, and watching the Bay from inside the protection of a vehicle makes sense for people with limited options.

My unscientific impression was that people who park to watch the Bay from their cars are, in general, from a lower-income demographic than other identifiable user groups. Not exclusively of course, but the demographic mix is noticeably more low-income and non-white. These are not people who routinely eat at waterfront restaurants with dining room views. They do not belong to a yacht club. They do not have boats in the marina. This demographic bias has been recently confirmed more rigorously by the Placer.ai report found in the comments on the Draft EIR compiled by other commenters.

This comment addresses the parking reconfiguration plan that eliminates nearly all of these west-facing parking spaces. This plan smacks of elitism and blatant disregard for this lower-income non-white demographic. Unfortunately it seems to

be a characteristic of other elements of the Pier-Ferry project: See the City's stated intention to apply parking fees only to the South Cove West parking lot, which serves Shorebird Park, the Shorebird Nature Center, and low-cost water access. Also see the proposed Waterfront Benefits District, "to collect fees from waterfront visitors to support marina and ferry infrastructure."

This is "reverse Robin Hood" at its worst: Charge fees paid by the lower-income marina visitors to help subsidize the ferry, which, by WETA's own estimate, serves passengers of which 90% are above median income.

PLEASE DO NOT REDUCE SHORELINE PARKING FOR IN-CAR VIEWING OF THE BAY.

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Please see attached. I would like to enter it into the record of comments on Draft EIR for the Pier-Ferry project.

Berkeley and WETA need to commit to electric ferries and only electric ferries for this route. Promises of electrification seem disingenuous when the costs, performance, schedule, and the initial business plan appear to be based on diesel ferries.

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Attachment:

Op Ed by Paul Kamen, Naval Architect
March 7, 2023

Why is Berkeley Going Backwards on Climate Change?

Berkeley is poised to embrace one of the dirtiest, highest-carbon, globally-destructive forms of transportation ever devised: Diesel Powered High Speed Commuter Ferries.

The numbers speak for themselves: A modern fast ferry is a carbon hog, using about 2300 BTU

of liquid fossil fuel energy per passenger mile. Compare to commuter buss at 130 BTU per passenger-mile, light rail at 91, or BART at only 68. Even an older gasoline-powered car, 20 MPG in a four-person carpool, leaves a lighter carbon footprint than the ferry at 1750 BTU/passenger-mile.

Modern battery-electric cars, single-occupancy, have an energy consumption range from 853 to about 1180 BTU equivalent per passenger-mile. Also consider that with private vehicles there's no reverse commute; with public transportation, a half-load in the reverse commute direction doubles the per-mile carbon footprint. If our high speed diesel ferry averages 50% passenger load throughout the day (probably optimistic), then the ferry's actual carbon footprint per passenger-mile is doubled.

While it's true that modern "Tier 4" emission controls can remove particulates and other pollutants from diesel exhaust, they do nothing for carbon dioxide, the primary greenhouse gas produced when petroleum fuel is burned. The carbon footprint tracks closely with the energy content of the liquid fossil fuel burned, so BTU per passenger-mile is a good measure of the carbon footprint of a diesel ferry. (Electric vehicle energy is more commonly given as kilowatt-hours rather than British thermal units, but the conversion is easy: 1 kWh = 3412 BTU.)

Now look at the latest purchase by our local ferry authority, WETA: Two diesel engines of 2557 HP each, 36 knots at full load, 320 passengers. It works out to 2719 BTU per passenger-mile, assuming every seat is occupied in both commute directions.

Meanwhile, California is aggressively pursuing full electrification of our transportation fleet. New cars must be all electric by 2035. We are transitioning to zero-emission busses. Electric ferries are in the works all over the world (Seattle, Vancouver, New York, Europe, and Asia). Norway is particularly progressive: A new 27 knot, 150-passenger all-electric ferry is now operational, joining a fleet of 70 zero-emission ferries. It runs at a relatively efficient 927 BTU/passenger-mile. And their largest all-electric ferry transports 360 passengers plus 120 vehicles at about 12 knots on a 4 mile route. If we count each car as equivalent to four more passengers, carbon footprint is a very clean 305 BTU per passenger-mile.

Thailand is planning no less than 27 250-passenger electric ferries to serve routes on the Chao Phraya River in Bangkok. Other electrification projects are underway in Taiwan, New York and several European routes.

Closer to home, BC Ferries is already operating two Island Class hybrid car ferries in Puget Sound – capacity is 47 vehicles and up to 450 passengers.

Here in the U.S., the Federal Trade Commission recently awarded \$97.6 million to fund the "Electric or Low-Emitting Ferry Pilot Program" in 7 states. Washington State Ferries, the largest ferry operator in the U.S., has initiated a \$4B program to first hybridize and then electrify its fleet by 2040.

Even the humble old Tiburon-Angel Island ferry will be electrified next year, moving 400 passengers at only 256 BTU/passenger-mile. This is less than one-tenth of the per-passenger per-

mile carbon footprint of WETA's newest diesel ferries.

The proposed Berkeley to San Francisco ferry service is well suited to electrification. It's a short route at only 6.5 miles, with a long enough dwell time at each end for useful recharge. (The SF-Jack London Square route is even shorter, at 6.2 miles.)

Before proceeding with plans for a major ferry terminal at the Berkeley Marina, Berkeley needs a firm contractual guarantee from WETA that ONLY electric ferries will operate from the new terminal. Yes, WETA has made this promise, but their cost projections are still based on diesel power. We need an enforceable agreement that we can hold them to. And we need to see realistic costs and revenue projections based on electric boats.

A ferry has a useful life of 30 to 40 years. In 2050 and beyond, do we really imagine that we will still be supporting a diesel fleet for the short run from Berkeley to San Francisco? Diesel will cost more, diesel will contribute to disastrous climate change, and adding more diesel exhaust is absolutely the wrong legacy to leave to those who come after us.

It's easy to see why the Berkeley City Council would love to take credit for bringing ferry service back to Berkeley. But if large diesel-powered boats come to Berkeley, the legacy will be regressive climate policy and an inexcusable disregard for the future.

Paul Kamen, Naval Architect

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The Draft EIR is seriously deficient in its estimation of the environmental effects of dredging and land fill. This is because the required size and extent of the breakwater is grossly underestimated. The problem is not the methodology, it is the omission of complete wind and wave data, specifically the occurrence of winter gale force north or north-west winds. These wind events produce waves that leave the ferry float entirely unprotected by the proposed breakwater design.

The same mistake was made in 1965 when the Berkeley Marina was designed. The original design only included the rip-rap breakwater, which was insufficient protection. During winter northerlies, the wave action INSIDE the marina was enough to repeatedly damage the docks on O-Dock that were in the waves' path. One section of boat berths had to be abandoned.

In the early '70s, the required fix was to add the sheet pile breakwater to the north of the original rip-rap breakwater, at great expense. The missing berths were replaced.

The problem then, as now, was that none of the wind measurement stations used for the wave analysis were accurately recording these north or north-west wind events. When these conditions are considered in the wave analysis for the proposed ferry terminal, it will be found that the breakwater must be much longer. Siltation and maintenance dredging

requirements will increase beyond current estimates. With the longer breakwater protecting the ferry float from the north, the location of the breakwater and the ferry floats may have to move farther west to allow sufficient maneuvering room for the ferry.

The analysis must include more extensive fill for a longer breakwater, a new assessment of landfill and maintenance dredging and related costs and impacts, and possible upgrades to the ferry float design or allowance for more frequent repairs after north wind events.

These costs should be considered as part of the feasibility assessment of the project as proposed, otherwise the City, WETA, and other funding agencies will be responsible for another expensive retrofit, similar to what happened in the same location more than 50 years ago.

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Liza - I know the deadline for comments on the Draft EIR has passed, but I have one more comment to add to the record.

There are some unanticipated expenses, none of them trivial, that should be included in the City's financial planning for the Pier-Ferry project. Looking at the GHD Feasibility Study from June 2023, I found dimensions of the proposed ferry docking float as 135 ft long by 42 ft wide. The design wave condition is 2.62 ft significant wave height with peak energy at a wave period of 4.0 seconds. I don't think these numbers have changed very much, if at all, in the more recent engineering summaries for the project.

Some quick arithmetic: Wavelength of a 4 second wave = $(5.121) T^2 = 82$ ft.

If the waves created by a strong north wind are approximately similar (and there's no good reason to assume they are not) then we have a platform with a beam almost exactly half the wavelength, and no breakwater protection. Not good. The waves will cause large motions of the float and/or sharp jerks when the float is constrained by piling rings or other devices that hold the float in place.

Berkeley should be prepared to defend against frequent "trip-and-fall" lawsuits if the ferry operates in north winds.

Some other unanticipated costs:

Regular commuters will discover that if they buy an old cheap sailboat they will get a 'berther' parking pass, and have fast and convenient parking in the berther lots for about \$10/day. When they no longer need to commute by ferry, the boat will most likely be abandoned as unmarketable, adding to the number of impounded boats that need to be removed at considerable expense.

Berkeley needs to be prepared to pay for removal of derelict boats from this new source.

One more unanticipated cost: Guests and crew on private boats have essentially the same parking requirements as ferry passengers (early arrival and all-day parking). Exceptions to parking time limits are needed. It will be necessary to issue one-day temporary parking permits when guests and crew arrive.

Berkeley needs to consider the additional cost of keeping the marina office open on Sundays, and extending hours to accommodate early morning and late afternoon arrivals so that one-day (and sometimes overnight) parking passes can be issued.

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