



Mooring Field Improved Utilization Report

Newport Beach Harbor Commission Objective

For

Harbor Viability

Within

Functional Area 2.3

Evaluate the current mooring fields and provide a recommendation for new guidelines that better define rows and fairways to improve navigation, safety, and optimization of space within the mooring fields

Ira Beer
Harbor Commissioner
June 8, 2022



Historical Background Relating to Mooring Extensions & Improving Navigation

- Historically, the Newport Harbor Mooring Fields had been managed by the Orange County Sheriff's Department (OCSD).
- Prior OCSD practice was to approve mooring extensions on an ad-hoc basis without any official policy, guidelines or best practices.
- In 2017, the City of Newport Beach ended its contract with the OCSD Harbor Patrol for mooring administration and code enforcement.
- In 2018, and as amended in 2022, the City Council approved the Harbor Commission Objective to evaluate the current mooring fields and provide a recommendation for new guidelines that better define rows and fairways to improve navigation, safety, and optimization of space within the mooring fields and allow for additional city moorings to be located within the designated mooring fields.
- In 2019, the Harbor Commission adopted a temporary policy to conditionally approve certain mooring extension requests of up to 5 feet. It was later determined this policy could adversely affect any design being developed for better utilization of space in the mooring fields and would be contrary to the Objectives approved by the City Council. Accordingly, no extensions have since been granted.



Current Status

- Newport Harbor is currently experiencing a mooring shortage. The City has only approximately 11 moorings for visiting mariners and no available moorings available for new long-term permittees.
- Current cost of entry to acquire a mooring permit in Newport Harbor is typically \$1,000 per foot or more. A mooring permittee with a 50' mooring will typically ask \$50,000 or more for the transfer of their permit to a new permittee.
- New City moorings will not require an acquisition fee and will therefore allow for more affordable boating.
- History of granting mooring extensions to existing permit holders without proper policy has resulted in less than desirable outcomes to aesthetics, safety and navigable water space. The mooring field footprints were originally intended to allow for safe navigation and use of the fairway space between mooring rows by the general public.
- As a result of prior practice, the current space within the mooring field footprints in many cases is not safely navigable nor suitable for public access and has turned into what closely resembles a crowded parking lot.



Improvements Under Consideration For Improved Safety and Utilization of Space

1. Utilizing shorter chain (or rode)

Benefits: Reducing the total chain length from 35' to 25' will result in a significantly reduced size mooring footprint (LOA).

Concern: Reduced chain length will require adding additional weight at a cost.

2. Consider a below surface spreader line mooring configuration (sand line), or at a minimum, require a floating spreader line between mooring buoys

Benefits: Prevent mooring buoys from drifting into fairways.

Provides for retrieving a single bow mooring line when tying to a mooring vs. retrieving both the bow and stern mooring lines separately. Increases fairway width for safer navigation.

Concern: Some boaters may require instruction on how to use a spreader line. However, about 30% to 40% of moorings currently have spreader lines. Lines may get caught up in propellers if a boater is not careful. Lines may get covered with silt and mud and may require cleaning.



Improvements Under Consideration For Improved Safety and Utilization of Space

3. Consider different anchors for securing the moorings to the sea floor

Benefits: Helical and manta anchors provide greater holding strength to accommodate a shorter rode without the need to add anchor weight. Provides for a smaller footprint resulting in less scarring on the seafloor.

Concern: Helical and manta anchors have a higher cost to relocate after installation.

4. Consider a double row vs. single row mooring configuration

Benefits: Provides much better utilization of space allowing for wider fairways, safer navigation and the addition of new moorings.

Concern: Although the shared anchor moorings will provide much greater space (up to 2X), inexperienced boaters may be uncomfortable approaching a mooring with a shared anchor.



Alternate Anchor Types Considered



Mushroom anchor, granite block, helical, pyramid and manta (not shown).



Metal (Block) Mooring Weight Specification For Two Point Mooring System in Newport Harbor

Mooring Length (feet)	Mooring Weight* (pounds)	Bottom Chain Size*(inches)	Top Chain Size*(inches)
20'	500	1/2"	1/2"
25'	650	1/2"	1/2"
30'	750	1/2"	1/2"
35'	1,000	5/8"	1/2"
40'	1,500	5/8"	1/2"
45'	2,000	3/4"	1/2"
50'	2,000	3/4"	1/2"
55'	2,500	3/4"	1/2"
60'	3,000	3/4"	1/2"
65'	3,000	1"	1/2"
70'	3,500	1"	5/8"
75'	3,500	1"	5/8"
80'	4,000	1"	3/4"
85'	4,500	1"	3/4"
90'	5,000	1"	3/4"
95'	5,000	1"	3/4"

* Weight and chain size shown in this table are minimums. Mooring permittee may adjust upward.



Helix Anchor System

(Anchor of Choice)

VINEYARD HAVEN, MA: COMPARATIVE PULL TEST

Mooring Type	Bottom Condition	Breakout Force
350-lb. Mushroom	5 ft. deep in mud	2,000 lb.
500-lb. Mushroom	in sand bottom	1,700 lb.
3,000-lb. concrete USCG block	set in mud	2,100 lb.
6,000-lb. cement block	on sand bottom	3,200 lb.
8 / 10 Helix	soft clay & mud	20,800+ lb.

ADVANTAGE HELIX ANCHOR SYSTEMS: Greatest holding strength is when pulled vertically as is the case when swells force the bow and stern of a boat up and down. Very important when considering a shorter rode and a shared anchor for a double mooring.

DISADVANTAGE OF BOTTOM MOORING WEIGHTS: Lowest holding strength when pulled straight up as opposed to at shallower angles. This results in requiring long scope of chain from the anchor weight to buoy causing buoys to drift deep into fairways when not tied to a boat. Shortening the rode will greatly increasing the bottom weight at both bow and stern.



Boring Log Map and Report



KC:\Jobs\090246-newport.cad\09024301-RP-02.dwg FIG-3
 Apr. 03, 2009 2:05pm phowell



Figure 3
 Example CAD Cell Locations
 Lower Newport Bay CAD Site Feasibility Study

Soil Boring Processing Log



Boring Location:		Boring <u>CNB-CAD-1</u> Date <u>9-6-09</u> Sheet <u>1</u> of <u>3</u>			
Job <u>Newport Harbor CAD</u> Job No.		Weather <u>N:tc</u>			
Logged By <u>Whelan + Stofforak</u>		Drilled By <u>Gregg Drilling</u>			
Time: <u>0900</u> Tide: <u>+4.0'</u>		Drill Type/Method <u>Auld Rotary</u>			
Leadline Depth: <u>15 ft</u>		Sampling Method <u>Split Spoon</u>			
Elevation: <u>-11 ft MLLW</u>		Bottom of Boring <u>ATD Water Level Depth</u>			
Obs. Well Install. <u>Yes</u> <u>1</u>		Datum: <u>MLLW</u>			
		Coordinates: <u>33°36.5057' N - 117°54.9050' W</u>			
		UTM: <u>1679887.42 N</u>			
		Easting: <u>658772.4 E</u>			
SIZE (%)		DEPTH	SAMPLE	REMARKS: Drill action, drill and sample procedures, water conditions, heave, etc.	SUMMARY LOG (Water & Date)
G	S	F	RECOVERY		
Max.	Range	Alt. Limits	Time From To Type Number <td>DESCRIPTION: Den., moist, color, minor, MAJOR CONSTITUENT, NON-SOIL SUBSTANCES: Color, staining, sheen, sorag, slag, etc. <td></td> </td>	DESCRIPTION: Den., moist, color, minor, MAJOR CONSTITUENT, NON-SOIL SUBSTANCES: Color, staining, sheen, sorag, slag, etc. <td></td>	
			0	0	
			1	1	
			2	2	
			3	3	
			4	4	
			5	5	
			6	6	
			7	7	
			8	8	
			9	9	
			10	10	
			11	11	
			12	12	
			13	13	
			14	14	
			15	15	
			16	16	
			17	17	
			18	18	
			19	19	
			20	20	

4
5
6

“Visual inspection of cores in the field indicated the material within the upper 5 feet of the surface typically a gray, very soft, silty clayey material that appears to be relatively recent sediment deposits. At depths below 5 feet, dense to very dense sand was encountered to the bottom of each boring.”
 Preliminarily, this material appears to be suitable for a helical type anchor system



Single Row Mooring Fields

Typical 2-Point Mooring Field



Typical Newport Harbor Mooring Field



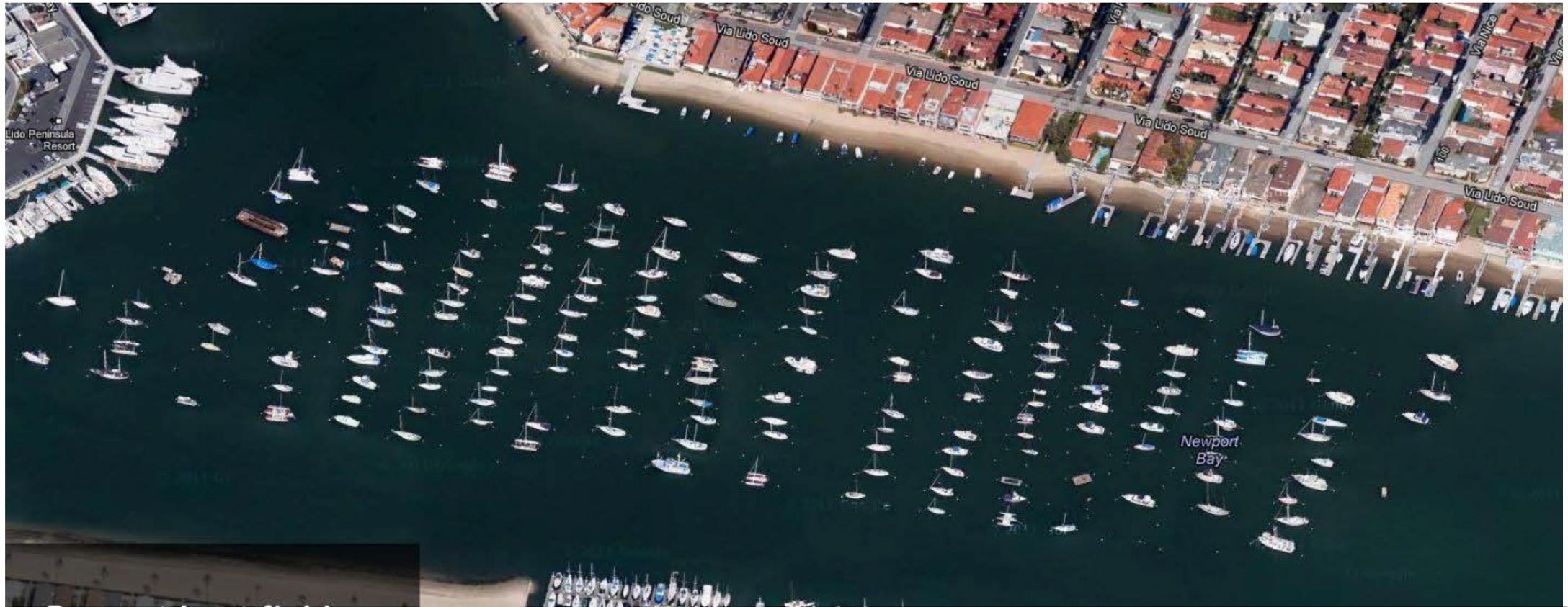
The typical 2-point mooring field above maintains consistent boat lengths in each row and clearly defined fairways for navigation. Newport Harbor mooring fields do not maintain consistency of boat lengths in rows or widths in fairways.



Single Row Mooring Field

Approximately 200 Moorings covering 1.3 million sq/ft (30 ACRES)

Newport Harbor Mooring Fields J & H



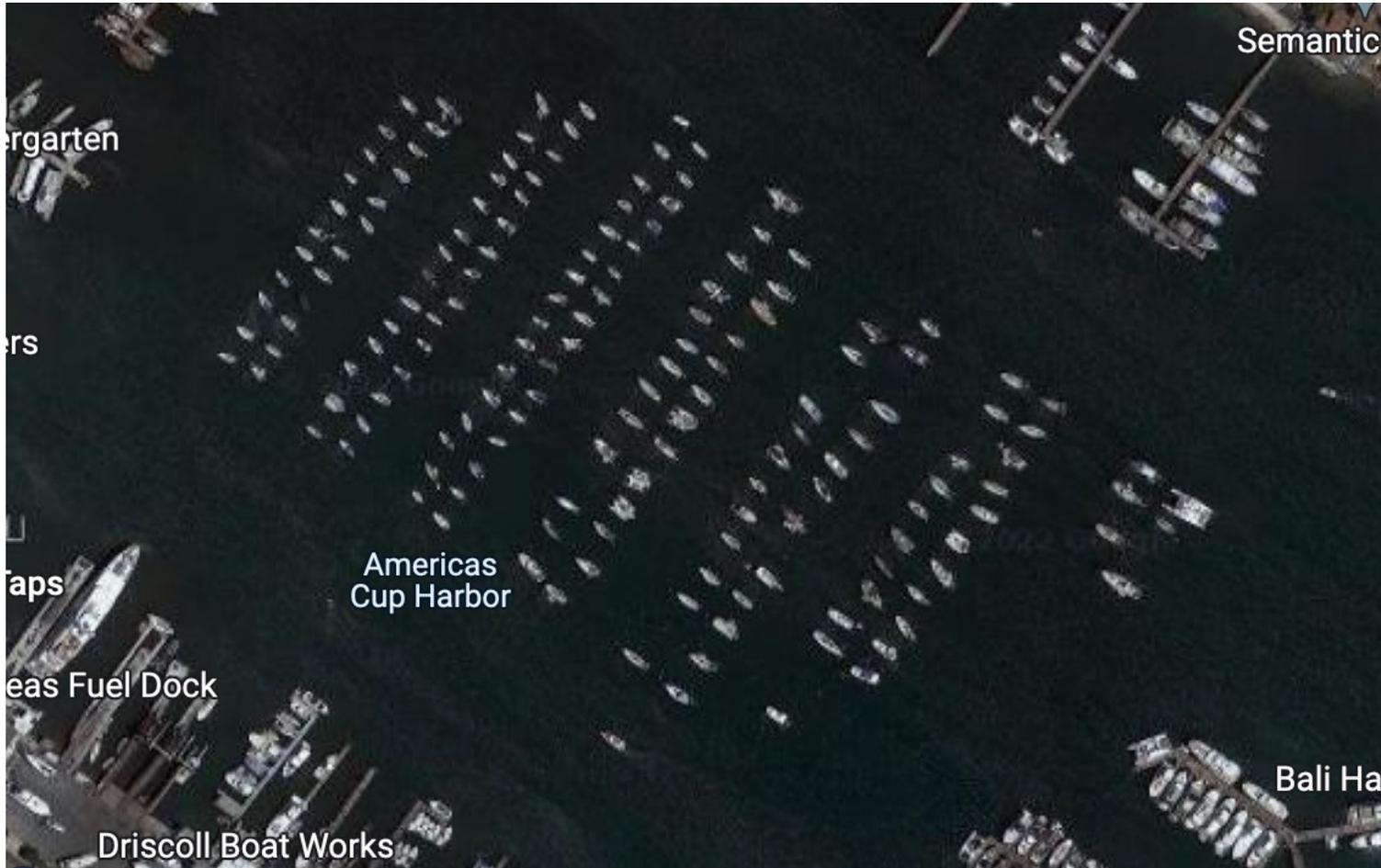
Without policies defining row and fairway sizes, a mooring field can become a safety concern to navigate and become very inefficient use of valuable waterways.



Double Row Mooring Configuration

America's Cup Harbor, San Diego

Approximately 180 Moorings covering 650,000 sq/ft (15 ACRES)

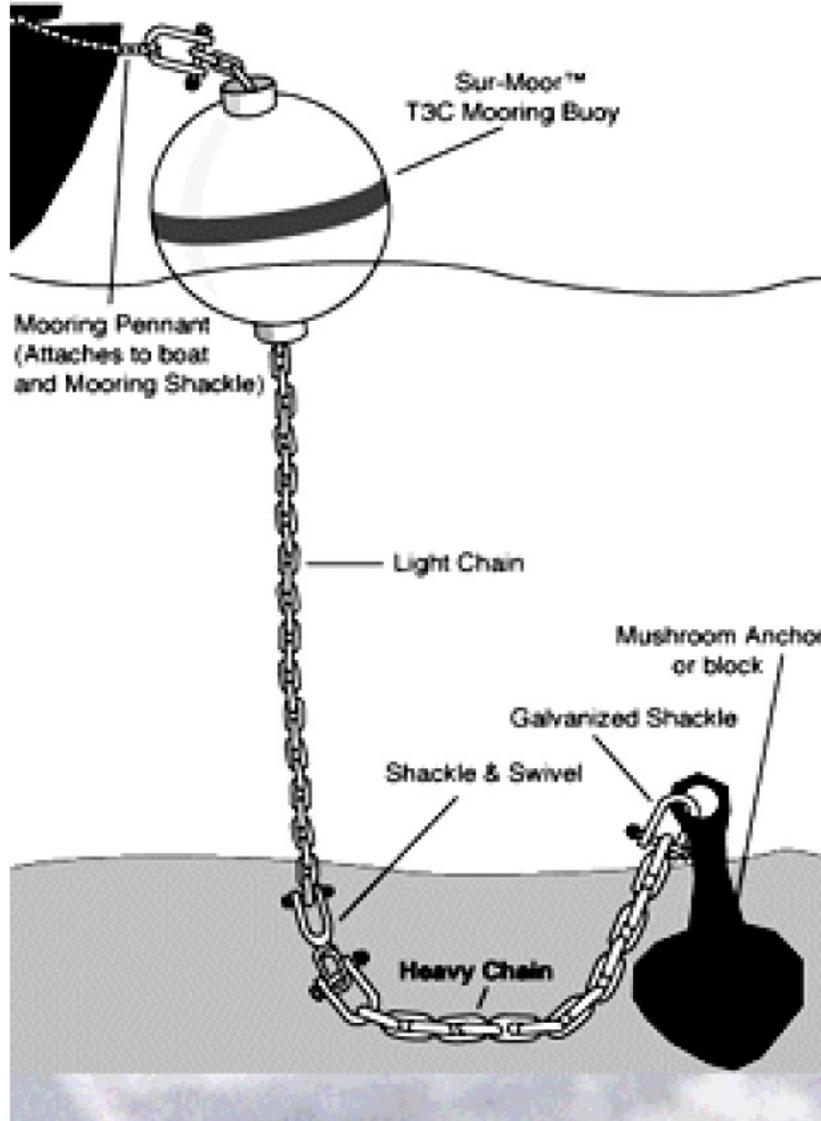


Similar to parking lots for vehicles, boats in double rows provide more efficient use of space than single rows allowing for wider fairways that improve safety, navigation and aesthetics.

Additionally, spreader lines allow for wider fairways without a 2nd buoy obstructing navigation.



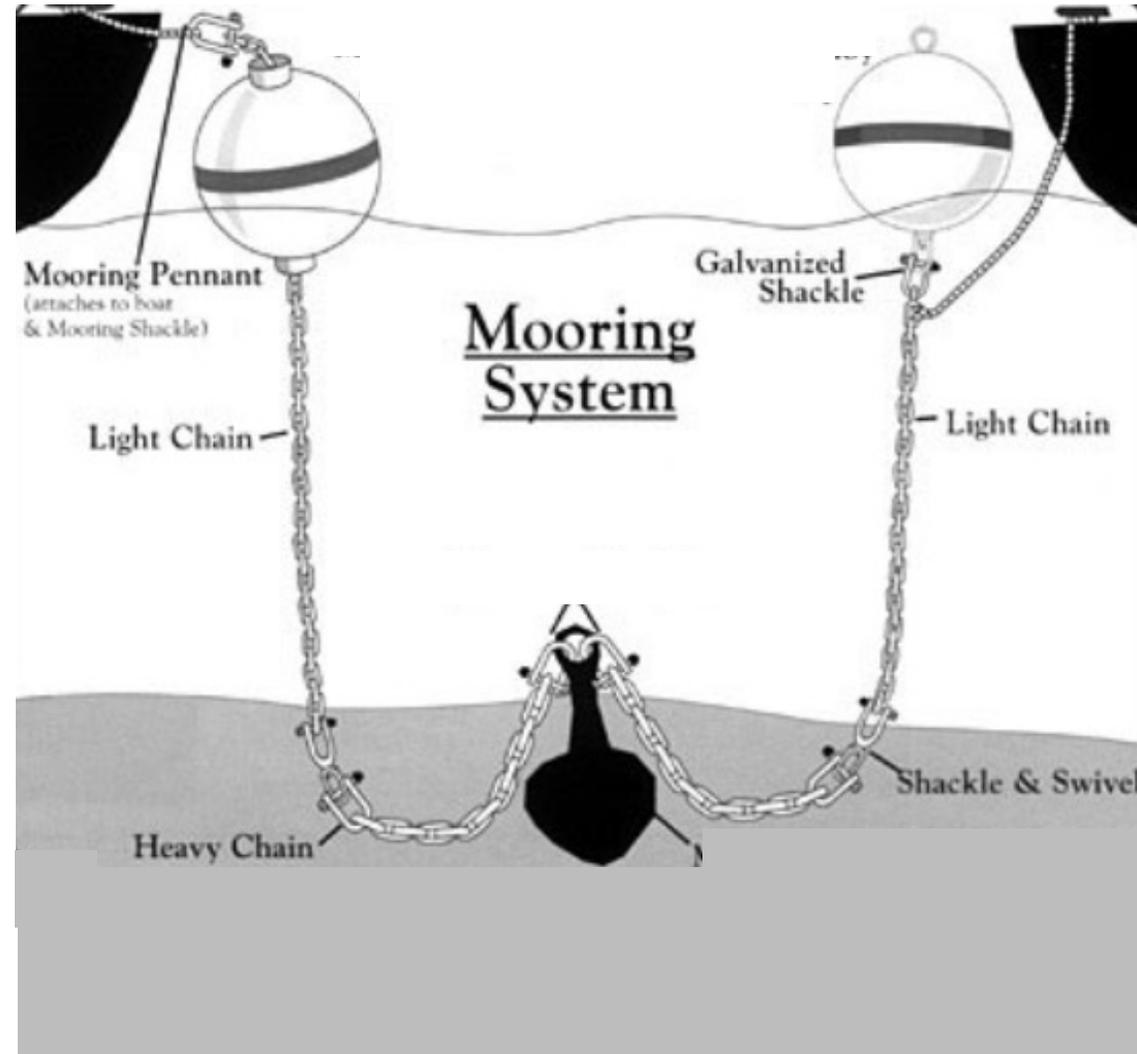
Typical Mooring Design In Newport Harbor



The diagram shows the typical configuration of an offshore mooring in Newport Harbor. A single two-point mooring will typically use two of the mooring configurations shown. One for the bow of the boat and one for the stern.



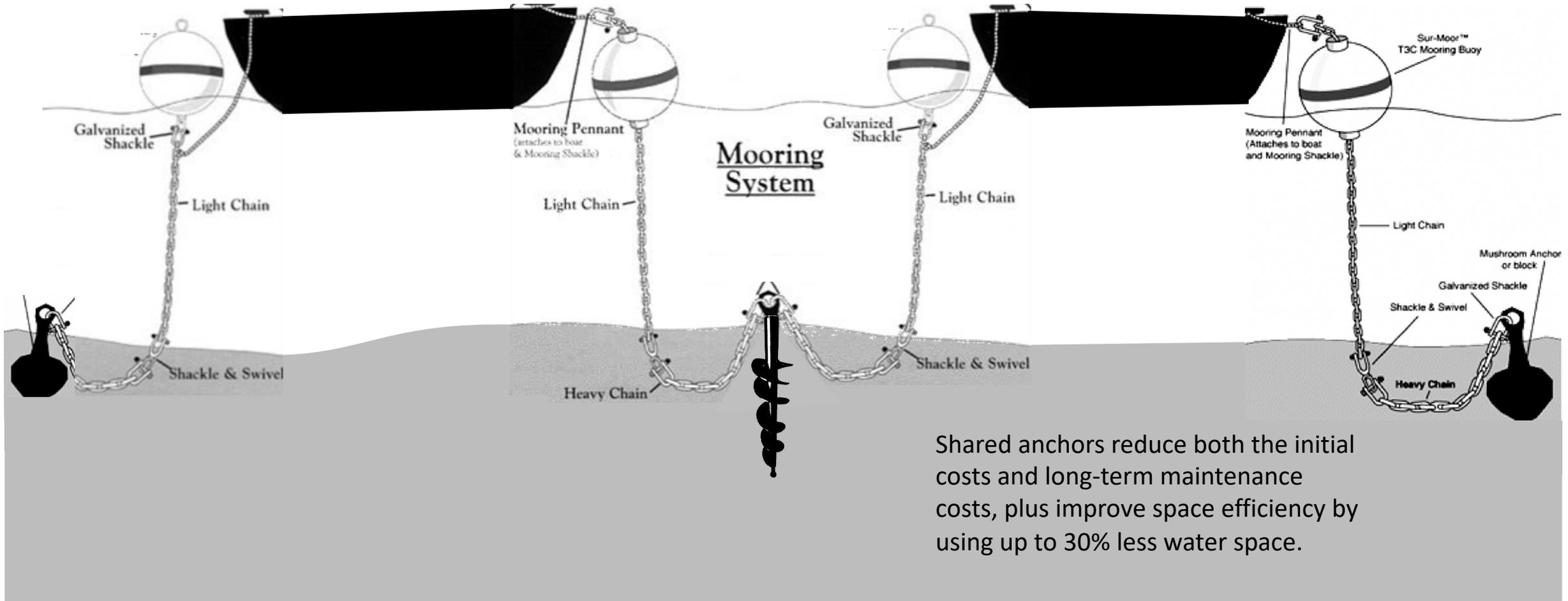
Typical Shared Center Mooring Anchor



One shared anchor properly sized will safely accommodate two boats.



Proposed Shared Center Helix Anchor



Shared anchors reduce both the initial costs and long-term maintenance costs, plus improve space efficiency by using up to 30% less water space.

Helix Anchor



Typical Spreader Line Mooring

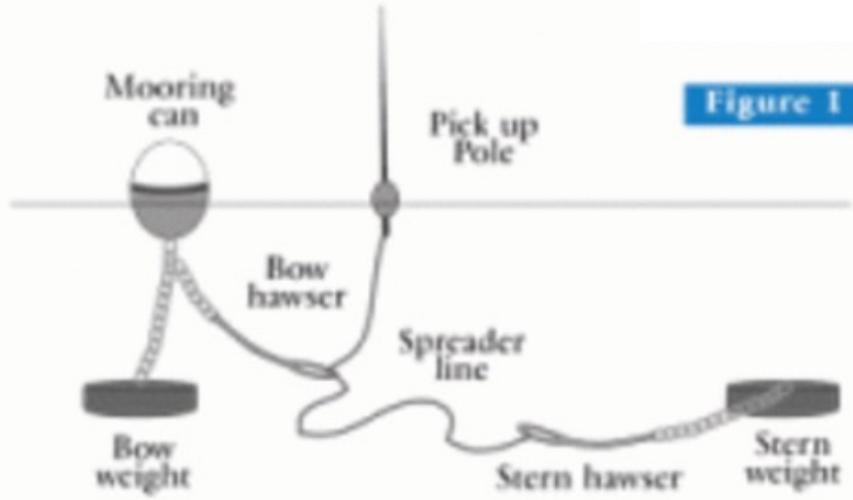


Figure 1

Spreader line moorings do not require the placement of a second buoy. This reduces the footprint of the mooring to a single point allowing for wider fairways between rows.

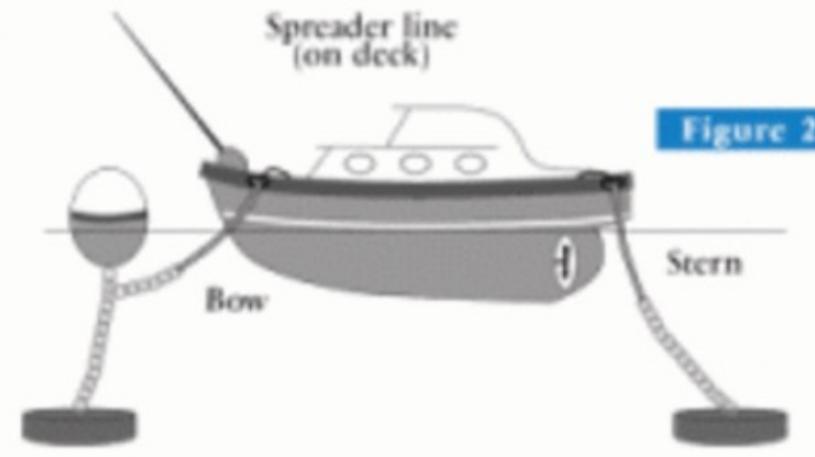


Figure 2

Spreader line moorings also allow a boater to retrieve only the one bow line from the mooring vs. both the bow and stern lines to secure the boat.

Without a stern buoy, sand line moorings will typically open about 20 feet more space in fairways.



Maintenance Cost Comparison For 2-Point and Shared Moorings

Current 2-Point Mooring Configuration Higher Maintenance Costs

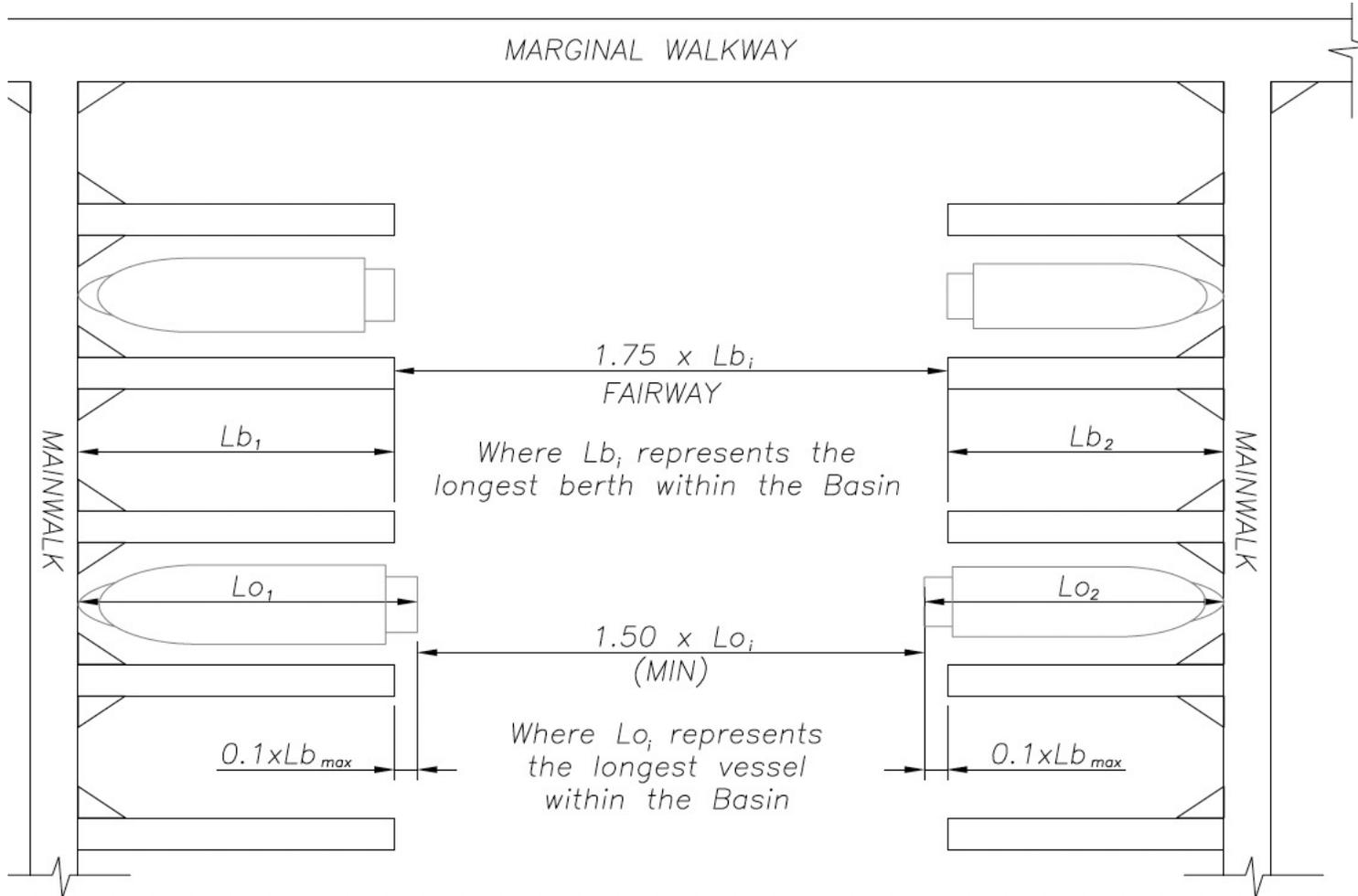
- Electrolysis wearing out the chain at the center shackle connection
- Thinner chain is replaced more often
- Both anchors need to be replaced in time
- Two mooring buoys to maintain

Proposed Shared Mooring Configuration Lower Long-term Maintenance Cost

- No center shackle
- Thicker chain wears slower
- City maintained Helix Anchor (or center weight)
- One Mooring buoy to maintain vs two



City of Newport Beach Harbor Design Standards

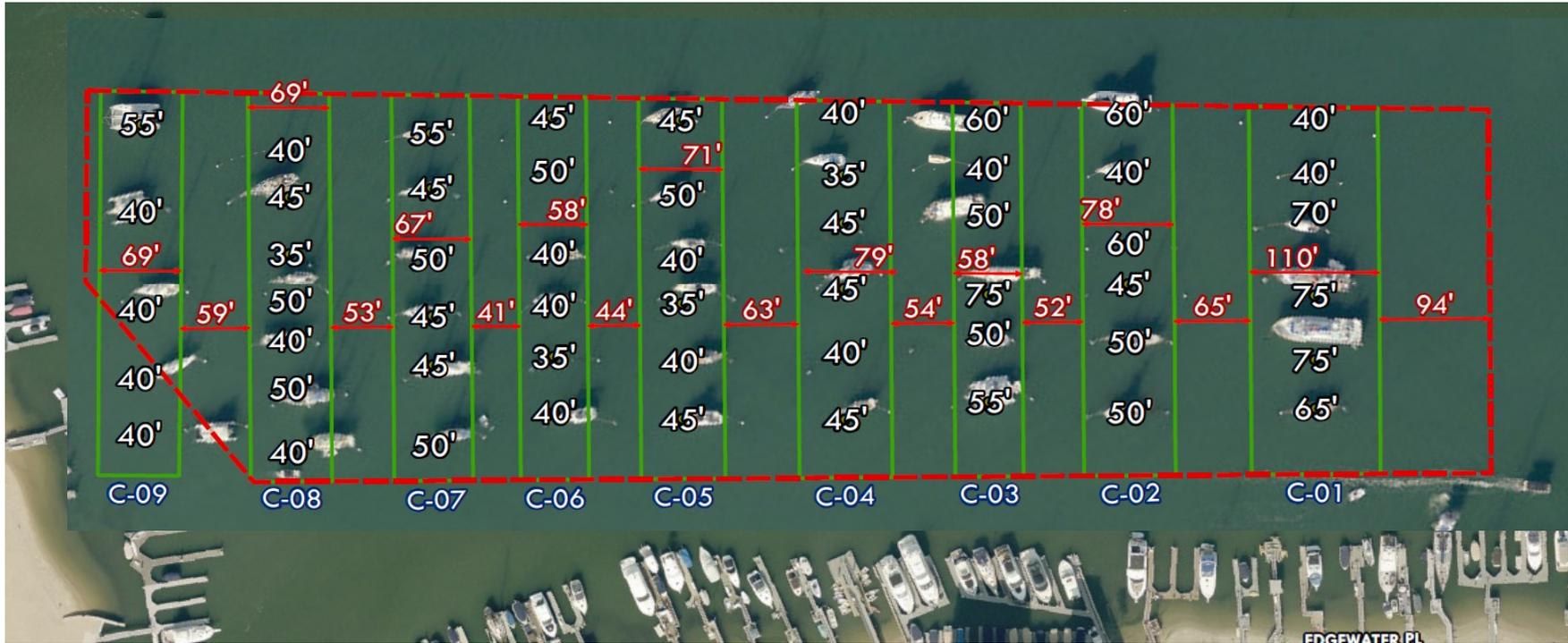


Harbor Design Standards adopted by the City of Newport Beach require the fairways (navigational area between slips) to be a minimum of 1.5 x the boat LOA (Length Overall)

Arguably, the fairways between rows in a mooring field should be held to the same or stricter guidelines as a marina slip is typically part of permanent structure. A mooring in open water allows for boat movement and drifting creating a less forgiving environment to safely navigate.



Existing Single Row Mooring Configuration C Field



Existing Conditions

All rows provide less than adequate spacing that is not compliant with Harbor Design Standards.

Examples of less than one boat LOA of fairway width between moorings and a significant underutilization of space. Example: Row C-03 has maximum space of 52' and 54', respectively, to navigate a 75' boat. Row C-06 only allows 41' to 44' to navigate a 50' boat.

Rows C-1 through C-3 have boat lengths varying as much as 35' in the same row from 40' to 75'.



Existing Single Row Mooring Configuration C Field



**New Configuration Provides
Improved Utilization of Space**

*Every row is in Substantial
Compliance with Harbor
Design Standards*

54	Existing Mooring
18	New Mooring

- 70' to 100' fairways between boats ranging from 30' to 70' LOA.
- Distance between vessels in same row is 55' minimum on center. Substantially greater than current conditions.
- **18 New City Moorings.** Approximately 16 new 60' moorings, 1 new 40' mooring and 1 new 70' mooring (33% increase)



Existing Single Row Mooring Configuration H Field



Every row provides less than adequate spacing and is not compliant with Harbor Design Standards.

Less than one boat LOA width between moorings.
Example: Fairways adjacent to rows H-04 and H-05 have maximum spacing of 31' to 40', respectively, to navigate 50' – 55' boats. Same exists for row H-04.

The typical distance between many boats in the same row is less than 30'.

Every row in the H-Field has boats with a minimum difference of 15 feet LOA in the same row. This is a poor utilization of space.



Double Row Mooring Configuration H Field



New Configuration Provides Improved Utilization of Space

*Every row is in substantial compliance with
Harbor Design Standards*

- 85' to 100' fairways between boats ranging from 50' to 80' LOA.
- Average distance between vessels in same row is 50' on center. Substantially greater than current conditions.
- **7 New City Moorings.** Approximately 5 new 50' moorings and 2 new 80' mooring

94	Existing Mooring
7	New Mooring



Single Row Mooring Configuration J Field



Every row provides less than adequate spacing and is not compliant with Harbor Design Standards.

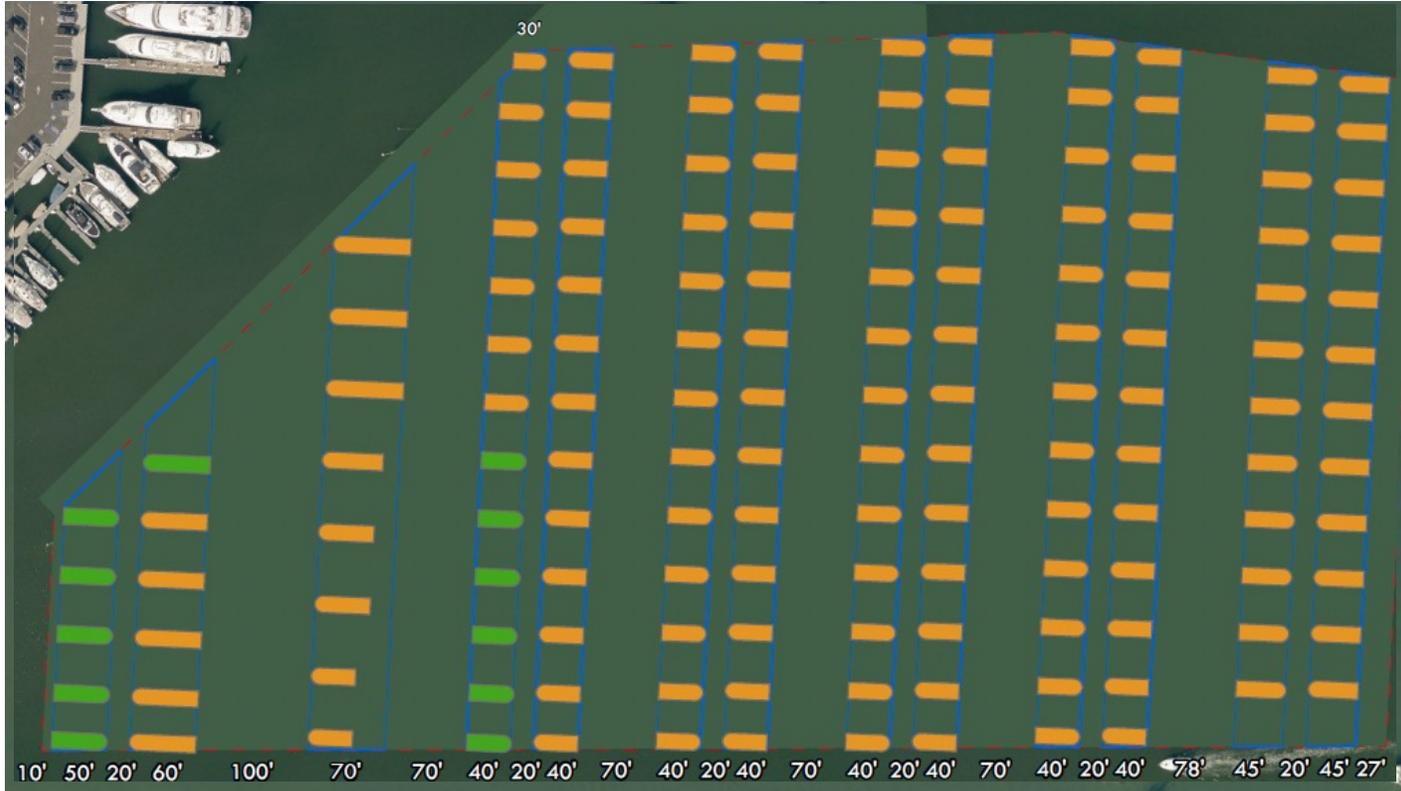
Less than one boat LOA width between moorings. Example: Fairways adjacent to all rows J-04, through J-08 have maximum spacing of 22' to 46', respectively, to navigate boats up to 55' LOA.

The typical distance between boats in the same row is less than 30'.

Every row in the J-Field has boats with a minimum difference of 15 feet LOA in the same row. This is a poor utilization of space.



Double Row Mooring Configuration J Field



- 123 Existing Mooring
- 12 New Mooring

New Configuration Provides Improved Utilization of Space

*Every row is in Substantial Compliance
with Harbor Design Standards*

- 70' to 100' fairways between boats ranging from 30' to 70' LOA. Compliance with Harbor Design Standards
- Average distance between vessels in same row is 50' on center. Substantially greater than current conditions.
- **12 New City Moorings.** Approximately 6 new 40' moorings, 5 new 50' moorings and 1 new 60' mooring.



Suggested New Guidelines for New Double Row Moorings (Partial list)

1. The City of Newport Beach will pay for the cost of reconfiguring the mooring fields to double rows. Costs include one new Helix Anchor system for every two moorings, relocation and/or addition of existing anchor weights and chain per new engineered specifications and new lines, as necessary.
2. Current mooring permittees will not pay any costs for the upgraded moorings but will continue to be responsible for maintenance of the chains, shackles, weights, lines and hardware. However, the City will maintain the new Helix Anchor system.
3. The new mooring configuration will accommodate all 5' extension requests formally submitted to the Harbor Department prior to June 1, 2022 (approximately 10 in total). No additional requests will be considered.
4. Mooring permittee shall remain responsible to provide documentation of bi-annual mooring inspections and compliance to City standards.
5. The addition of new City moorings will be awarded by lottery, followed by a waiting list, and will be non-transferable other than to immediate family members such as legal spouse, child, grandchild or sibling.



Suggested New Guidelines for New Double Row Moorings (Partial list continued)

5. All boats up to 50' LOA must be secured with minimum 3/4" nylon lines at bow and stern and boats greater than 50' LOA shall require 1" lines to be used.
6. For two-point moorings, all boats must be tied from both bow and stern to the mooring buoys, or in the case of a spreader line or single buoy two-point mooring then the stern shall be tied to the rode. The lines shall be a length of 10' or as otherwise determined and specified for each mooring.
7. Mooring permittees in general, and those specifically relocated to larger moorings than currently occupied will be subject to relocation at a future date as determined by the Public Works Director and/or Harbormaster as provided for under Title 17.60.040, Section B.
8. The Adjusted LOA as defined in Title 17 – Vessel Lengths, may not exceed the distance between the mooring buoys to which it is moored. At no time shall any portion of the boat or objects attached to the boat extend outward beyond the mooring buoy to which it is moored or obstruct any fairway.
9. Initially, there will be no additional increase in mooring fees for permittees that are relocated to larger moorings than are currently permitted and occupied. When a boat vacates a mooring or is replaced with a new boat, the mooring fees will then adjust, if necessary, to reflect the mooring size.



Suggested New Guidelines for New Double Row Moorings (Partial list continued)

9. Future requests for mooring extensions will not be granted. However, requests for relocation will be considered if received within one-year of the initial relocation from current permittees seeking a mooring no greater than 5' longer than is currently permitted for. If a boat was relocated to a mooring at least 5' larger than was permitted prior to the relocation, the Harbormaster shall have discretion to relocate that boat to another more appropriately sized mooring. Such approval shall be based on the exchange of mooring locations by two or more mooring permittees resulting in all mooring permittees being relocated in their current mooring field and in rows commensurate with their respective boat LOA. Any relocation will be conditional and subject to restrictions substantially similar those defined in Title 17.60.040, Section M and no boats will be relocated until and unless all the above provisions and of the Municipal Code have been satisfied.
10. In the event of an approved relocation of any vessel, only the permittee requesting the relocation to a larger mooring shall be required to pay a mooring transfer fee. The permittee whose vessel was relocated at the Harbormaster's request shall not be subject to a permit transfer fee.



Summary

Newport Harbor Mooring Field Redesign

- No upfront cost to existing mooring permittees.
- Accommodation for all 5' mooring extension requests received before June 1, 2022. Additional consideration for one-year for relocation extension requests up to 5'.
- Lower maintenance costs for mooring permittees.
- Greater average distance between boats.
- Substantially wider fairways that comply with Newport Harbor Design Standards.
- Safer navigation through the mooring fields.
- Improved public access through the mooring fields for both human-powered and motor-powered craft.
- Improved aesthetics for shoreline properties of residents, commercial establishments, visitors and all harbor users.
- Additional moorings that will (i) be more affordable and require no initial investment to use, and (ii) generate additional revenue to offset some of the annual deficit funded by the City of Newport Beach for the Tidelands Fund and Harbor Operations.



Question & Answer
Session
for
Harbor Commissioners

Presented by

Ira Beer
Harbor Commissioner



Public Comments

Open Forum

