







- √ analysis to 2100 horizon
- √ recommendations to 2050
- √ non-regulatory guidance document
- ✓ ongoing monitoring + adaptive management
- √ re-evaluation in 2030



# six (6) key moves

SOUTH REACH

**KEY MOVE 1**: Reroute Great Highway behind the Zoo via Sloat and Skyline

KEY MOVE 2: Introduce a multi-purpose coastal protection/restoration/access system

MIDDLE REACH

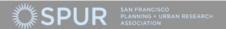
KEY MOVE 3: Reduce width of Great Highway to provide Amenities / Managed Retreat

**KEY MOVE 4: Middle Reach Native Dune Restoration** 

NORTH REACH

KEY MOVE 5: Better Connection between Golden Gate Park and Beach

KEY MOVE 6: Bicycle + pedestrian improvements north of Balboa



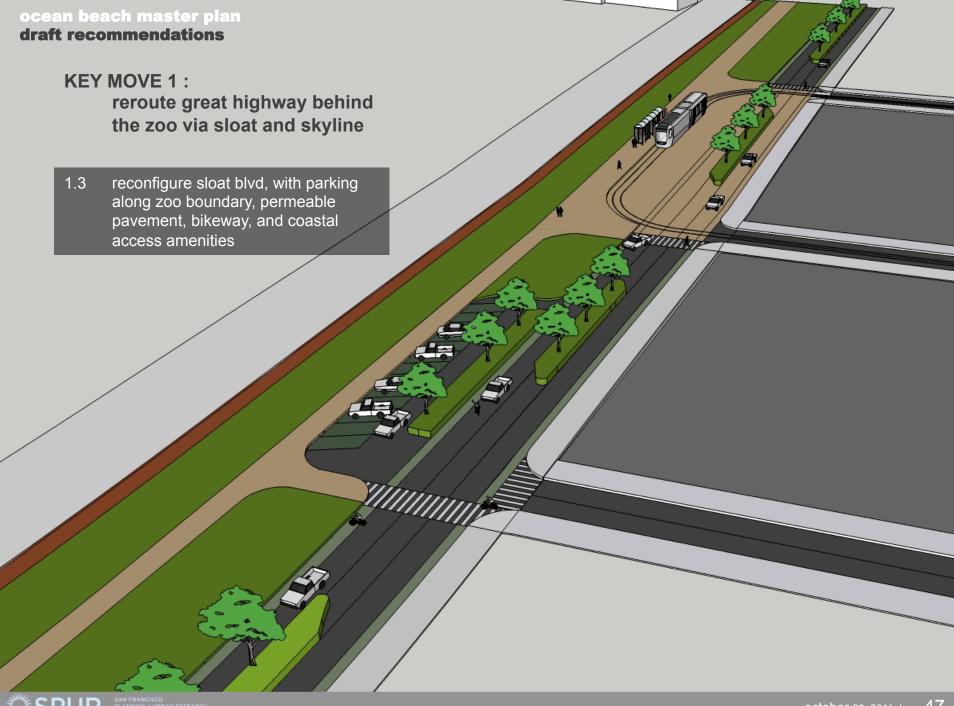






- 1.1 reconfigure sloat/great highway and sloat/skyline intersections
- 1.2 maintain 1-lane out southbound from oceanside treatment plant (OTP) for trucks
- 1.3 reconfigure sloat blvd, with parking along zoo boundary, permeable pavement, bikeway, and coastal access amenities
- 1.4 pull L-taraval south across sloat, terminus at zoo gate
- 1.5 introduce coastal trail to ft funston
- 1.6 connect N-S to california coastal trail, linking lake merced all the way to marin
- 1.7 replace beach/zoo parking along armory road and using OTP roof
- 1.8 reopen armory road: skyline to zoo lot





#### **KEY MOVE 1:**

reroute great highway behind the zoo via sloat and skyline



**BEFORE** 

#### **KEY MOVE 1:**

reroute great highway behind the zoo via sloat and skyline



#### **KEY MOVE 1:**

reroute great highway behind the zoo via sloat and skyline

## benefits

- ✓ spectacular new coastal trail, continuous pedestrian connection
- ✓ enables significant retreat from coastal erosion
- ✓ more flexible infrastructure protection
- ✓ major improvements to sloat blvd design, with green infrastructure elements.

## constraints

- ✓ some traffic impacts, likely minor
- √ requires reconfiguring zoo access
- ✓ cost of roadway and intersection improvements

# outstanding questions

- ✓ nature of traffic impacts?
- ✓ configuration of sloat blvd?
- √ funding sources?



### KEY MOVE 2: introduce a multi-purpose coastal protection / restoration / access system

- withdraw from bluff edge, incrementally demolish roadway, parking, restroom at sloat
- 2.2 reinforce the lake merced tunnel in place with a low profile structure or internal ballast, remove revetments and fill
- 2.3 sand nourishment via army corps, develop and pursue best practices for beach nourishment
- 2.4 cobble berm over Im tunnel covered by sand (via army corps sand nourishment) serves as wave dissipation zone; overwash occurs during severe storm events
- 2.5 second cobble berm protects force mains, high ground at pump station, fleishhacker bldg



## **KEY MOVE 2 (cont):** introduce a multi-purpose coastal protection / restoration / access system

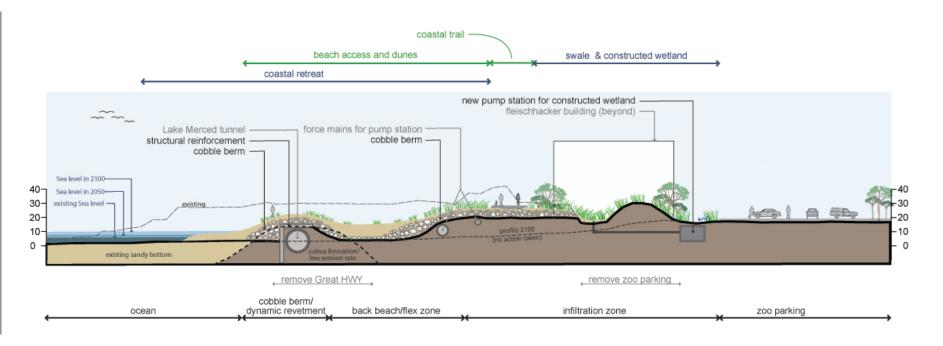
- terraced, vegetated seawall with cobble toe along oceanside treatment plant, incorporating tunnel structure, coastal trail, erodible bluff (banks swallow habitat), and plant driveway
- create detention swale (through zoo) and constructed wetland to passively clean and infiltrate stormwater from sloat blvd and adjacent parking
- fleishhacker bldg renovated as warming hut and interpretive center
- 2.9 pump station, force mains remain; interpretive elements explain the system to visitors. beautify pump station and reconfigure to maximize adjacent coastal access
- 2.10 conduct near-term pilot studies of dynamic coastal protection



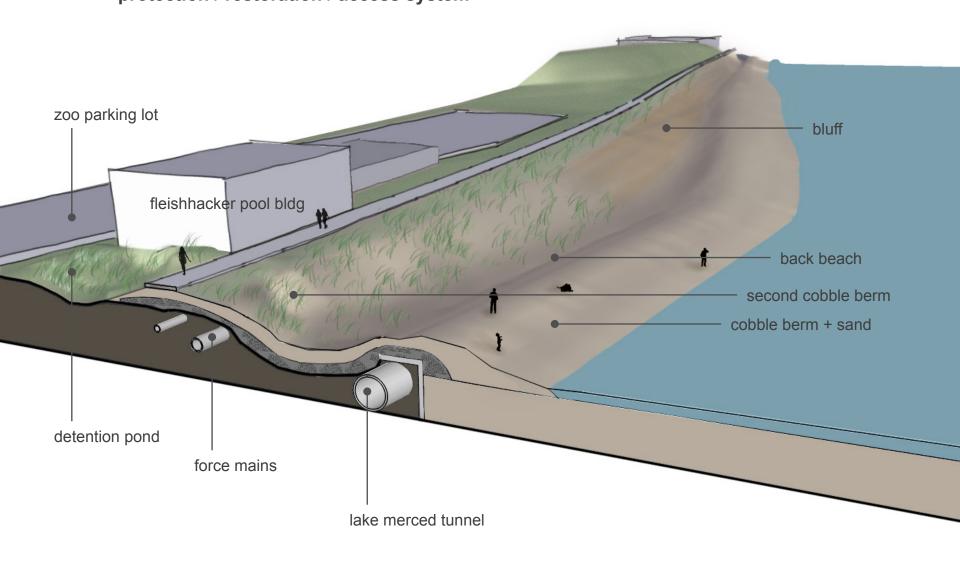
#### **KEY MOVE 2:**

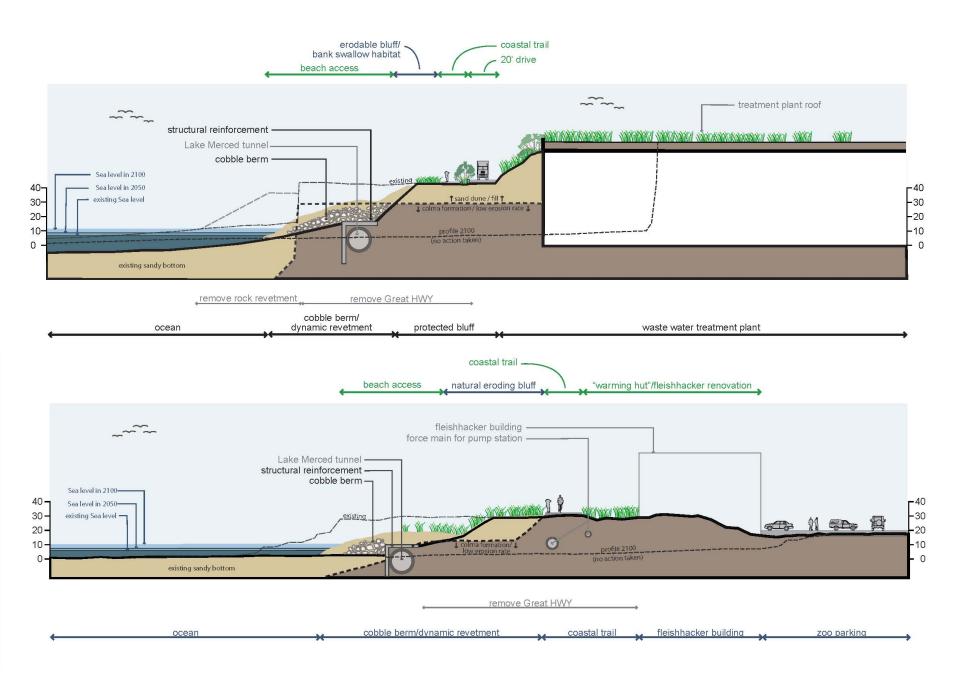
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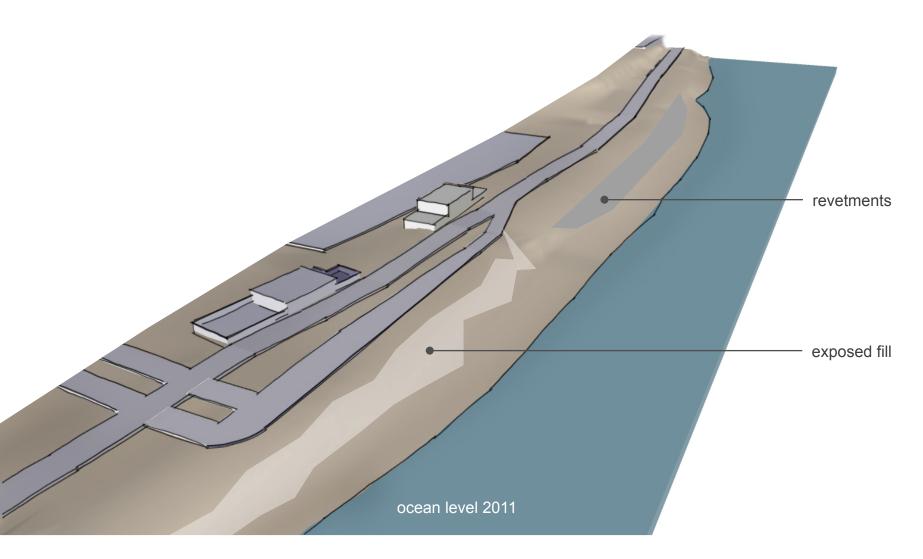
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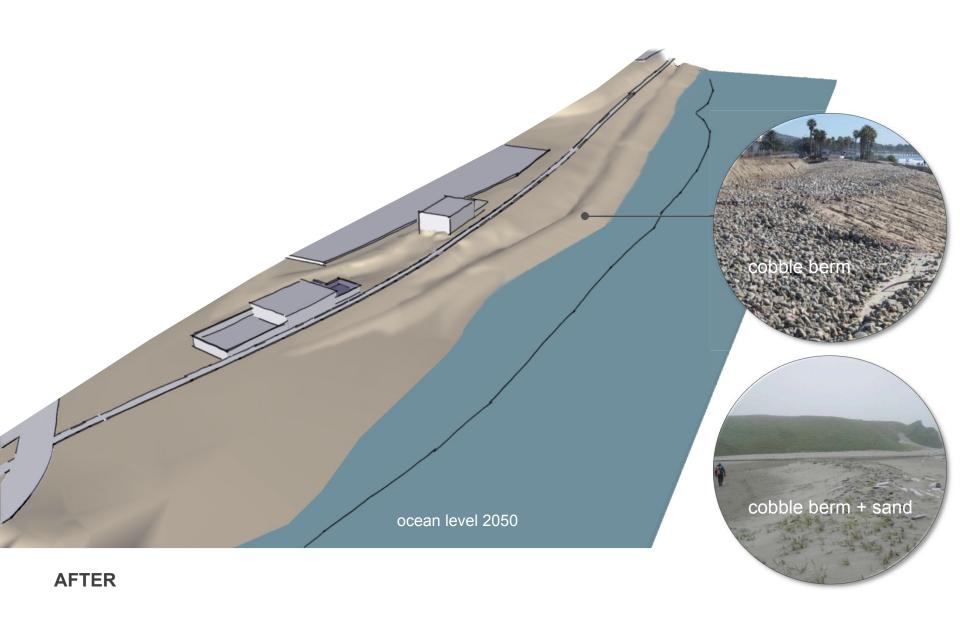
KEY MOVE 2: introduce a multi-purpose coastal protection / restoration / access system







**BEFORE** 



#### **KEY MOVE 2:**

introduce a multi-purpose coastal protection / restoration / access system

## benefits

- √ incorporates significant coastal retreat
- ✓ protects costly infrastructure in place for decades
- ✓ a softer approach to coastal protection, that can work with coastal processes
- ✓ restores ecological and recreational function

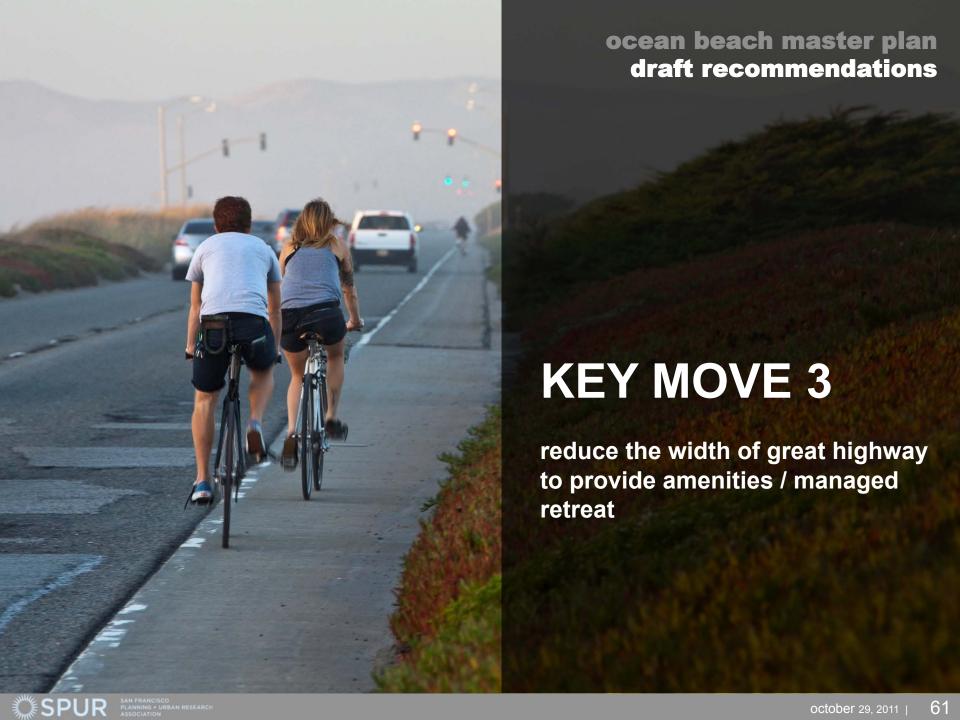
# constraints

- ✓ significant up-front investment from multiple agencies.
- ✓ challenging to maintain sand cover and surface restoration.
- ✓ depends on careful integration with army corps beach nourishment.
- ✓ new approach requiring careful study and monitoring

# outstanding questions

- ✓ can the tunnel be protected at a low enough profile for a reasonable cost?
- how will wave action interact with cobble and sand to shape the beach and berm?
- ✓ how will protection measures be phased to prevent spills, protect habitat, and manage cost?





# KEY MOVE 3: reduce the width of great highway to provide amenities / managed retreat

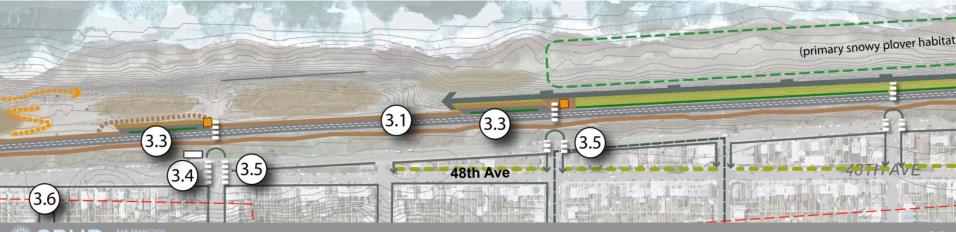
- 3.1 reduce great highway from 4 lanes to 2 at balboa-sloat, including wide shoulder for cycling/emergency access; use current south-bound lanes and median for dune restoration, amenities
- 3.2 reconfigure great highway/sloat intersection slightly inland, following transport box to avoid erosion
- 3.3 introduce small pockets of parking distributed at key access nodes
- 3.4 powered by wind and solarrestore existing restrooms; introduce 3 new off-the-grid restrooms
- 3.5 improve access at judah, taraval, rivera and noriega with trailheads/info, bike parking, vertical elements, etc
- 3.6 traffic calming and mitigation measures to lessen neighborhood traffic impacts
- 3.7 LID (Low-Impact Design) throughout adjacent neighborhoods to address stormwater management

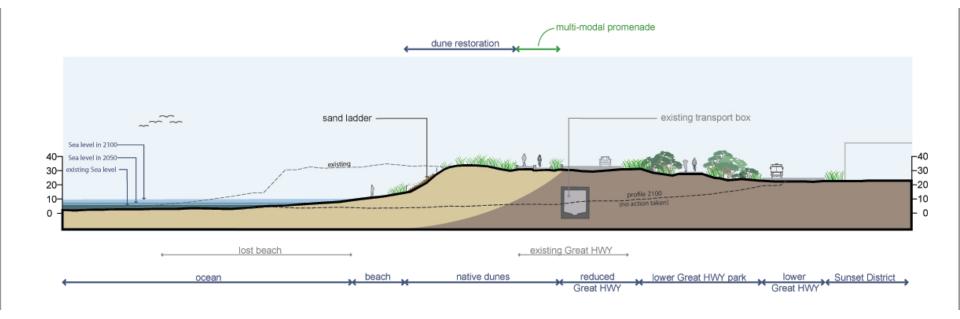


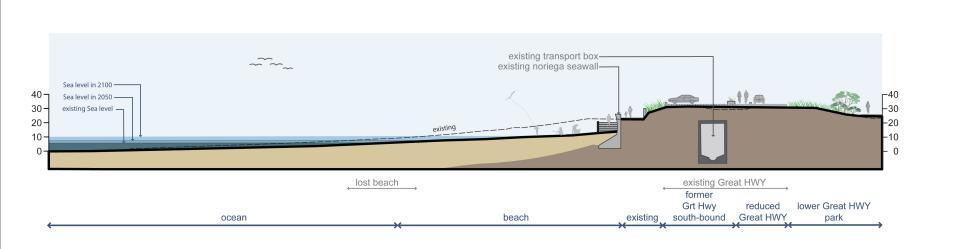
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#### **DETAIL**

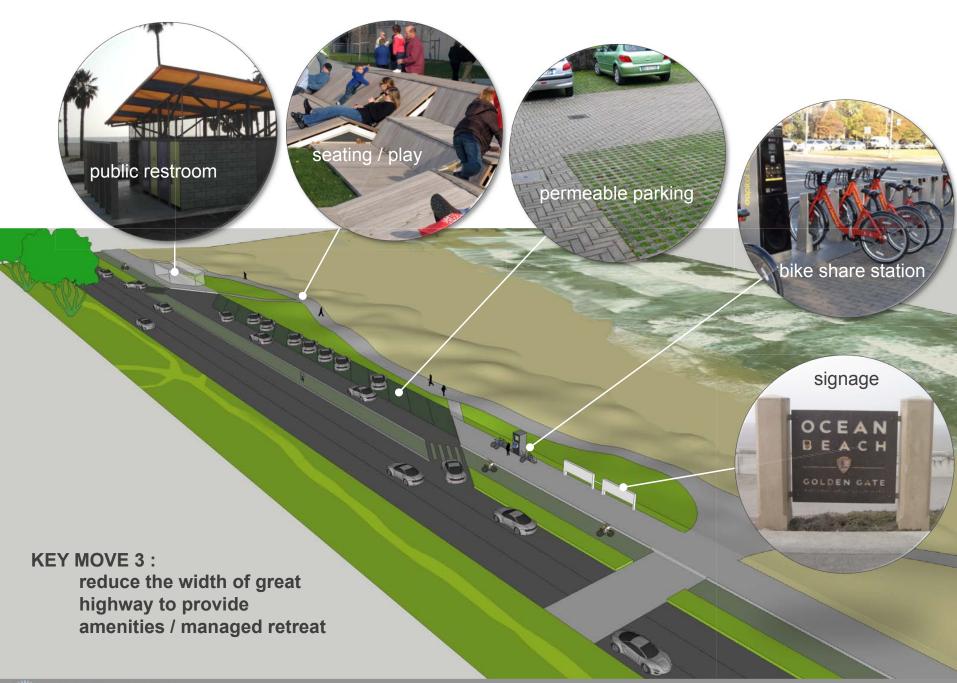






beach access

promenade distributed parking two-way bike way



#### **KEY MOVE 3:**

reduce the width of great highway to provide amenities / managed retreat

## benefits

- ✓ a restored dune system is given space to migrate landward, allowing a
  wider beach as sea-level rise sets in.
- ✓ allows space for additional amenities, improved beach access
- ✓ favors pedestrians, bicycles, beach access, and wildlife over traffic flow

# constraints

- ✓ traffic impacts, which may be significant, in adjacent neighborhoods
- ✓ limited space gained at substantial cost
- ✓ potential to bring more users to plover habitat areas.
- ✓ some redundancy between recreational trails

# outstanding questions

- ✓ what will traffic impacts be and to what degree can they be mitigated?
- ✓ how much additional beach width will result in the long run?

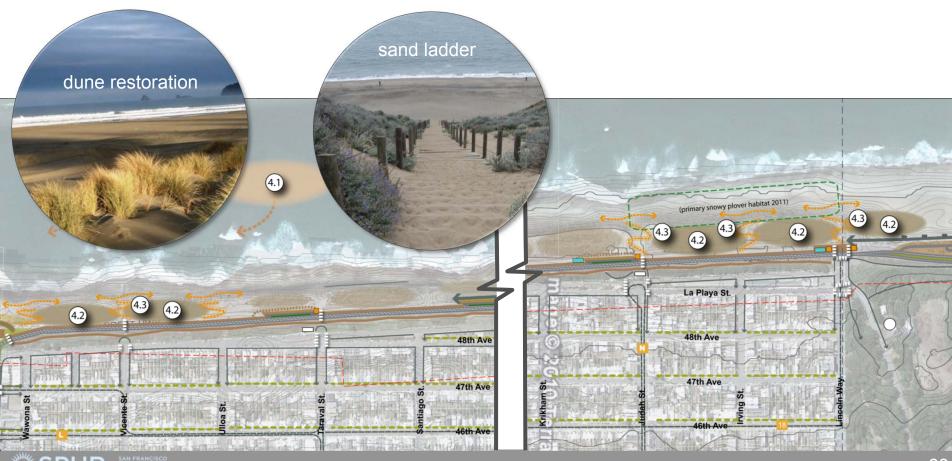


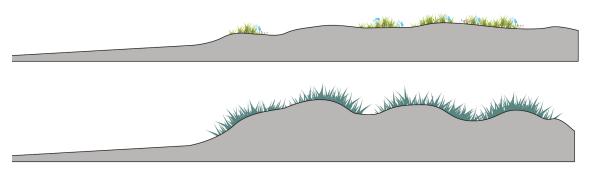
# **KEY MOVE 4**

middle reach native dune restoration

# **KEY MOVE 4:** middle reach native dune restoration

- 4.1 sand nourishment via army corps of engineers along southern end of middle reach
- 4.2 dune restoration in key locations: especially at lincoln, vicente
- 4.3 sand ladders and modular boardwalks provide access while limiting impact

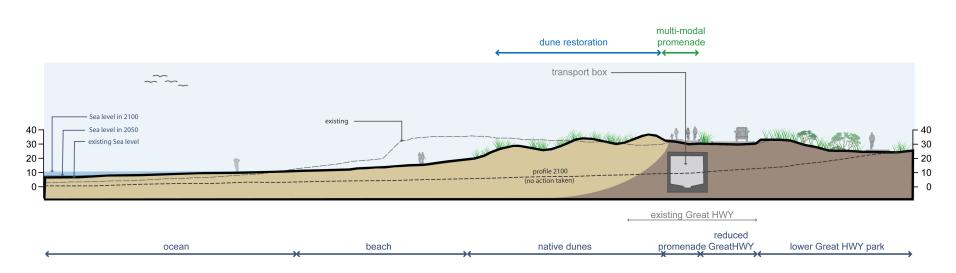




#### **CA** native dune profile

non-native dune profile

#### **EXISTING** non-native dune at OB



**PROPOSED** native dune restoration

# KEY MOVE 4: middle reach native dune restoration

# benefits

- ✓ ecological restoration and improved aesthetics
- ✓ removal of non-native species
- ✓ lower profile will allow more visual access to the ocean
- ✓ potential for improved sand management with lower profile

## constraints

- √ significant cost
- ✓ challenge of fully removing non-native grasses.
- ✓ access to dunes limited to protect restoration

# outstanding questions

- ✓ would a native dune form offer comparable coastal protection?
- ✓ to what degree would management of windblown sand be improved.
- how can sand placed through beach nourishment best feed the dune system?



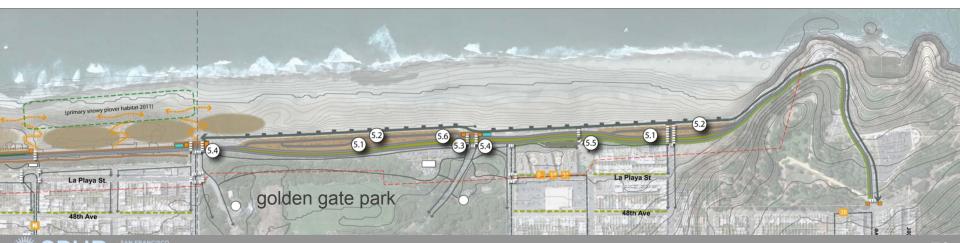


# ocean beach master plan draft recommendations **KEY MOVE 5** better connection between golden gate park and beach

#### **KEY MOVE 5:**

#### better connection between golden gate park and beach

- 5.1 tighten parking lot potentially replacing asphalt for permeable paving, preserve event/flex-space capacity
- 5.2 maintain row of "watching the water" parking
- 5.3 modify parking entrances, and improve pedestrian crossings at JFK/beach chalet
- 5.4 provide vertical arrival element / overlook at ends of golden gate park
- 5.5 add east side bike lanes (in both directions) north of fulton to balboa, connect bike trail with existing GGP trail right-of-way
- 5.6 add abundant bike parking
- 5.7 joint city/federal parking management plan, consider some fee parking on peak days
- 5.8 introduce landscape site elements and seating appropriate to rugged conditions and introduce and restore climate appropriate/native landscape



#### **KEY MOVE 5:**

better connection between golden gate park and beach



#### **KEY MOVE 5:**

better connection between golden gate park and beach

# benefits

- ✓ a sense of arrival in a context-appropriate landscape
- ✓ improved basic amenities at the busiest access point
- maintains parking and event capacity while improving pedestrian and bicycle safety
- ✓ improved environmental performance with permeable paving, alternative energy

## constraints

- √ cost
- ✓ interagency management challenges



### ocean beach master plan draft recommendations

# KEY MOVE 6: bicycle + pedestrian improvements north of balboa

- 6.1 narrow great highway north of balboa (from 4 to 2 lanes)
- 6.2 keep diagonal cliff house parking
- 6.3 narrow point lobos avenue from 4 lanes to 2, add 2-way separated bikeway on inland side; separated bikeway along cliff to prevent bicycle/vehicular conflict on steep slope
- 6.4 connect bike lane to bike trail to lands end and add "bicycle box" at pt lobos and 49<sup>th</sup>



#### **KEY MOVE 6:**

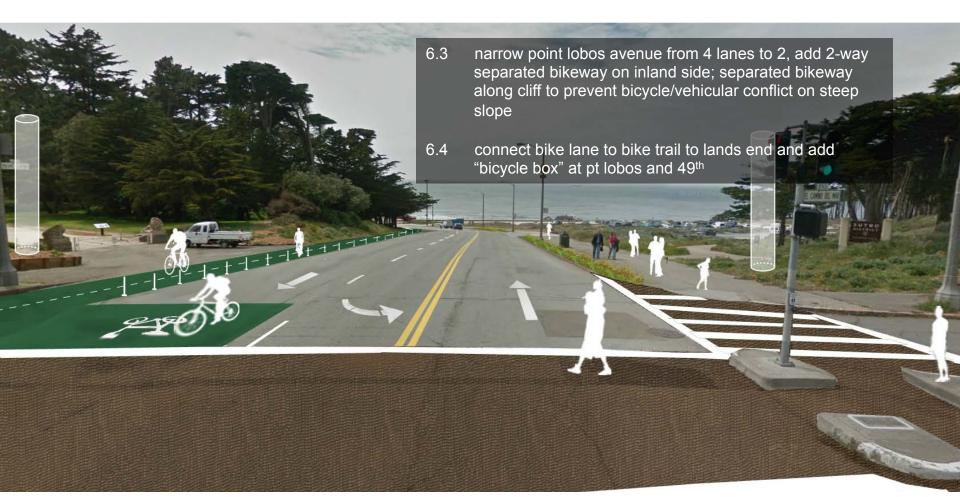
bicycle + pedestrian improvements north of balboa



**BEFORE** 

#### **KEY MOVE 6:**

bicycle + pedestrian improvements north of balboa



**AFTER** 

#### **KEY MOVE 6:**

bicycle + pedestrian improvements north of balboa

#### benefits

- ✓ improved pedestrian, bicycle safety, shortened crossings
- ✓ improved aesthetics and street design
- ✓ maintains cliff house parking while reducing car-bike conflicts
- ✓ enhances key recreational connection to land's end, coastal trail

#### constraints

✓ modest traffic impacts

#### outstanding questions

- ✓ what is the optimal arrangement of bicycle lanes along point lobos avenue?
- ✓ what will the traffic impacts be?

#### key moves

#### after 2050

- ✓ with the same assumptions:
  - additional armoring will likely be required
  - ✓ availability of sand may change
  - ✓ beach may become difficult to maintain
- ✓ revisit assumptions and adapt in 2030
  - ✓ infrastructure configuration
  - ✓ private property acquisition



## key move 7

ocean beach master plan adaptive revision: 2030

- ✓ better data on climate change
- ✓ advances in techniques and policies
- ✓ more public awareness
- ✓ 2 decades of proactive management
- ✓ 2 decades left in phase I

#### implementation updates

- ✓ Army Corps beach nourishment process update
  - ✓ Environmental Review Documents Pending
  - ✓ Beneficial Reuse Plan in Draft Form
  - ✓ Dredge retrofit awaiting funding





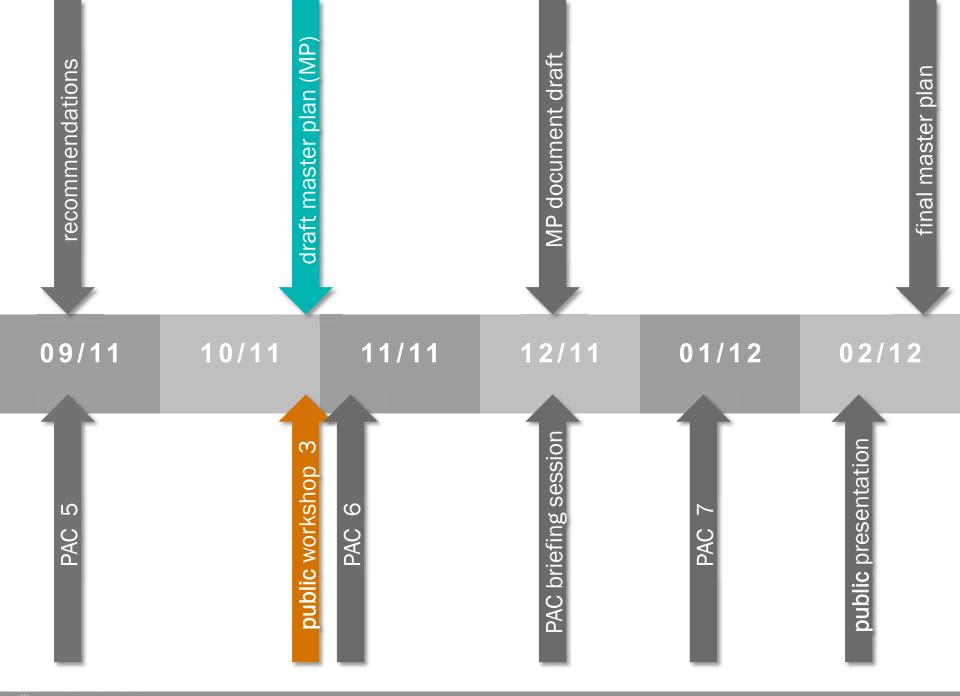
## implementation updates

- ✓ OBMP implementation roadmap in progress
  - projects
  - lead and partner agencies
  - regulatory process
  - funding opportunities

#### implementation updates

- ✓ Several efforts already pending
  - ✓ Recreation and Open Space Element (SF General Plan)
  - ✓ GGNRA General Management Plan Update (in Draft)
  - ✓ Urban Watersheds Framework (SFPUC)
  - ✓ "Tier 5" WestsideTransportation Study(meeting 11/2, SFSU)





## master plan document draft : december 2011 next public meeting : february 2012

questions / comments / suggestions? email: oceanbeach@spur.org