REPORT
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moffatt & nichol

MARINA REPLACEMENT PLAN / CONCEPTUAL DESIGN REPORT

PREPARED BY: MOFFATT & NICHOL

In Association with
BST and Anchor QEA

Table of Contents

1. Introduction 1
2. Existing Marina Conditions 2
2.1. Marina Docks 2
2.2. Utilities 2
2.2.1. Mechanical 2
2.2.2. Electrical 2
2.3. Bathymetry 3
2.4. Eelgrass 3
3. Marina Market/Demand Updates 5
3.1. Marina Utilization Rates 5
3.2. Boating Market Trends and Projections 6
3.2.1. Washington State 6
3.2.2. Pierce-King County Region 8
3.3. Comparisons with Leading Puget Sound Marinas 9
3.4. Determine the optimal slip mix for the future 11
3.4.1. Existing Factors affecting Layouts 11
3.4.2. Determining Optimal Slip Layouts 11
3.4.3. Comparison with Existing and Proposed Layouts 12
3.5. Market Conclusions 13
4. Marina Dock Basis of Design 15
4.1. Basis of Marina Layouts 15
4.2. Layout Alternatives 16
4.3. Float Structure Types 22
4.4. Mechanical 24
4.5. Electrical 24
5. Financial Analysis 26
5.1. Current Financial Performance 26
5.1.1. Revenues 26
5.1.2. Expenses 26
5.1.3. Net Revenue and Debt Service Coverage 27
5.2. Cost Estimates 28
5.3. Financial analysis of reconfiguration layouts 28
5.3.1. Rates 29
5.3.2. Other Assumptions 31
5.3.3. Benefit/Cost Ratios 32
5.3.4. Financing 35
5.4. Finance Conclusions 37
6. Estimate of Construction Costs 39
6.1. Basis of Costs 39
6.1.1. Demolition 39
6.1.2. Floating Docks 39
6.1.3. Guide Pile 39

6.1.4. Gangway 40
6.1.5. Covered Structure 40
6.1.6. Mechanical 40
6.1.7. Electrical 40
7. Environmental Compliance Approach 41
7.1. Permitting 41
7.1.1. Federal Permits and Approvals 42
7.1.2. State Permits and Approvals 42
7.1.3. Local Permits and Approvals 43
7.2. Eelgrass and Macroalgae 44
7.3. ESA Mitigation Considerations 45
8. Summary 46
8.1. Finances 46
8.2. Marina Dock Design 46
9. References 47

List of Figures

Figure 1. Marina basin bathymetric survey (september 2021) 4
Figure 2. Average Des Moines Marina Occupancy (2017-2020) 5
Figure 3. Washington State New Boat Sales Trends by Length (26+ feet) 6
Figure 4. Washington State Registered Boats (26+feet) per 1,000 Residents 7
Figure 5. Washington State Registered Boats – Growth by Length Range 8
Figure 6. Pierce-King County Registered Boat Forecast (26+ feet) 9
Figure 7. Comparison of Slip Distribution with other Central Puget Sound Marinas 10
Figure 8. Layout 1A (All Open Moorage) 18
Figure 9. Layout 1B (All Open Moorage) 19
Figure 10. Layout 2A (Partial Covered) 20
Figure 11. Layout 2B (Partial Covered) 21
Figure 12. Moorage Revenues – Share by Payment Program 26
Figure 13. Benefit/Cost Ratios (Phase 1) 32
Figure 14. Benefit/Cost Ratios (Phase 2) 33
Figure 15. Benefit/Cost Ratios (Phase 1) 34
Figure 16. Benefit/Cost - Covered vs Open Slips 35
Figure 17. Debt Service for Open Slip Layouts 36
Figure 18. Debt Service for Mixed Slip Layouts 37
Figure 19. Floating dock system used for basis of costs 39
Figure 20. Eelgrass and Macroalgae Survey Results (September 2021) 45

List of Tables

Table 1. Optimal Slip Lengths for 30-foot to 39-foot range 11
Table 2. Optimal Slip Lengths for 40-foot to 49-foot 12

Table 3. Optimal Slip Lengths for 50-foot to 59-foot 12
Table 4. Comparison of Des Moines Marina Layouts 14
Table 5. Planning Level - Marina Layout Dimensions 16
Table 6. Marina Layout Alternatives 17
Table 7. Float Structure Comparison 22
Table 8. Current Financial Performance of the Des Moines Marina ($millions) 27
Table 9. Construction Cost by Proposed Layout ($million) 28
Table 10. Des Moines Monthly Rate Structure 29
Table 11. Puget Sound Monthly Marina Rate Assessment – Open Slips 30
Table 12. Puget Sound Monthly Marina Rate Assessment – Covered Slips 30

1. Introduction

The replacement of L, M and N Docks is the foundational first phase of a multi-phase marina redevelopment program. The City of Des Moines (City) has invested significant effort in exploring and developing the basis for an integrated, long-term, multiphase marina replacement. The starting point is provided by the City in the Redevelopment of Des Moines Marina Assessment and Strategy Report by Waggoner Marine Services (2018). The purpose of this project is to develop a Long-Range Conceptual Phasing Plan and analysis for dock replacement with a specific focus on Phase 1 replacement of L, M, and N Docks.

During Phase I, the team developed a permit strategy plan to identify the permits and approvals anticipated to be required for both near-term and long-term projects, including regulatory triggers (actions that create the requirement to obtain a given permit), timeframes (for both obtaining permits and anticipated longevity and expiration of each required permit), application materials, and general requirements associated with each permit and approval. The permit strategy was to verify necessary permits and approvals for each identified phase of the project along with those approvals that should be addressed for the entirety of the project. The long-range conceptual design process includes high-level mitigation scenarios through the NMFS application of the Habitat Equivalency Analysis (HEA) with their Nearshore Habitat Values Model (NVHM) to provide information on the overall project costs (i.e., construction and mitigation costs) and inform project regulatory and implementation phasing.

Long-term basis of design. A conceptual basis of design (BOD) for the marina replacement was developed in order to provide a guidance document for the City and the in-water improvements. The BOD included an evaluation of different float types, covered moorage structure configuration and appearance, associated relative costs, maintenance costs, and construction issues. Full replacement of the marina can be a 15 to 20-year multi-phase project and maintaining a consistent look, feel and quality across time is important. The overall layout would be defined including issues such as layout of covered moorage, access float and gangway configuration, ADA compliance, consideration of electrical and fire protection requirements, the flow and function of the marina property and integration with the marina vision and other projects.

2. Existing Marina Conditions

2.1. Marina Docks

The existing marina consists of a combination of open and covered moorage. In the areas of open moorage, the floating docks are modular concrete floats, anchored in place by creosote treated timber pile. For the covered moorage, the timber roof structures are supported by timber float systems, anchored by creosote treated timber pile. A condition assessment was completed in 2020 (Reid Middleton 2020) to evaluate the overall condition of the in-water marina structures visible above the water line. Findings indicated that although the concrete floating docks and timber pile may have approximately 15 to 25 years of useful service life remaining with routine maintenance, the timber floats with the covered roof structures are nearing the end of their service life with an estimated 10 to 15 years of useful service life remaining. This estimate of remaining service life is subject to change due to continued escalating deterioration of the marina structures.

2.2. Utilities

2.2.1. Mechanical

Potable water is provided on all docks. Potable water is connected to the upland potable water system, utilizing reduced pressure backflow prevention with flexible hoses on the gangway. Hoses are routed in a traveling link cable/hose carrier assembly, known as Kabel Schlepp. Each slip is provided with a hose connection. The existing potable water system on the floats must be drained prior to anticipated temperatures below freezing to avoid damage to the system. Only Docks J, M, N and Guest Moorage have the Kabel Schlepp at the gangways.

Moorage areas do not have sewer pump-out. There is a sewer pump-out station at the fuelling dock.

Fire protection on the floating dock is provided by a manual dry standpipe system on all docks. Nominal spacing for hose connections along the main walkways is approximately 250-300 feet apart, to provide coverage of 150 feet to any point from a hose connection. The standpipe system extends to a fire department connection on the mainwalk float at the bottom of the gangway. The covered moorage areas do not have a fire sprinkler system for protection.

2.2.2. Electrical

The incoming service for the marina is a 12, 470 volt, 3 phase service that is provided by Puget Sound Energy from the Des Moines Substation. The utility service is supplied by a 15kV pole located on 6th Avenue South above the central stairwell to 6th Avenue. The service travels down the pole to an underground duct. From the pole, the conductors travel underground and down the hillside to the 15kV sectionalizer switch.

The 15kV switch connects two loop feed conductor systems, north and south. This loop allows for more flexibility and redundancy to the medium voltage system. The conductors are routed through a series of manholes connected by a ductbank along the street on the east side of the property next to the hillside. This design allows for easier installation of future loads and connections to the 12.47kV distribution within the manhole without restriction to capacity.

From the manholes, another loop system feeds each distribution transformer. The transformers are liquid-filled, loop feed, pad-mounted, 12.47kV:480/277 volt, 3 phase transformers protected by fuses. Each transformer feeds a 480/277 volt, 3 phase, distribution switchgear with a main circuit breaker. Each load is protected by circuit breakers. Distribution Switchboard 3 (DSB3) is rated for 1500 amperes provides power for Docks M, N, Guest #1 and #2. DSB3 has ground fault protection. Distribution Switchboard 4 (DSB4) provides power for the office, new office building addition, existing restroom and pier building and the power

pedestals for miscellaneous events, such as the carnival. In 2016, the remainder of the 15kV feeders from the repair yard down to Dock A was replaced with new and the existing Switchboards KL, IJ, GH, FE, and ABCD were reconnected to the new feeder. The original upland transformers in the vaults, switchboards, and feeders onto the docks are beyond their service life and needs to be replaced as soon as possible.

From each switchboard, the dock feeders are routed underground, under the gangway, and routed into the end of the dock and into the branch panelboard. From each panelboard, the shore power boxes are fed from below. Each slip has a shore power box with a local disconnect, plug and revenue meter. Most of the existing shore power boxes on the smaller slips are 20 amp, 1 phase, 120 volt type. On the larger slips, they are 30 amp, 1 phase, 120 volt type.

Docks A, B, C and D panelboards and shore power boxes have been replaced with newer equipment since 2000. In 2013, a fire occurred on Dock J, which resulted in replacement of the incoming power from the switchboard, one of the two dock panelboards and replacement of the first half of the shore power boxes and connections to the 2nd half of the dock.

For some of the slips on the other docks, the shore boxes were replaced due to normal wear and tear, such as the end of Docks E and K. Those units were replaced with local boxes with meters and circuit breakers at those specific individual slips. Otherwise, there is no existing ground fault protection for each dock panelboard or for the overall dock per today's current Electrical Code requirements.

2.3. Bathymetry

A multibeam survey of the marina basin was completed in September 2021. Water depths in the Guest Moorage (north section of the marina basin) and in the area of M and N Docks, average about -15 feet Mean Lower Low Water (MLLW). The remaining marina basin has water depths of -13 to -14 feet MLLW.

2.4. Eelgrass

A video survey of the L, M and N Docks was completed in late September 2021. The results are discussed in Section 7.2 of this report.

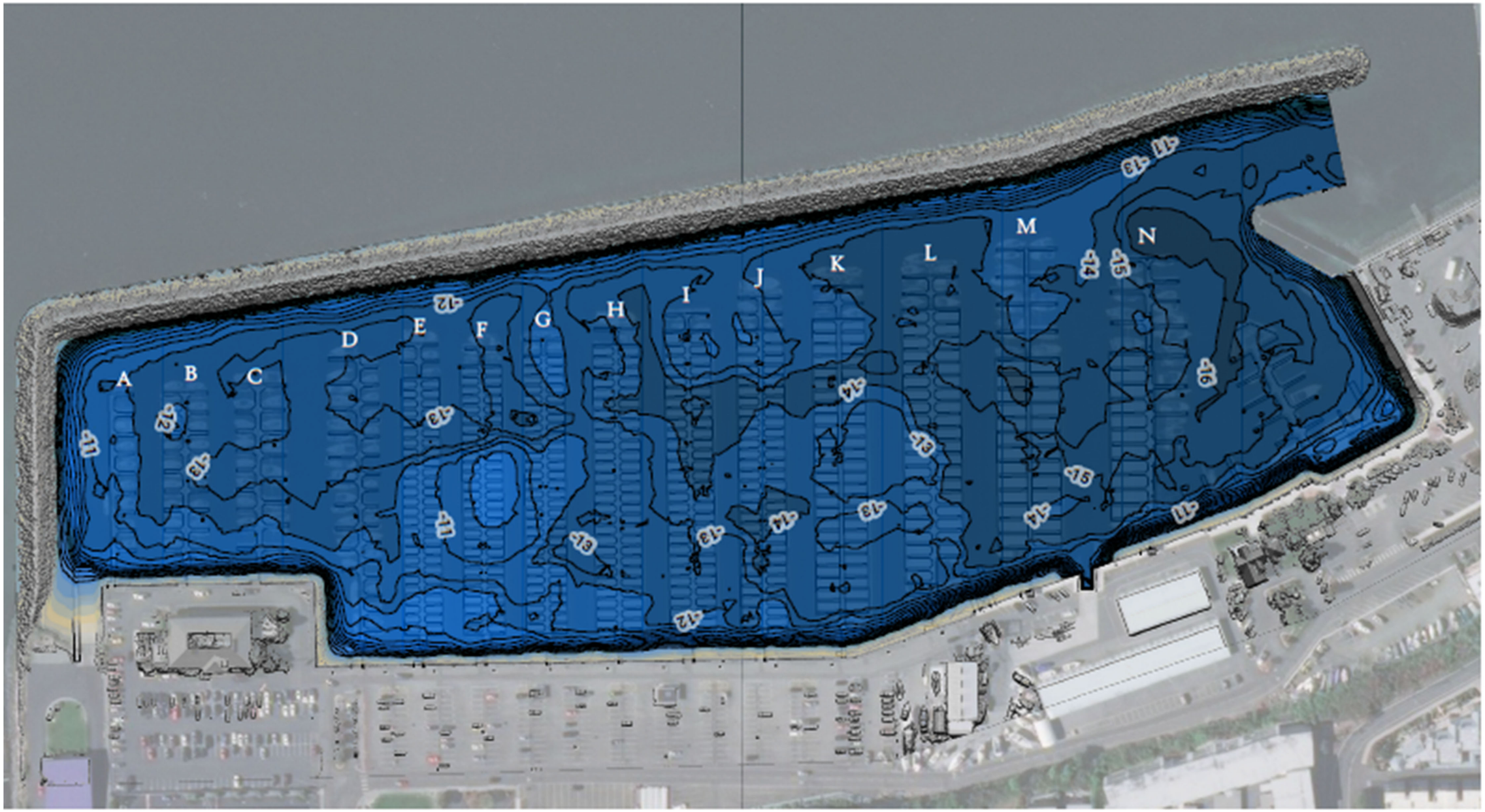


FIGURE 1. MARINA BASIN BATHYMETRIC SURVEY (SEPTEMBER 2021)

3. Marina Market/Demand Updates

BST Associates prepared a detailed analysis of marina market trends for the City of Des Moines Marina. This analysis was then used to recommend the appropriate mix of moorage slips at the City of Des Moines Marina.

This market analysis was prepared in late 2021 and is based on data through 2020.

The City of Des Moines Marina serves a regional market that includes King County and Pierce County. Approximately 98% of current tenants are residents of these two counties, and approximately 21% of all tenants are residents of Des Moines. Future layouts of the marina should reflect the needs of the regional market.

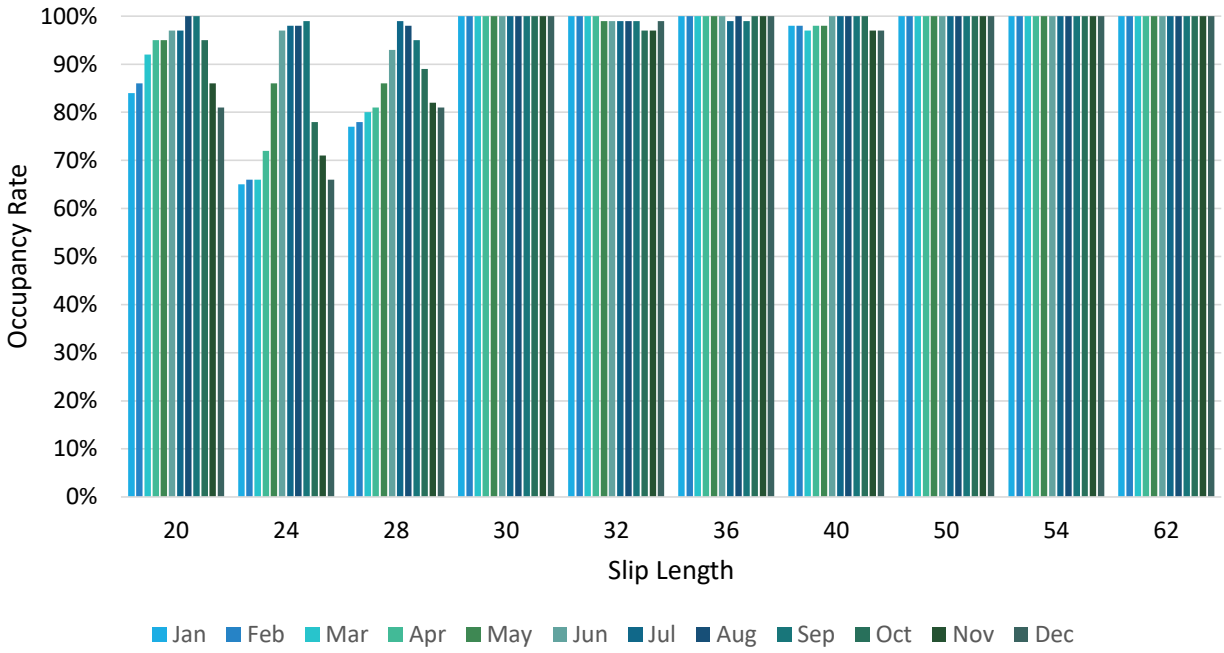
3.1. Marina Utilization Rates

The City of Des Moines Marina has a total of 734 slips, including end-ties. Approximately 63.5% of these slips are covered, and 35.5% are open (i.e., not covered).

Compared with the regional market, Des Moines has a disproportionate number of smaller slips. Approximately 66% of the existing slips are less than 30 feet long, which is not unusual for Puget Sound marinas that were constructed more than 30 or 40 years ago. However, average boat lengths have increased substantially over time, and the existing slip distribution does not match the recreational fleet in the market.

The result of the mis-match between slip sizes and boat lengths is that annual occupancy is low for slips under 30 feet long. Most smaller boats are easily trailered, which causes vacancies during the off-peak season and negatively impacts financial performance. In contrast, slips that are 30-feet and longer are performing near full-occupancy year-round. (See Figure 2).

FIGURE 2. AVERAGE DES MOINES MARINA OCCUPANCY (2017-2020)



In order to accommodate the existing tenant base the City has allowed overhangs, i.e., boats that are longer than the slips they are in. In some cases, a boat may extend as much as four to five feet past the end of

the slip. However, the farther boats extend past the ends of slips the more they constrict the width of the fairways used to egress/ingress slips. After the marina is reconfigured with longer slips, it is recommended that overhangs be eliminated.

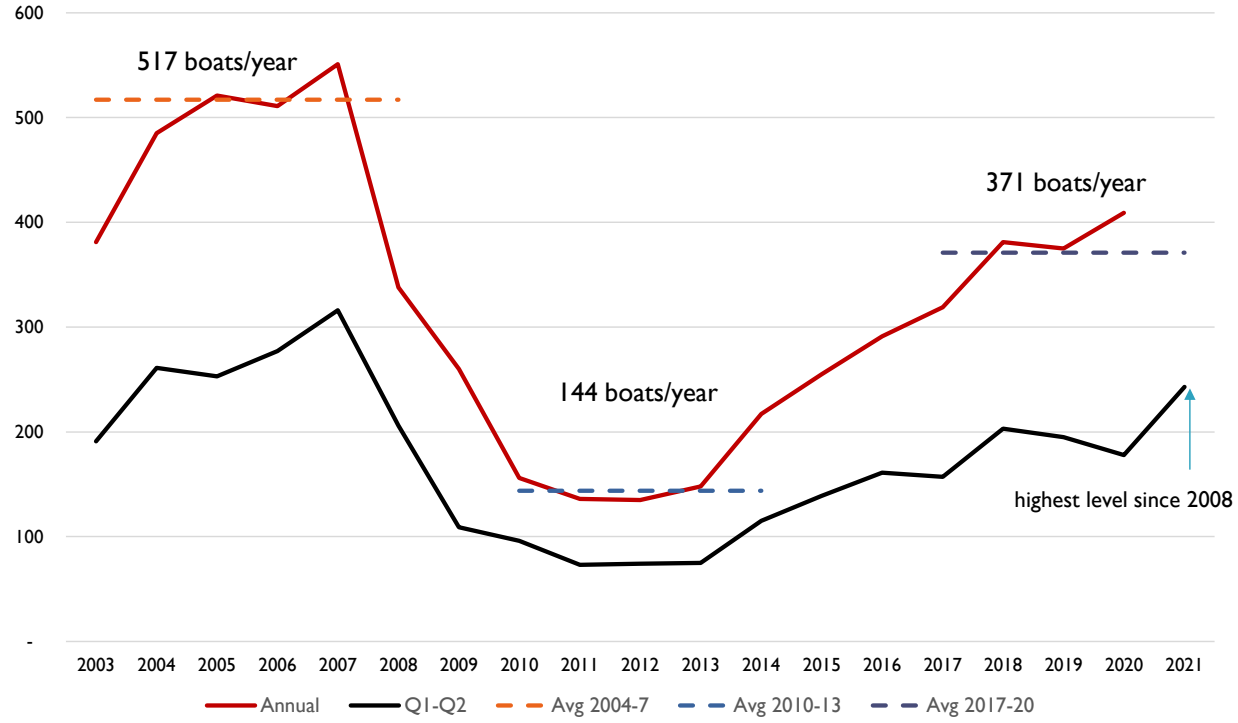
3.2. Boating Market Trends and Projections

Boat ownership trends and forecasts are described in this section.

3.2.1. Washington State

New boat sales in Washington have been volatile over the past 18 years, as consumers have responded to economic conditions. New boat sales peaked in the period from 2004 to 2007 at approximately 517 new boats per year. The recession that began in 2008 caused a steep decline in sales that didn't bottom out until 2011, and annual sales averaged 144 new boats from 2010 to 2013. Sales have increased relatively steadily since 2013, and averaged 371 new boats per year 2017 to 2020.[1] (See Figure 3)

FIGURE 3. WASHINGTON STATE NEW BOAT SALES TRENDS BY LENGTH (26+ FEET)



Source: Northwest Marine Trade Association/SeaGrant using Dept of Licensing data

According to a recent analysis, Covid 19 actually helped to boost boat sales:

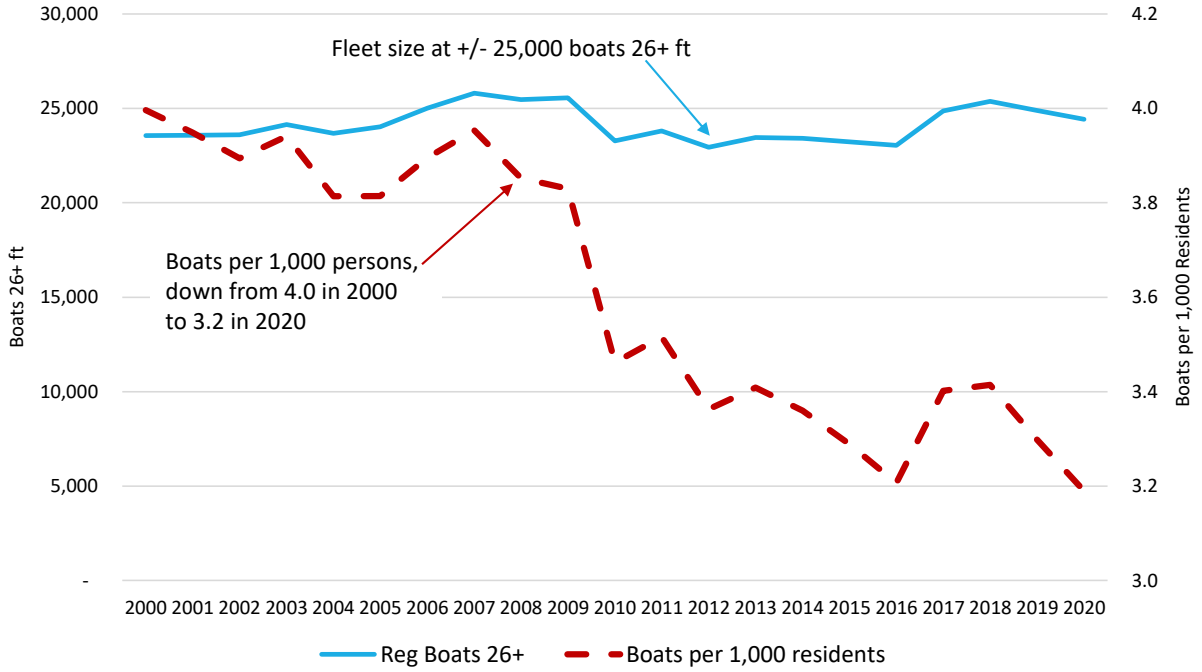
- "Originally having busy, packed schedules, boaters and non-boaters didn't have the time to fit these activities in, spending the little flexible time on other priorities.
- However, the spread of the coronavirus led to flexible schedules, reduced working hours and the elimination of typical activities, offering up free time with few things to do.

[1] This section focuses on boats that are 26 feet and longer because they represent the majority of boats requiring wet moorage.

- Looking ahead, it will be critical to maintain appeal and remain top of mind to ensure fishing and boating stays in the consideration set of 'things to do.'[2]

Boats that were purchased new between 2003 and 2020 account for approximately 20% to 40% of the registered fleet in 2020, depending on the length range. As shown in Figure 6, the number of registered boats 26 feet and longer in Washington has remained fairly consistent at 23,000 to 25,000 units from 2000 to 2020. Per capita sales of boats 26 feet and over has decreased significantly during this period. Boats per 1,000 persons, decreased from 4.0 in 2000 to 3.2 in 2020. However, the drop in per capita sales was offset by growth in population.[3] (See Figure 4).

FIGURE 4. WASHINGTON STATE REGISTERED BOATS (26+FEET) PER 1,000 RESIDENTS



Source: BST Associates using data from Washington State Department of Licensing and the Office of Financial Management

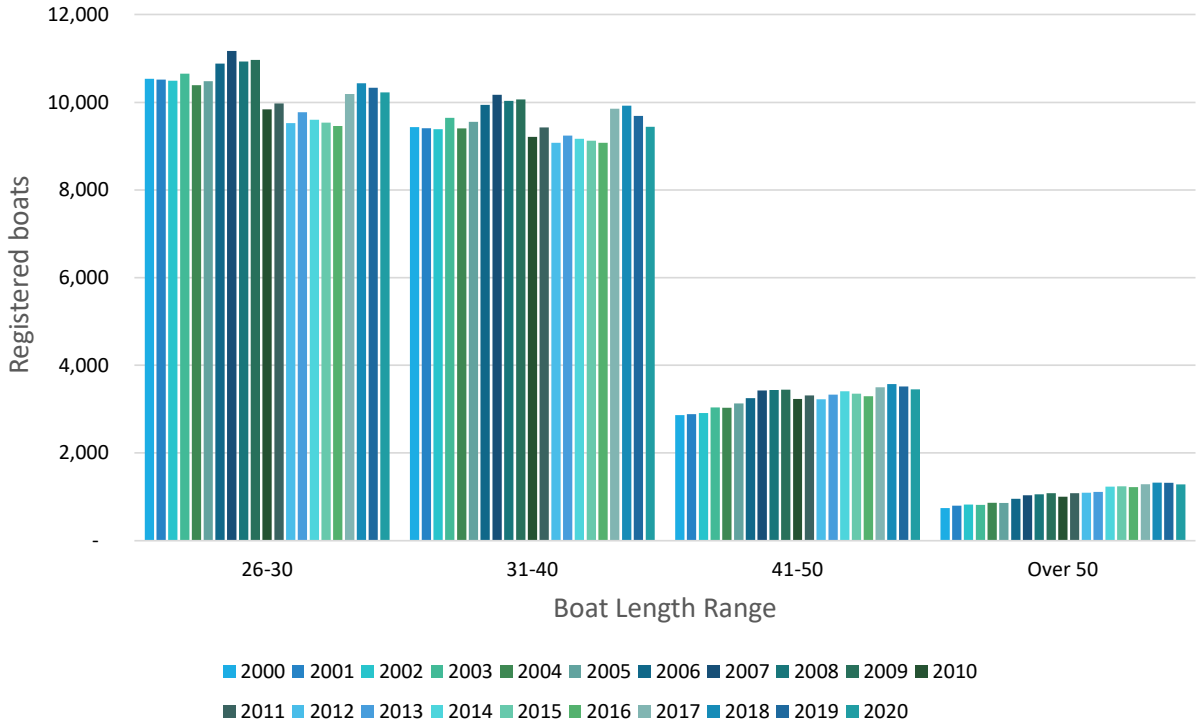
Smaller boats (26 to 40 feet), represent a large share of the recreational fleet, but exhibited little growth in annual registrations during the past 20 years. Longer boats (over 40 feet) showed significant growth. As shown in Figure 5, growth trends in statewide boat registrations from 2000 to 2020 were as follows:

- 26- to 30-foot boats remained stable with little growth (-0.1% per year),
- 31- to 40-foot boats remained stable with little growth (0.0% per year),
- 41- to 50-foot boat registrations increased 0.9% per year, and
- Registrations for boats over 50 feet increased 2.8% per year.

[2] Casting a wide net: Identifying New Anglers & Boaters and Determining Tactics for Retention, TAKEMEFISHING/IPSOS Nov 2020

[3] The Department of Licensing uses hull length to measure vessel length. Marinas use length overall (LOA), which includes swim steps, bow pulpits, dinghies, motors and other devices protruding from the hull. BST evaluated Des Moines tenants hull length versus LOA and found that, on average, LOA was 10% longer than hull length.

FIGURE 5. WASHINGTON STATE REGISTERED BOATS – GROWTH BY LENGTH RANGE



Source: BST Associates using data from Washington State Department of Licensing

3.2.2. Pierce-King County Region

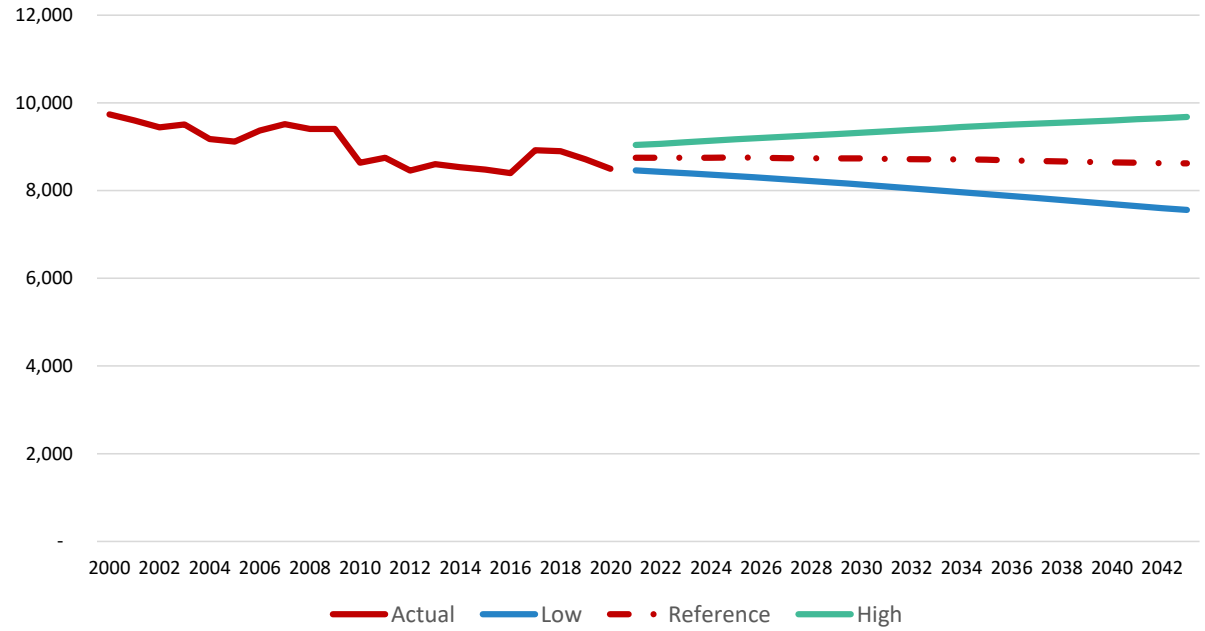
Pierce-King County trends lagged behind those in Washington State, and as a result, the Pierce-King County region lost market share:

- Number of 26 to 30 foot boats declined slightly (-0.9% per year), and market share of Washington State declined by 6.1%
- Number of 31 to 40 foot boats also declined slightly (-0.7% per year), , and market share of Washington State declined by 6.8%
- 41 to 50 foot boat registrations increased 0.2% per year, and market share of Washington State declined by 7.7%
- Registrations for boats over 50 feet increased 2.6% per year, and market share of Washington State declined by 1.4%

The forecast for Pierce-King County in 2043 ranges from:

- Low forecast - 7,500 boats, representing a decrease from 2020 of 938 boats,
- Reference forecast – 8,600 boats, representing an increase of 120 boats,
- High forecast – 9,700 boats, representing an increase of 1,200 boats.

FIGURE 6. PIERCE-KING COUNTY REGISTERED BOAT FORECAST (26+ FEET)



Source: BST Associates using data from Washington State Department of Licensing and the Office of Financial Management

Two additional factors which will likely impact future boat ownership, are 1) aging out and 2) changing patterns of ownership.

- Age - Boaters have begun aging out and are not being replaced. Continued loss is expected if this trend continues, or core boaters (baby boomers) may become a larger share of the market. Participation by Millennials and GenZ is relatively low.
- Boat Ownership - The average boater uses the boat around 15 days per year, making it a perfect candidate for shared ownership. This market has been growing, including in such services as boat rentals, charters, boat clubs, and fractional ownership. This trend could attract more non-boaters to boating, but shared ownership could also reduce the demand for marina slips.

3.3. Comparisons with Leading Puget Sound Marinas

The slip characteristics at the Des Moines Marina were compared with four of the largest public marinas on Puget Sound, including Shilshole Bay Marina, Elliott Bay Marina, Port of Everett Marina, and Port of Edmonds Marina.

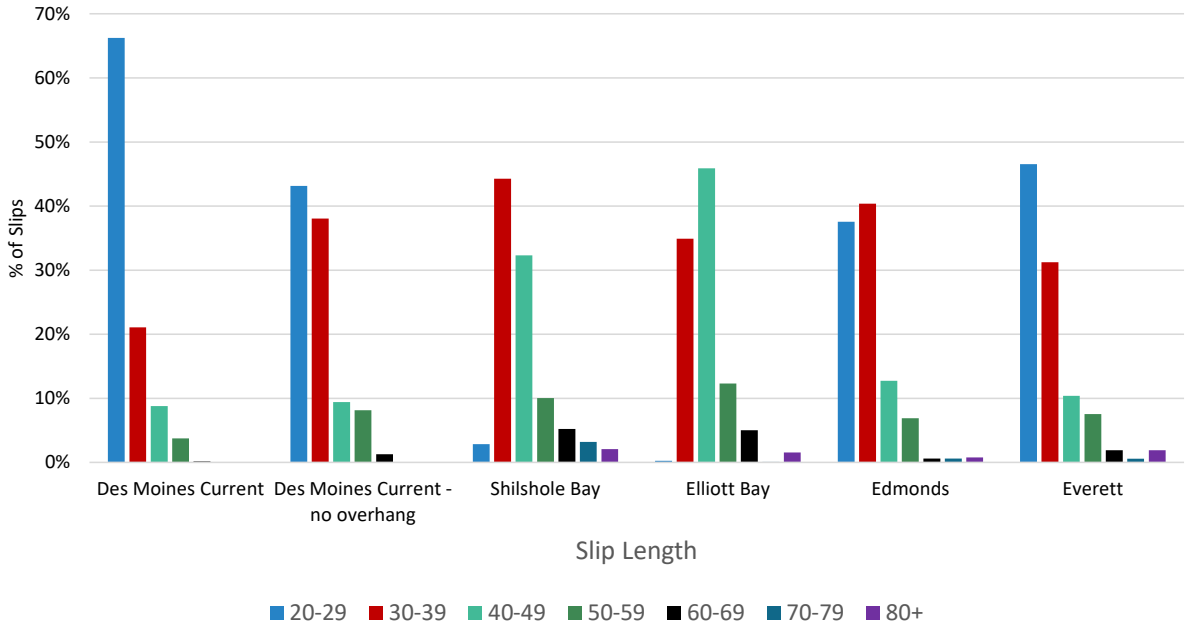
- **Shilshole Bay Marina**
  - The Port of Seattle's Shilshole Bay Marina has around 1,400 open moorage slips. The marina was rebuilt in 2009. The reconfiguration resulted in a reduction in the number of 30-foot, 40-foot and 60-foot slips, with additions of slips between 30 and 40 feet (34 and 38-foot slips), between 40 and 50 feet (42 and 46-foot slips), and slips over 60 feet.
  - The reconfiguration gave port staff the ability to shift a boat from a shorter slip to the next longer size to curtail overhangs.
  - The marina has strong occupancy in all lengths and a growing waitlist.
- **Elliott Bay Marina.**
  - Elliott Bay Marina, which was built in 1989, has around 1,200 open moorage slips. The slip mix focuses on 30 to 39-foot (35% of slips) and 40 to 49-foot slips (47% of slips) with a significant base of 50+ foot slips (17%).

- Elliott Bay occupancy remains full year around.

- **Port of Everett Marina**
  - The Port of Everett Marina has around 1,800 moorage slips. The older portion of the marina (Central and South sections) have approximately 1,300 open slips and 338 covered slips, which mainly consist of 20-29 foot and 30-39-foot slips. See Figure 5.
  - The newer portion of the marina (North), which was completed in 2005, has 170 slips that range from 40-feet to 70-feet, as well as some longer end-ties.
  - Occupancy at the marina has improved during the past 5 years. Longer slips are nearly always full while some of the shorter slips are vacant during the off-peak months.

- **Port of Edmonds Marina**
  - The Port of Edmonds Marina is very similar to the Des Moines Marina, with 303 open slips and 363 covered slips. Most of the slips are 20-29 feet and 30-39 feet but there a larger share of longer slips than at Des Moines. The marina was damaged by a storm and rebuilt in 1988/89.
  - Occupancy patterns are similar to Everett, with smaller slips (under 30 feet) experiencing seasonal vacancies and longer slips (30 feet and up) generally full all year around.

FIGURE 7. COMPARISON OF SLIP DISTRIBUTION WITH OTHER CENTRAL PUGET SOUND MARINAS



Source: City of Des Moines, public/private marinas

There have been very few new marinas in Puget Sound built during the past 20 to 30 years. Most of the additional moorage capacity in Puget Sound has come from:

- Dry stack storage (i.e., Foss Landing, Twin Bridges, Bayside et al.) serving boats from 20 feet up to 36 or so feet long. The average boat length at these facilities is approximately 29 feet (LOA).
- Large slip marinas serving boats over 60 feet (Ward Cove and Salmon Bay Marine Center, among others).

Some reconfigurations have also occurred at other Puget Sound marinas but the supply has not changed significantly. Shilshole Bay Marina and Elliott Bay marinas represent successful models for the proposed reconfiguration at Des Moines Marina.

3.4. Determine the optimal slip mix for the future

The optimal slip mix takes into consideration existing structures that affect the length of new slips as well as the market conditions. At this stage of the analysis, the focus is on total number of slips, which combines open and covered moorage. The viability of covered versus open slips is evaluated in the financial analysis.

3.4.1. Existing Factors affecting Layouts

The existing layout of the marina and phasing requirements constrain the slip distribution of the proposed layouts. Phase 1 is designed to mitigate impacts to slips/activities that are located north and south of the Phase 1 area (transient moorage, K Dock, and Travel Lift pier, among other items). In addition, it is assumed that two other structures are in place prior to development of Phase 2 (the seawall adjacent to slips K through A needs to be replaced and the dry stack storage facility is constructed).

3.4.2. Determining Optimal Slip Layouts

The recommended slip mix for the reconfigured marina was determined based on several factors:

- Recreational boat fleet in Pierce and King counties (i.e., relative size in 2020 and projected growth from 2020 to 2040).
- Des Moines Marina existing tenant base in 2021 (i.e., required slip sizes based on the existing fleet without overhang).
- Slip mix in the other large salt-water marinas in King County (i.e., Shilshole Bay Marina, and Elliott Bay Marina).

These factors were ranked for each slip length from 30-feet to 59-feet, as shown in Tables 3 to 5 on a scale of 1 to 10 (where 1 is the highest and 10 is the lowest). This process indicates the optimal slips by length range with a slip choice ranging from 1 to 3 in the righthand column (shaded orange):

- 30-39 foot slips – optimal slip lengths are 30-, 36-, 32- and 38-foot,
- 40-49 foot slips – optimal slip lengths are 40-, 42-, and 48-foot, and,
- 50-59 foot slips – optimal slip lengths are 52-, 53-, 50- and 51-foot.

TABLE 1. OPTIMAL SLIP LENGTHS FOR 30-FOOT TO 39-FOOT RANGE

	2040	CAGR	Existing	Puget Sound Leaders		Slip Choice	
30-39 foot slips	# Boats	2020-40	Tenants	Shilshole Bay	Elliott Bay	Average Ranking	Recom-dation
30	1	5	2	1	10	3.8	**1**
31	2	7	1	10	10	6.0	5
32	5	3	8	10	2	5.6	**3**
33	3	9	4	10	10	7.2	7
34	10	10	6	4	10	8.0	10
35	9	2	5	10	10	7.2	7
36	4	8	9	2	1	4.8	**2**
37	6	1	3	10	10	6.0	5
38	7	6	9	3	3	5.6	3
39	8	4	7	10	10	7.8	9

CAGR means compound annual growth rate
Source: BST Associates using data from City of Des Moines, Washington State Department of Licensing and other sources

TABLE 2. OPTIMAL SLIP LENGTHS FOR 40-FOOT TO 49-FOOT

	2040	CAGR	Existing	Puget Sound Leaders		Slip Choice	
40-49 foot slips	# Boats	2020-40	Tenants	Shilshole Bay	Elliott Bay	Average Ranking	Recom-dation
40	2	9	2	1	1	3.0	**1**
41	3	4	1	10	10	5.6	6
42	5	8	3	2	4	4.4	**2**
43	6	2	3	10	5	5.2	4
44	1	6	6	10	10	6.6	8
45	10	10	5	10	10	9.0	10
46	8	3	10	3	2	5.2	4
47	4	7	8	10	3	6.4	7
48	7	1	6	4	5	4.6	**3**
49	9	5	8	10	5	7.4	9

CAGR means compound annual growth rate
Source: BST Associates using data from City of Des Moines, Washington State Department of Licensing and other sources

TABLE 3. OPTIMAL SLIP LENGTHS FOR 50-FOOT TO 59-FOOT

	2040	CAGR	Existing	Puget Sound Leaders		Slip Choice	
50-59 foot slips	# Boats	2020-40	Tenants	Shilshole Bay	Elliott Bay	Average Ranking	Recom-dation
50	2	8	5	1	10	5.2	**3**
51	4	6	3	10	3	5.2	**3**
52	1	5	6	10	1	4.6	**1**
53	3	7	3	10	2	5.0	**2**
54	8	1	6	10	10	7.0	6
55	7	9	1	10	10	7.4	7
56	10	10	1	10	10	8.2	10
57	9	2	9	10	10	8.0	9
58	6	3	6	10	4	5.8	5
59	5	4	9	10	10	7.6	8

CAGR means compound annual growth rate
Source: BST Associates using data from City of Des Moines, Washington State Department of Licensing and other sources

3.4.3. Comparison with Existing and Proposed Layouts

BST Associates prepared an initial layout assessment of the reconfiguration, using a fairway width of 1.5 and floats in similar east-west lengths as under existing conditions. The analysis resulted in 511 slips with 19,910 lineal feet of moorage. See Table 4.

The typical process in these studies is to develop an estimate of moorage at a planning level and then refine the initial analysis to take into account the impacts from phasing and slip type (covered versus open

slips). Moffatt & Nichol prepared four alternative layouts based upon the recommended BST Associates slip mix. These improved layouts took into account phasing as well as ensuring overall compatibility of the layouts that ensured proper spacing between the slips, the fairway and the seawall.

Table 6 shows the detailed slip mix and associated lineal feet comparing the layouts by BST Associates and Moffatt & Nichol with the existing slip mix and the Waggoner layout. Each layout was developed with the goal of best matching the slip mix identified by BST. See Section 4 for a discussion of the basis of design for the marina and presentation of the four layouts.

When marinas are reconfigured, the resulting layouts typically reduce the number of slips and linear feet, when compared with the existing layout. Since there is a reduction in the number of slips, the reduction of slips is greater than the reduction of linear feet. This is the case at Des Moines:[4]

- Slip reduction ranges from -218 slips to -232 slips depending on the layout alternative ranging from 1A (-29.9% loss) to 2A (-31.8% loss).
- Lineal footage reduction ranges from -2,194 lineal feet to -2,742 lineal feet depending on the layout alternative ranging from 1A (-10.1% loss) to 2A (-12.6% loss).

3.5. Market Conclusions

BST Associates finds the differences between Waggoner report, BST Associates and Moffatt & Nichol layouts are minor and concludes that the City's approach is sound.

- Focusing on 30-59 foot slips for the reconfiguration is reasonable. These slips are performing well in terms of occupancy.
- All alternatives reduce 20-29 foot slips compared with the existing layout, which are not performing well in terms of occupancy.
- Dry stack facilities are a successful model for smaller power boats. The City is planning to evaluate this alternative in greater detail.
- Financial analysis (discussed below) further evaluates the viability of the alternative layouts with a particular emphasis on covered versus open slips as well as the financial viability of phased construction.
- There is time to re-evaluate Phase 2 and 3 (for docks A through K) prior to finalizing the concept in the future. Since most of the smaller slips are in floats A through D, this will mitigate the loss of smaller slips in the near-term future.

The increase in market share by the proposed reconfiguration layouts is considered achievable. The existing design of the Des Moines Marina currently accounts for 3.0% of the Pierce/King market for 30- to 59-foot slips. However, the current tenant base (without overhangs) accounts for 3.9% of the market. The proposed layout alternatives would account for approximately 6.0%+/- of the Pierce/King County market for 30- to 59-foot slips.

[4] Comparison is between MN alternatives and the existing layout.

TABLE 4. COMPARISON OF DES MOINES MARINA LAYOUTS

	Number of Slips							Lineal feet						
Length	Existing Slips	Wagonner	BST	MN 1A	MN 1B	MN 2A	MN 2B	Existing Slips	Wagonner	BST	MN 1A	MN 1B	MN 2A	MN 2B
20	37	-	-	-	-	-	-	740	-	-	-	-	-	-
24	191	-	-	-	-	-	-	4,584	-	-	-	-	-	-
26	-	-	-	8	8	8	8	-	-	-	208	208	208	208
28	255	-	-	-	-	-	-	7,140	-	-	-	-	-	-
30	8	69	68	63	63	63	63	240	2,070	2,040	1,890	1,890	1,890	1,890
32	69	-	126	127	127	123	123	2,208	-	4,032	4,064	4,064	3,936	3,936
34	-	75	-	-	-	-	-	-	2,550	-	-	-	-	-
36	71	-	80	100	75	96	72	2,556	-	2,880	3,600	2,700	3,456	2,592
38	-	113	-	3	27	3	26	-	4,294	-	114	1,026	114	988
40	66	-	52	56	55	54	57	2,640	-	2,080	2,240	2,200	2,160	2,280
42	-	106	27	21	26	21	23	-	4,452	1,134	882	1,092	882	966
44	-	-	-	-	2	-	2	-	-	-	-	88	-	88
46	-	104	-	-	18	-	18	-	4,784	-	-	828	-	828
48	-	-	78	66	66	64	64	-	-	3,744	3,168	3,168	3,072	3,072
50	27	58	80	46	23	44	22	1,350	2,900	4,000	2,300	1,150	2,200	1,100
52	-	-	-	21	21	21	21	-	-	-	1,092	1,092	1,092	1,092
54	2	4	-	-	-	-	-	108	216	-	-	-	-	-
62	3	-	-	-	-	-	-	186	-	-	-	-	-	-
64		3	-	-	-	-	-	-	192	-	-	-	-	-
Total	729	532	511	511	511	497	499	21,752	21,458	19,910	19,558	19,506	19,010	19,040
Difference from existing layout														
		(197)	(218)	(218)	(218)	(232)	(230)		(294)	(1,842)	(2,194)	(2,246)	(2,742)	(2,712)

Sources: BST Associates (BST), City of Des Moines (Existing), Waggoner Marine Group (Waggoner) and Moffatt & Nichol (MN)

4. Marina Dock Basis of Design

4.1. Basis of Marina Layouts

1. Slip Size Distribution: The marina layouts were based on a slip mix distribution described earlier in Section 3. The slip distribution considered the trends of boating in the region and analysed the financial and economic feasibility of the slip mix.

2. Slip Widths: The trends of larger, wider boats were considered as part of the planning level study. Marina layouts consider the water area (slip) provided for an individual boat and adjacent finger docks to be provided for access. Single-loaded slips have a finger dock on both sides of the open water area versus a double-loaded slip that has a finger only along one side of the slip.

   For the planning study, the marina layouts were based on providing double loaded slips for open moorage, and single-loaded slips for covered. Single loaded slips in the covered moorage areas are assumed to be needed in order to support both the dead loads and live loads (snow loads) on the roof structures. Floatation provided by the floating dock system must be adequate to support the loading cases that will be used in final design.

3. Finger and Main Walkway Widths. For the planning level layout of the marina slips, a nominal width of 4 feet was used for most fingers, with slips 32 feet or shorter using 3 feet wide. For end tie slips (slips located at the offshore end of main walkways), the finger widths were increased to 6 feet wide to allow boats longer than 60 feet to tie up.

   Main walkways and marginal walkways are 6 feet wide, with localized widening where gangway landings need to occur.

4. Gangways: Improvements to the marina will include providing access to slips that will comply with the Americans with Disabilities Act Accessibility Guidelines (ADAAG). Gangways that are part of the accessible route to floating docks are not required to be longer than 80 feet.

   For M and N Docks, the gangways would be located at the same location as the existing gangways in order to minimize impacts to the Travel Lift Pier. Gangway locations for the remainder of docks in the layout alternatives would utilize marginal walkways to allow access to two docks from one gangway. Access to L Dock in Layouts 1B and 2B would be a shared gangway with M Dock, and a marginal walkway to connect the two docks.

5. Covered Moorage Structures: The roof structure for covered moorage must be designed to meet the requirements for the local building codes. Roof structures should be designed to support vertical loading such as snow loads and dead loads, and horizontal loading due to winds. The structure is anchored to the floating docks.

6. Overall Marina Layout; Planning level layouts were developed based on consideration of existing slip sizes on each dock, and strategic locations of slip sizes with respect to the fairway widths, and existing water depths of the marina basin. The general trend of the existing marina layout was to provide larger sized slips closer to the marina entrance, and smaller slips located to the south portion of the marina basin. Planning also considered phasing of replacement and minimizing loss of moorage and associated revenue between phases.

   Length of main walkways were based on the offshore extent of the existing docks in order to minimize impacts to the main access channel that is parallel to the breakwater structures.

7. Guide Pile: For the planning study, guide piles are located at the ends of finger and additional guide piles along the main walkway as needed.

A summary of the dimensions used for the marina layouts developed for this planning study are presented in Table 5.

TABLE 5. PLANNING LEVEL - MARINA LAYOUT DIMENSIONS

Slip Length (ft)	Recommended Double Slip Width (ft)	Recommended Finger Float Widths (ft)	Recommended Main Walk Widths (ft)
30'	28.5	3	6
32'	30	3	6
36'	33	4	6
38'	34.5	4	6
40'	36	4	6
42'	37.5	4	6
46'	39	4	6
48'	39.5	4	6
50'	40	4	8
60'	45	4	8

8. Fairways: Fairway widths are typically based on a factor applied to the larger slip located along the fairway for access to/from the slip. These factors typically range from 1.1 to 1.5 or greater.

   At the Des Moines marina, most of the existing fairways are about 1.25 times the longer slip length facing into the fairway. In order to maximize the number of slips provided and optimize the marina layout for the existing marina basin, the fairway widths for the marina layouts used in the economic analysis were also based on a factor of 1.25. It is assumed that no overhang of boats in slips would be allowed.

4.2. Layout Alternatives

Alternative layouts were developed using two approaches; Layout 1 was an all open moorage and Layout 2 provided covered moorage for a portion of the slips. (For this study, Layout 2 is referred to as Partial Covered). To support the financial performance analysis of a phased replacement program, two phasing scenarios for the replacement strategy of the marina docks were identified. Phasing scenario A would initially replace Docks M and N, with two subsequent phases accomplished at future dates. The second phasing scenario would replace Docks L, M and N, with two subsequent phases accomplished at future dates. This was referred to as phasing scenario B.

During the development of the layout alternatives, consideration was given to the docks that were to remain and required fairway widths after each phase. Slight variations occurred with the slip distribution between Layouts 1 and 2 on docks G through M in order to optimize slip lengths versus fairway widths.

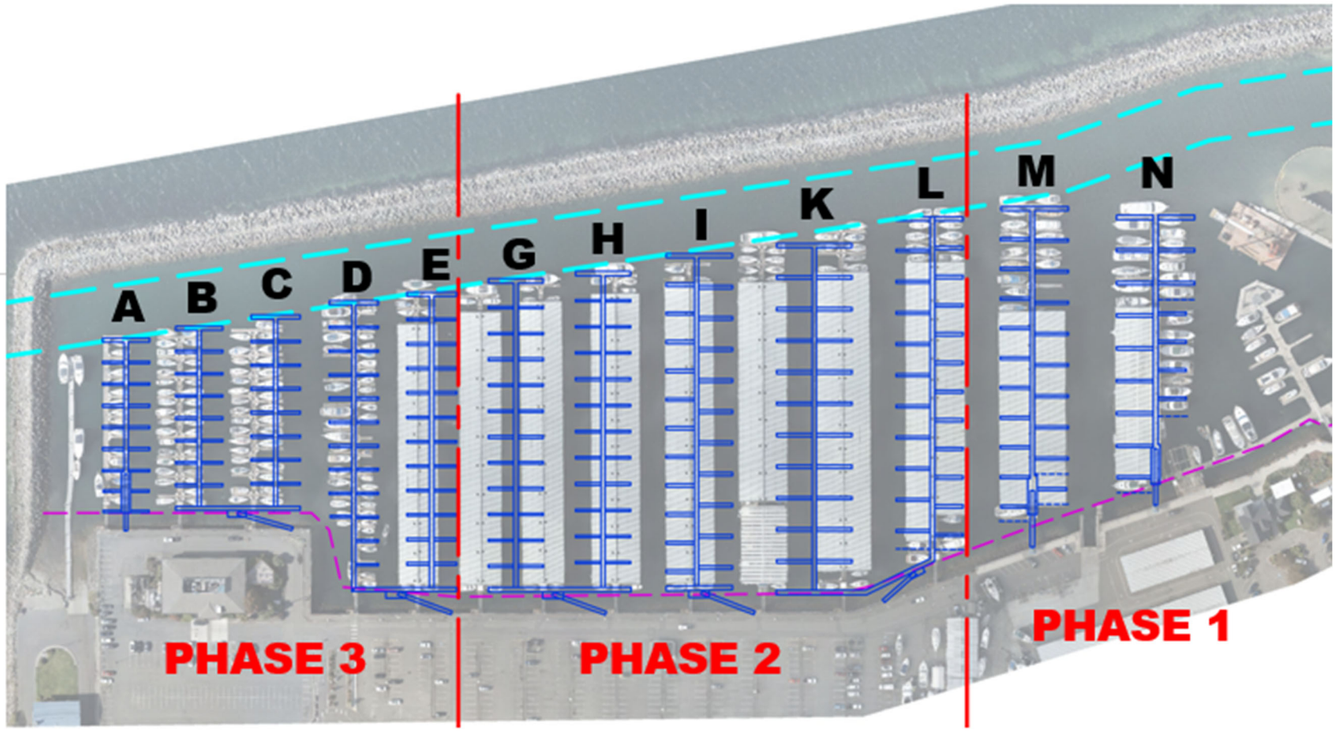
TABLE 6. MARINA LAYOUT ALTERNATIVES

Layout Description	Phasing Scenario	Docks Replaced in First Phase
1 (All Open)	A	Replace M and N
1 (All Open)	B	Replace L, M and N
2 (Partial Covered)	A	Replace M and N
2 (Partial Covered)	B	Replace L, M and N

Layout plan and summaries of the slip distribution for each layout is provided on Figure 8 thru Figure 11.

Layout 1A

- All open slips
- Total slip count (including end ties = 511 slips)
- Phased construction (Phase 1 – M and N docks)

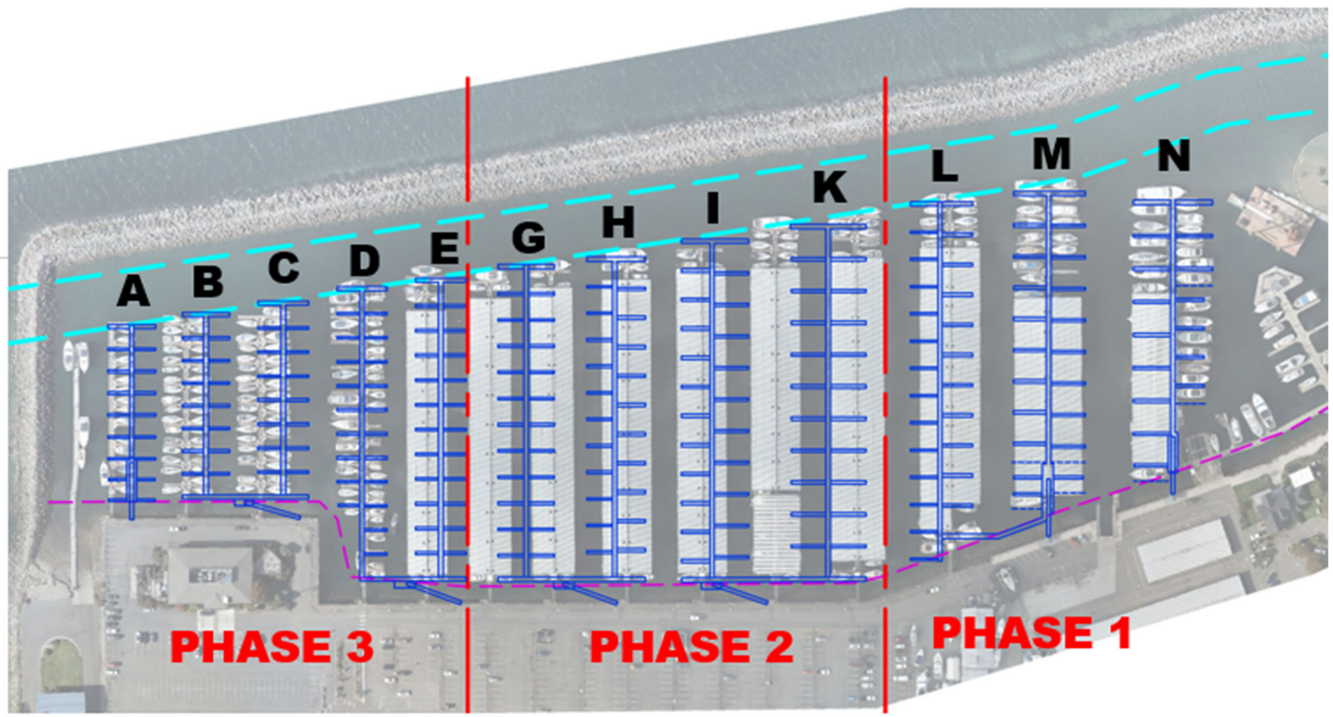


A Dock		B Dock		C Dock		D Dock		E Dock		G Dock		H Dock		I Dock		K Dock		L Dock		M Dock		N Dock		
Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	
30	24	30	32	32	32	32	41	32	48	36	48	36	48	48	21	50	44	40	23	48	17	40	8	
26	8					30	3							40	23			48	22	42	20	48	3	
																				38	3	52	19	
End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		
30	2	30	2	32	2	32	2	32	2	36	2	36	2	48	1	50	2	40	1	48	1	52	2	
														40	1			48	1	42	1			
ln ft	*994*	*ln ft*	*1,026*	*ln ft*	*1,094*	*ln ft*	*1,472*	*ln ft*	*1,606*	*ln ft*	*1,806*	*ln ft*	*1,806*	*ln ft*	*2,022*	*ln ft*	*2,306*	*ln ft*	*2,070*	*ln ft*	*1,793*	*ln ft*	*1,562*	*19,557*
	34		34		34		46		50		50		50		46		46		47		42		32	511

FIGURE 8. LAYOUT 1A (ALL OPEN MOORAGE)

Layout 1B

- All open slips
- Total slip count (including end ties = 511 slips)
- Phased construction (Phase 1 – L, M and N docks)

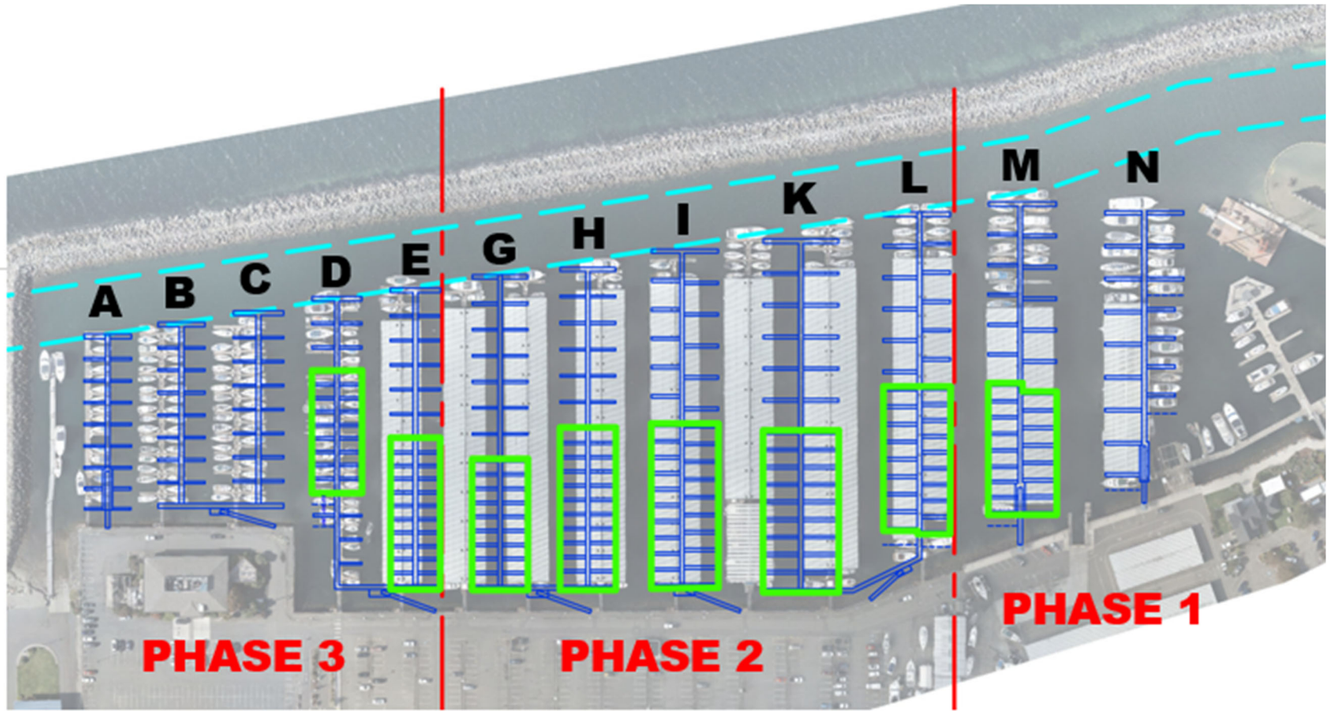


A Dock		B Dock		C Dock		D Dock		E Dock		G Dock		H Dock		I Dock		K Dock		L Dock		M Dock		N Dock		
Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	
30	24	30	32	32	32	32	41	32	48	36	48	36	24	48	21	50	22	42	22	48	17	40	8	
26	8					30	3					40	22	40	23	48	22	38	26	46	17	48	3	
																				44	2	52	19	
																				42	3			
End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		
30	2	30	2	32	2	32	2	32	2	36	2	36	1	48	1	50	1	42	1	48	1	52	2	
												40	1	40	1	48	1	38	1	46	1			
ln ft	*994*	*ln ft*	*1,026*	*ln ft*	*1,094*	*ln ft*	*1,472*	*ln ft*	*1,606*	*ln ft*	*1,806*	*ln ft*	*1,826*	*ln ft*	*2,022*	*ln ft*	*2,260*	*ln ft*	*1,998*	*ln ft*	*1,831*	*ln ft*	*1,562*	*19,497*
	34		34		34		46		50		50		48		46		46		50		41		32	511

FIGURE 9. LAYOUT 1B (ALL OPEN MOORAGE)

Layout 2A

- Partial covered slips on Docks D thru M (approx 30% of total slips covered)
- Total slip count (including end ties = 497 slips)
- Phased construction (Phase 1 – M and N docks)

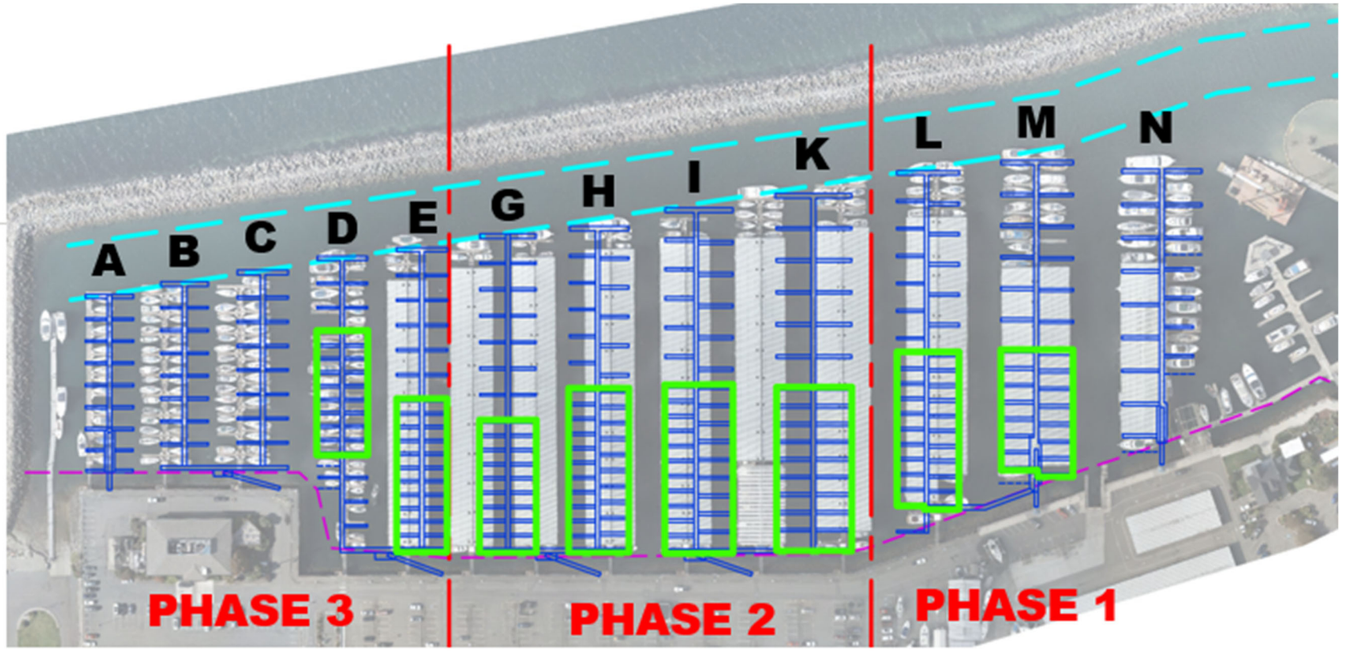


A Dock		B Dock		C Dock		D Dock		E Dock		G Dock		H Dock		I Dock		K Dock		L Dock		M Dock		N Dock		
Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	
30	24	30	32	32	32	32	39	32	46	36	46	36	46	48	20	50	42	40	22	48	17	40	8	
26	8					30	3							40	22			48	21	42	20	48	3	
																				38	3	52	19	
End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		
30	2	30	2	32	2	32	2	32	2	36	2	36	2	48	1	50	2	40	1	48	1	52	2	
														40	1			48	1	42	1			
ln ft	*994*	*ln ft*	*1,026*	*ln ft*	*1,094*	*ln ft*	*1,408*	*ln ft*	*1,542*	*ln ft*	*1,734*	*ln ft*	*1,734*	*ln ft*	*1,934*	*ln ft*	*2,206*	*ln ft*	*1,982*	*ln ft*	*1,866*	*ln ft*	*1,562*	*19,082*
sq ft		*sq ft*		*sq ft*		*sq ft*		*sq ft*		*sq ft*		*sq ft*		*sq ft*		*sq ft*		*sq ft*		*sq ft*		*sq ft*		*0*
sq ft	*0*	*# cvr*	*0*	*# cvr*	*0*	*# cvr*	*18*	*# cvr*	*22*	*# cvr*	*18*	*# cvr*	*22*	*# cvr*	*19*	*# cvr*	*18*	*# cvr*	*17*	*# cvr*	*15*	*# cvr*	*0*	*149*
	34		34		34		44		48		48		48		44		44		45		42		32	497
41.0%		*0.0%*		*0.0%*		*0.0%*		*40.9%*		*45.8%*		*37.5%*		*45.8%*		*43.2%*		*40.9%*		*37.8%*		*35.7%*		*0.0%*	*30.0%*

FIGURE 10. LAYOUT 2A (PARTIAL COVERED)

Layout 2B

- Partial covered slips on Docks D thru M (approx 30% of total slips covered)
- Total slip count (including end ties = 499 slips)
- Phased construction (Phase 1 – L, M and N docks)



	A Dock		B Dock		C Dock		D Dock		E Dock		G Dock		H Dock		I Dock		K Dock		L Dock		M Dock		N Dock		
	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	
	30	24	30	32	32	32	32	39	32	46	36	46	36	23	48	20	50	21	42	22	48	17	40	8	
	26	8					30	3					40	21	40	22	48	21	38	25	46	17	48	3	
																					44	2	52	19	
																					42	4			
	End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		End Ties		
	30	2	30	2	32	2	32	2	32	2	36	2	36	1	48	1	50	1	42	1	48	1	52	2	
													40	1	40	1	48	1	38	1	46	1			
	ln ft	*994*	*ln ft*	*1,026*	*ln ft*	*1,094*	*ln ft*	*1,408*	*ln ft*	*1,542*	*ln ft*	*1,734*	*ln ft*	*1,750*	*ln ft*	*1,934*	*ln ft*	*2,162*	*ln ft*	*1,960*	*ln ft*	*1,955*	*ln ft*	*1,562*	*19,121*
	# cvr	*0*	*# cvr*	*0*	*# cvr*	*0*	*# cvr*	*18*	*# cvr*	*22*	*# cvr*	*18*	*# cvr*	*21*	*# cvr*	*19*	*# cvr*	*18*	*# cvr*	*20*	*# cvr*	*14*	*# cvr*	*0*	*150*
		34		34		34		44		48		48		46		44		44		49		42		32	499
41.1%		*0.0%*		*0.0%*		*0.0%*		*40.9%*		*45.8%*		*37.5%*		*45.7%*		*43.2%*		*40.9%*		*40.8%*		*33.3%*		*0.0%*	*30.1%*

FIGURE 11. LAYOUT 2B (PARTIAL COVERED) – SLIP DISTRIBUTION BASE

4.3. Float Structure Types

There are several basic float structure types considered for the Des Moines Marina as part of the replacement strategy. These float types are described based on the float structure construction – timber, steel, aluminum and concrete – and summarized in Table 7 below. Evaluation of these float types included consideration of the initial capital costs, structural suitability (such as supporting covered roof structures and integration of grated decking surfaces), stability of floats underfoot, maintenance requirements, expected service life of the float system in saltwater environment, and the marinas experience and history with various float types.

Capital costs for each float type is based on conceptual level costs provided by local float manufacturers. There is some amount of uncertainty in the costs due to impacts of the current pandemic on supply chain and labor. Cost of floats are also influenced by the incorporation of utilities, location of guide pile (internal to the float versus external), use of manufacturer's typical or standard unit sizes versus custom units, and structural design for the float system. Costs indicated in the table below, are only for the float system, with no allowance for guide pile or utilities.

A consistent float system throughout the marina for both open and covered moorage options was considered a factor in the evaluation. Floats used to support roof structures would require more floatation compared to the same floats as open moorage areas. Connection of supports for the roof structures to the float and guide pile locations can influence the float configuration depending on the design of the roof structure.

Timber docks can be constructed using material that is usually readily available. Structural capacity of wood can be increased using glu-lam members that have desirable structural properties. Wood is durable when treated for saltwater exposure, however the types of treatment that are acceptable to use are influenced by the local environmental regulations. Repairs can be accomplished relatively easily. Longer fingers can be engineered/designed so that guide pile are only needed at ends of finger (similar to the other dock systems).

Steel docks are constructed using readily available material and offer flexibility in design and structural competency. Steel is subject to corrosion so protective coatings such as galvanizing is required in saltwater exposure.

Aluminum docks are used in marina installations for its resistance to marine corrosion. Aluminum has a high strength to weight ratio. However, aluminum can be subject to fatigue and stress cracking.

Concrete docks are a desirable float system as its mass provides stability and the concrete deck surface provides a suitable walking surface. Durability of concrete docks relies on the concrete mix design and placement. Concrete patching of damaged areas can be accomplished, but repairs may not be long-lasting. Connection of concrete float units must be properly designed to avoid stress concentrations and concrete failures.

TABLE 7. FLOAT STRUCTURE COMPARISON

Float Structure Type	Pros	Cons	Capital Costs	Estimated Service Life
Timber	• Flexible and lightweight • Range of floatation can be used (HDPE,	• Connection points can work loose over time; requiring dock maintenance.	$ 155 / SF	30+ years

Float Structure Type	Pros	Cons	Capital Costs	Estimated Service Life
	Steel, or polyethylene tubs) • Repair to damaged members can be relatively easy • Grating can be incorporated into system easily			
Steel	• Durable and strong • Range of floatation can be used • Grating can be incorporated into system	• May require more maintenance due to corrosion • Field adjustments may be difficult • Repair of damaged sections can be difficult	$ 170 / SF	30+ years
Aluminum	• Lightweight compared to steel and concrete. • Better resistance to corrosion than steel • Grating can be incorporated into system	• Field adjustments may be difficult • Repair of damaged sections can be difficult	$ 175 / SF	30+ years
Concrete	• Solid feeling underfoot • Long service life • Difficult to incorporate grating into system	• Difficult to meet grating requirements • Repairs can be difficult	$ 180 / SF	40+ years

A review of four types of float systems and discussions with Marina management indicates that a timber system will meet the design and permitting requirements, and the City's considerations of costs, maintenance, and service life for the marina replacement. Portions of the deck surface can be grated material in order to address environmental concerns with overwater shading and light transmission. Repairs can be completed by City Marina staff. The timber dock system (with a composite deck surface) were used along a portion of covered moorage on J Dock that was replaced due to a fire in 2014. The marina staff

have been very satisfied with the performance of the dock system to date with low maintenance requirements.

4.4. Mechanical

Where new floats are provided, potable water connections will be provided, with connection to upland utility utilizing flexible cable carrier assembly at the gangways.

For fire protection, a manual dry pipe standpipe system with 2-1/2 inch hose connections will be provided, spaced to cover all areas on the floats up to 150 feet from the hose connection.

Where covered moorage exceeds 5,000 square feet or Fire Department access is not sufficient, City of Des Moines Municipal code section 14.10.060 requires provision of fire sprinkler protection as described below.

14.10.060 Sprinkler Installation
Fire sprinkler systems shall be installed:

In addition to the automatic sprinkler system requirements specified in the IBC and the IFC, the following new buildings and structures, and existing buildings with new additional square footage, are required to be protected by an approved automatic sprinkler system:

(1) All occupancies without the basic fire flow requirements of the IFC and appendix.

Exception: Group U occupancies.

(2) All occupancies without approved Fire Department access as defined in the IFC. Exception: Group U occupancies, and additions to single unit R3 structures, are not required to be sprinklered, provided the new fire flow meets the requirements of the IFC and Appendix B, and the access is not unduly compromised, as approved by the Fire Code Official.

(3) In all occupancies, other than Groups R3 and U, where the total floor area included within the surrounding exterior walls on all floor levels, including basements, exceeds 5,000 square feet. Fire walls, as noted in the IBC, shall not be considered to be a separate building to enable deletion of the required fire sprinkler system.

Exception: Additions to existing buildings, that through alternate materials or methods do not increase the hazards of the building, as agreed and approved by the Building Official and the Fire Code Official. [Ord. 1662 § 3, 2016: Ord. 1581 § 48, 2013.]

Discussions with South King County Fire have indicated a concern with access with respect to item 2, since there is limited access due to water.

If fire sprinkler protection is provided for covered moorage, it will require a heated enclosure for the dry pipe valve, with a dry pipe system serving the covered moorage area. Supply piping to the dry pipe valve will require an insulated and heat traced pipe connection to the upland potable water system. A backflow preventer will be required for connection to the potable water system.

4.5. Electrical

Under the original electrical master plan and docks located south of Dock M, any upgrade would require extending the upland distribution, which would include extending the 12.47kV underground distribution to the bulkhead area and providing new distribution transformer and switchboard configuration.

As part of upgrades to Docks M, N and L, it is possible to reconfigure Distribution Switchboard DSB3 to accommodate Dock L Load as well. This would provide 50 amp, 240 volt shore power connection at each slip on Docks L, M and N.

However, the 480 volt ductbank layout from the switchboard along the bulkhead would need to be modified to accommodate Dock L. New conduits would be needed to be added between the existing ductbank to Dock L to the vault in front of the Office.

The existing panelboards on Docks M and N can be reused and replace the circuit breakers with new ground-fault type. The existing transformers could also be reused, but they should be re-tested to make sure that they are still performing within tolerances.

Per the latest 2020 Edition of the National Electric Code, the Code requirements include ground fault protection where on the water. Therefore, to be fully Code compliant, all the breakers would need to be replaced in the distribution panel feeding each dock loads, including the 600A marina disconnect switch to shunt-trip type with a ground fault monitoring system set to trip at 100mA. Also, replace the circuit breakers in the shore power box with a unit with 30mA, ground-fault type for each receptacle.1027

The 2020 NEC also requires the bonding of all non-current carrying metal parts with a minimum of #8 gauge grounding/bonding conductor. Therefore, any future modifications to the dock electrical service will include this grounding/bonding conductor.

As part of the future phases, new distribution transformers and switchboards will be extended from the 15kV service. Distribution Switchboard 1 (DSB1) would provide power for Docks A, B, C, D, and E. Distribution Switchboard 2 (DSB2) provides power for Docks G, H, I, K and the existing restroom building.

For Docks D thru K, the power distribution configuration will be similar to the configuration installed for Guest Moorage and Docks M and N. This would include extending 480 volt, 3phase service underground from the distribution switchboard, route the feeders under the gangway and onto the float to a 600 amp, 480 volt panelboard at the head end of the dock. This would provide power for 3 sets of 100kVA, single phase transformer and 400 amp, 240/120 volt, 1 phase, branch panelboard. These panels would provide 50 amp, 240 volt power at each slip.

For the smaller Docks A, B and C, the distribution will be slightly different from the other docks. For these docks, 480 volt feeders will be provided down the gangway, but directly feed a single transformer via local disconnect switch. A 100kVA, single phase, transformer and one branch circuit, panelboard would be provided at the head end of the dock. For this configuration, each slip would with 30 amps, 240 volts at each slip.

However, if additional power is required, such as providing 50 amp, 240 to each slip, this would require providing the typical 480 volt panelboard with 3 transformers and 3 panelboard configuration, similar with the other docks.

For Docks A, B, C, D and some of the newer slips, the shore power boxes can be reused. This would include replacing the receptacles with new and providing ground-fault type, circuit breakers.

5. Financial Analysis

The financial analysis evaluates the benefit/cost ratio associated with each of the proposed layouts prepared by Moffatt & Nichol.

5.1. Current Financial Performance

This section reviews the recent financial performance of the Des Moines marina.

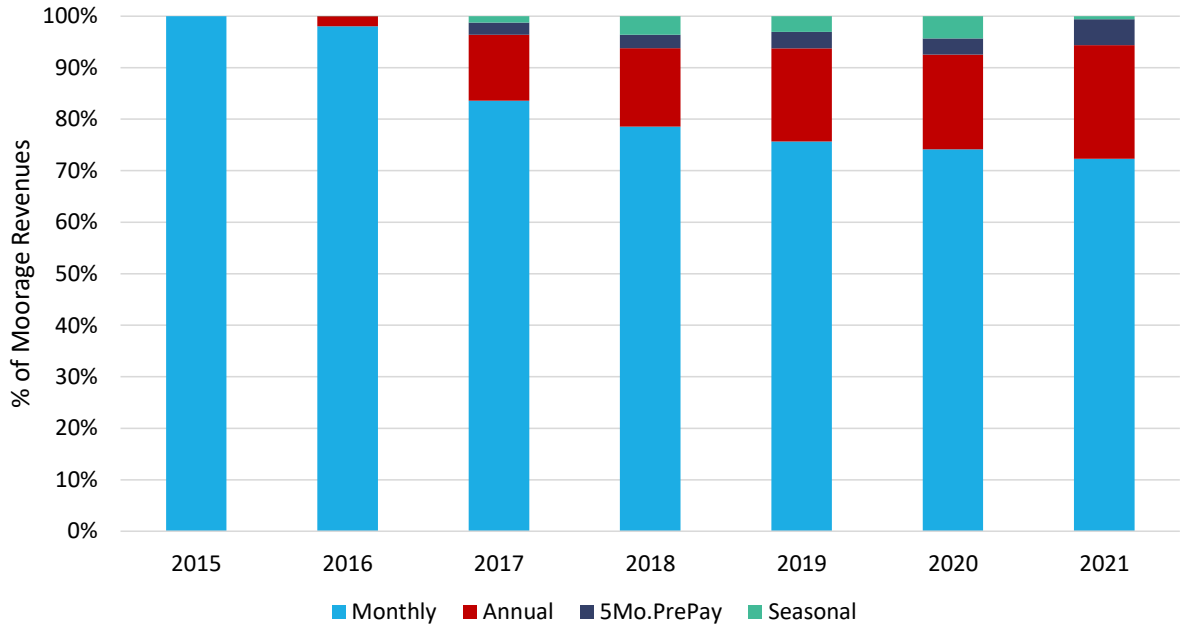
5.1.1. Revenues

Revenues are separated between moorage and other revenues to facilitate the pro forma statements for the four MN layouts.

Moorage is defined to include monthly, annual and seasonal moorage fees but excludes transient overnight moorage, winter moorage and live-aboard fees as well as non-moorage revenues, which are included in other revenues. Moorage revenues, which accounted for 58% of operating revenue in 2020, up from 53% in 2012, grew an average annual rate of 1.8% between 2012 and 2020.

As shown in Figure 12, the share of tenants paying monthly moorage rates has declined from 100% in 2015 to 72% in 2021. This trend has constrained potential moorage revenue. Rate and occupancy trends are described in greater detail below.

FIGURE 12. MOORAGE REVENUES – SHARE BY PAYMENT PROGRAM



Source: City of Des Moines

Other revenues declined from $1.9 million in 2012 to $1.8 million in 2020. Revenue declined primarily due to reduced fuel sales and storage fees as well as to a diversion of parking revenues from the Marina to the Waterfront District.

5.1.2. Expenses

Expenses are categorized in three primary categories: payroll, cost of fuel and other expenses. Payroll costs remained steady at approximately $900,000 per year from 2012 to 2020. During this period, the

number of full-time staff declined from 10 in 2012 to 7 in 2020, but increased to 9 in 2021. Fuel costs declined from $1.1 million in 2012 to $800,000 in 2020, due to a drop in price and consumption. Other expenses, which include office operating costs, tidelands lease, utilities (electricity, stormwater, garbage, water and sewer), and insurance, among other categories, increased in the past three years.

5.1.3. Net Revenue and Debt Service Coverage

Net revenue available for debt service increased from $1.3 million in 2012 to $1.4 million in 2020, resulting in average annual growth of 0.7%.

A portion of these funds are allocated to capital improvements (CIP). The most recent CIP calls for $1.5 million for improvements per year from 2021 to 2027. Excluding marina dock replacement and building construction, the average expenditure is budgeted at $222,000 per year (includes marina dredging, fuel & electrical replacement, tenant restroom replacement, dock electrical replacement, etc.).

TABLE 8. CURRENT FINANCIAL PERFORMANCE OF THE DES MOINES MARINA ($MILLIONS)

Category	2012	2013	2014	2015	2016	2017	2018	2019	2020	CAGR 2012-20
Revenues										
Moorage	$2.2	$2.2	$2.2	$2.3	$2.3	$2.3	$2.4	$2.4	$2.5	1.8%
Other	$1.9	$2.1	$2.1	$1.7	$1.5	$5.3	$1.8	$1.9	$1.8	-0.8%
Total	$4.1	$4.2	$4.2	$4.0	$3.8	$7.6	$4.2	$4.4	$4.3	0.7%
Expenses										
Payroll	$0.9	$0.9	$0.9	$0.9	$0.8	$0.8	$0.8	$0.8	$0.9	-0.3%
Fuel	$1.1	$1.2	$1.2	$0.9	$0.7	$0.8	$1.0	$1.0	$0.8	-3.7%
Other	$0.8	$0.9	$0.8	$0.7	$0.7	$3.5	$0.9	$1.0	$1.3	5.5%
Total	$2.8	$2.9	$2.9	$2.5	$2.2	$5.1	$2.7	$2.8	$2.9	0.7%
Net Revenue Available for Debt Service	$1.3	$1.3	$1.3	$1.5	$1.5	$2.5	$1.5	$1.6	$1.4	0.7%
Debt Service	$0.8	$0.8	$0.8	$0.8	$0.8	$0.8	$0.8	$0.9	$0.7	-0.3%
Coverage Ratio (DSC)	1.75	1.63	1.58	1.87	1.86	3.01	1.83	1.82	1.89	

Notes - Per bond covenants:
Min debt service coverage requirement is: 1.25 times the Annual Debt Service

"Net Revenue" means the Revenue from the Marina less the Operating and Maintenance Expense.

(1) "Revenue from the Marina" is defined as all earning except:

- governmental grant proceeds
- proceeds from the sale of property
- city taxes collected by or through the Marina
- principal proceeds of bonds
- interest earnings on arbitrage investments

(2)"Operating and Maintenance Expense" is defined as all current maintenance and repair charges except:

- depreciation
- interest expense
- administrative charges paid to the city

(3) Excludes premium/discount amortizations
Source: City of Des Moines

Debt payments averaged $800,000 per year from 2012 to 2020. Debt service coverage (defined as net revenues available for debt service over annual debt) averaged 1.9 between 2012 and 2020. The minimum debt service coverage requirement is 1.25 times the Annual Debt Service. [5]

5.2. Cost Estimates

The estimated cost of the proposed layouts is shown in Table 7 by layout option and phase. The replacement schedule assumes that construction occurs in three phases:

- Phase 1 is expected to occur in 2025,
- Phase 2 is expected to occur in 2032, and,
- Phase 3 is expected to occur in 2039.

TABLE 9. CONSTRUCTION COST BY PROPOSED LAYOUT ($MILLION)

		Present Value	Future Value		
Layout	Phase	2021	2025	2032	2039
1A	1	$6.3	$7.0		
1A	2	$20.1		$26.8	
1A	3	$13.1			$21.1
1A	Total	$39.5			
2A	1	$8.9	$9.9		
2A	2	$34.6		$46.2	
2A	3	$17.5			$28.1
2A	Total	$61.0			
1B	1	$10.5	$11.7		
1B	2	$16.2		$21.7	
1B	3	$13.1			$21.1
1B	Total	$39.9			
2B	1	$15.5	$17.2		
2B	2	$27.2		$36.3	
2B	3	$17.1			$27.4
2B	Total	$59.7			

The 2021 values, which were estimated at the end of 2021, are used in the benefit/cost ratios in the section.
The projected future values assume that construction costs increase at 2.7% per year.
Source: Moffatt & Nichol

5.3. Financial analysis of reconfiguration layouts

Key assumptions, methodology and findings of the financial analysis of proposed layout alternatives: include: existing and proposed rates, occupancy and inflation.

[5] City of Des Moines Annual Comprehensive Financial Report 2020, page 133.

5.3.1. Rates

5.3.1.1. Des Moines Marina Rate Structure

This section reviews the trends in the Des Moines Marina rate structure. Table 9 presents the monthly rates at Des Moines marina from 2011 to 2021. Monthly rates for smaller open and covered slips have increased at a rate equal to or less than the CPI rate for the period (2011-2021). Monthly rates for larger slips have generally increase at 0.3% to 0.6% above the CPI rate for the period (2011-2021).

TABLE 10. DES MOINES MONTHLY RATE STRUCTURE

Length	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Covered											
20	$8.00	$8.21	$8.44	$8.53	$8.69	$8.85	$9.03	$9.21	$9.39	$9.58	$9.74
24	$9.17	$9.42	$9.68	$9.78	$9.96	$10.14	$10.35	$10.55	$10.76	$10.98	$11.16
28	$9.91	$10.18	$10.45	$10.60	$10.79	$10.99	$11.32	$11.66	$12.01	$12.37	$12.57
30	$9.91	$10.18	$10.45	$10.60	$10.79	$10.99	$11.32	$11.66	$12.01	$12.37	$13.65
32	$10.58	$10.87	$11.16	$11.28	$11.49	$11.70	$12.16	$12.66	$13.16	$13.69	$13.90
36	$12.05	$12.38	$12.71	$12.85	$13.09	$13.33	$13.86	$14.41	$14.99	$15.59	$15.84
40	$12.78	$13.13	$13.49	$13.63	$13.88	$14.14	$14.57	$15.00	$15.45	$15.91	$16.17
50	$15.00	$15.40	$15.82	$15.99	$16.28	$16.51	$17.00	$17.68	$18.39	$19.13	$19.43
Open											
20	$6.43	$6.60	$6.78	$6.86	$6.98	$7.12	$7.27	$7.40	$7.56	$7.71	$7.83
24	$7.21	$7.40	$7.60	$7.68	$7.83	$7.94	$8.10	$8.26	$8.43	$8.60	$8.73
28	$7.48	$7.68	$7.89	$7.98	$8.12	$8.27	$8.60	$8.95	$9.31	$9.61	$9.84
30					$8.87	$8.84	$8.60	$8.95	$9.31	$9.61	$0.00
32	$8.17	$8.40	$8.62	$8.71	$8.87	$9.04	$9.40	$9.77	$10.17	$10.57	$10.74
36	$8.67	$8.90	$9.14	$9.24	$9.41	$9.58	$9.96	$10.36	$10.78	$11.21	$11.39
40	$9.25	$9.50	$9.76	$9.87	$10.05	$10.23	$10.64	$11.07	$11.51	$11.97	$12.16
50	$10.45	$10.73	$11.02	$11.15	$11.35	$11.57	$12.03	$12.51	$13.01	$13.53	$13.74
60	$10.78	$11.07	$11.37	$11.49	$11.70	$11.99	$12.48	$12.98	$13.50	$14.04	$14.26

Note: includes leasehold tax
Source: City of Des Moines

The City currently allows a pre-payment annual discount of 18% for boats from 20 to 27 feet and 10% for boats from 28 to 31 feet. The effective weighted average rate of the discount is estimated at approximately 13% lower than the monthly rate for both small open and covered slips.

The discount has a negative effect on the Marina's financial performance but is necessary to improve occupancy in small slips. The financial model assumes that all discounts are eliminated.

5.3.1.2. Competitive Marina Rate Structure

Several marinas[6] were evaluated to determine the rate per lineal foot for monthly moorage, defined to include monthly fee plus any additional charges (utilities, environment and other fees as well as taxes). If rates were not available for a certain length, they were estimated based upon the closest rates (i.e., if a 24-foot rate was unknown but 22-foot and 26-foot rates were known then the rate was estimated on the average).

[6] See Appendix Table 16.

5.3.1.2.1. Open Rates

Comparisons for open rates are shown in Table 10 (monthly rates only) and Figure 13 (includes discount rates for smaller boats).

- Des Moines monthly rates for open slips are approximately 12% less across all slips than the average rates of Puget Sound competitors. However, the differential varies significantly by slip length, ranging from +3% to -20%.
- Des Moines monthly rates for open moorage are approximately 26% less than the 90th percentile rates of Puget Sound competitors, ranging from -14% to -36%.

TABLE 11. PUGET SOUND MONTHLY MARINA RATE ASSESSMENT – OPEN SLIPS

	Des Moines	Puget Sound Competitors		Comparison (DM +/-):	
Location	Monthly Rates	Average	Upper 90%	Average	Upper 90%
20	$7.83	$9.84	$12.15	-20%	-36%
24	$8.73	$10.25	$12.94	-15%	-32%
26	$9.29	$11.78	$14.13	-21%	-34%
28	$9.84	$10.43	$13.40	-6%	-27%
30	$10.29	$11.48	$13.88	-10%	-26%
32	$10.74	$12.30	$14.26	-13%	-25%
34	$11.06	$13.54	$16.69	-18%	-34%
36	$11.39	$12.81	$16.29	-11%	-30%
38	$11.77	$14.56	$16.15	-19%	-27%
40	$12.16	$13.15	$16.66	-8%	-27%
42	$12.48	$14.31	$16.47	-13%	-24%
44	$12.80	$14.26	$17.37	-10%	-26%
46	$13.11	$13.72	$16.48	-4%	-20%
48	$13.43	$14.51	$15.65	-7%	-14%
50	$13.74	$13.39	$17.37	3%	-21%
52	$13.85	$14.87	$16.67	-7%	-17%
54	$14.00	$16.23	$18.79	-14%	-25%
62	$14.26	$16.87	$20.12	-15%	-29%
65	$14.26	$16.69	$19.53	-15%	-27%

Note: rates were inferred based on neighboring rates if they were not available for a particular slip length
Source: BST Associates, marinas; 2021 rates

5.3.1.2.2. Covered Rates

Comparisons for covered rates are shown in Table 11 (monthly rates only) and Figure 14 (includes discount rates for smaller boats).

- Des Moines monthly rates for covered slips are approximately 12% less across all slips than the average rates of Puget Sound competitors. However, the differential varies significantly by slip length, ranging from +1% to -21%.
- Des Moines monthly rates for covered moorage are approximately 23% less than the 90th percentile rates of Puget Sound competitors, ranging from -11% to -32%.

TABLE 12. PUGET SOUND MONTHLY MARINA RATE ASSESSMENT – COVERED SLIPS

	Des Moines	Puget Sound Competitors		DM comparison with:	
Location	Monthly Rates	Average	Upper 90%	Average	Upper 90%
20	$9.74	$10.63	$12.90	-8%	-25%

24	$11.16	$12.68	$14.48	-12%	-23%
26	$11.87	$13.16	$15.09	-10%	-21%
28	$12.57	$14.74	$16.06	-15%	-22%
30	$13.65	$13.86	$15.34	-1%	-11%
32	$13.90	$15.77	$18.61	-12%	-25%
34	$14.87	$17.26	$18.62	-14%	-20%
36	$15.84	$17.50	$19.91	-9%	-20%
38	$16.01	$20.01	$22.32	-20%	-28%
40	$16.17	$17.80	$23.17	-9%	-30%
42	$16.82	$19.89	$24.34	-15%	-31%
44	$17.47	$21.99	$25.51	-21%	-32%
46	$18.13	$21.70	$25.18	-16%	-28%
48	$18.78	$21.42	$24.84	-12%	-24%
50	$19.43	$19.29	$23.82	1%	-18%
52	$20.08	$21.35	$24.97	-6%	-20%
54	$20.74	$23.41	$26.13	-11%	-21%
62	$23.34	$29.58	$29.58	-21%	-21%
65	$24.32	$31.64	$30.74	-23%	-21%

Note: rates were inferred based on neighboring rates if they were not available for a particular slip length
Source: BST Associates, marinas; 2021 rates

Rate assumptions in the financial model:

- Discounts are eliminated.
- Tenants are charged Puget Sound average rates for use of the existing slips during the transition from existing to new slips.
- Tenants are charged Puget Sound 90th percentile rates for use of the new slips.

5.3.2. Other Assumptions

5.3.2.1. Inflation and Interest Rates

Assumptions for inflation and interest rates are as follows:

- Construction costs inflated at 2.7% per year,
- CPI projected to range from 2.3% to 2.5% per year from 2022 to 2045,
- Rates for existing slips are set at the average of Puget Sound competitors and increase at historical trends,
  - Rates for smaller slips at slightly less than inflation and rates for longer slips at slightly above inflation,
- Rates set at 90th percentile of Puget Sound competitors,
  - Annual increases at CPI plus 1%,
- Other revenues (leases, fuel sales etc.) are projected to grow at CPI
- Cost increases
  - Payroll increase at CPI plus 0.5%,
  - Other expenses (office costs, maintenance and repair etc.) increase at CPI.
- Debt assumed to be GO bonds at approximately 3% interest rate,
- Net present value estimated using interest rates ranging from 3% to 5%.

5.3.2.2. Occupancy

Occupancy rates for existing slips during the transition are based on existing occupancy rates for the period 2017 to 2020. Occupancy rates for new slips are capped at 90% occupancy.

5.3.3. Benefit/Cost Ratios

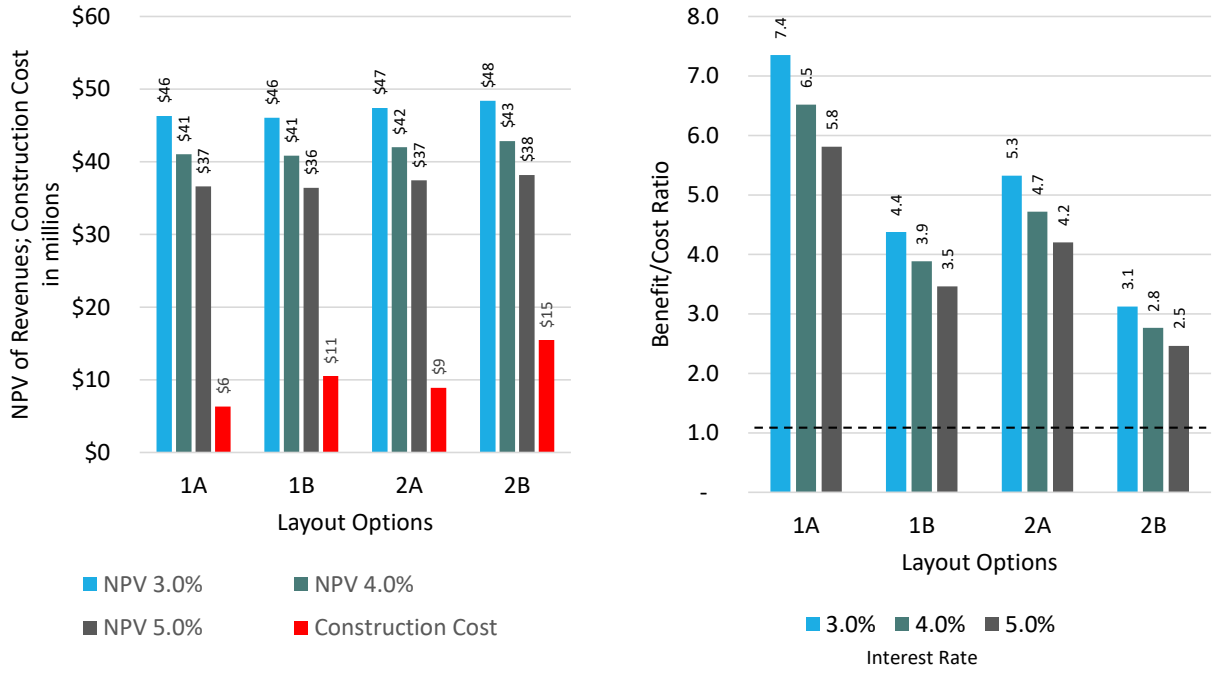
The financial analysis evaluates the benefit/cost ratio (B/C) for each layout through all three phases of development. The B/C ratio is defined as the NPV of the net revenue available for debt service with the associated cost of the project.

- Benefits are defined as the NPV of net revenues (total marina revenues less operating and maintenance costs for the period 2022 to 2045) and discounted at interest rates ranging from 3% to 5%.
- Construction costs were estimated by Moffatt-Nichol.

5.3.3.1. Phase 1 results

For Phase 1, the benefits (NPV of net revenue) are significantly higher than the Phase 1 cost estimates for all alternatives. All layout options for Phase 1 have a B/C ratio above 1, which is breakeven (NPV of net revenues equals costs).

FIGURE 13. BENEFIT/COST RATIOS (PHASE 1)



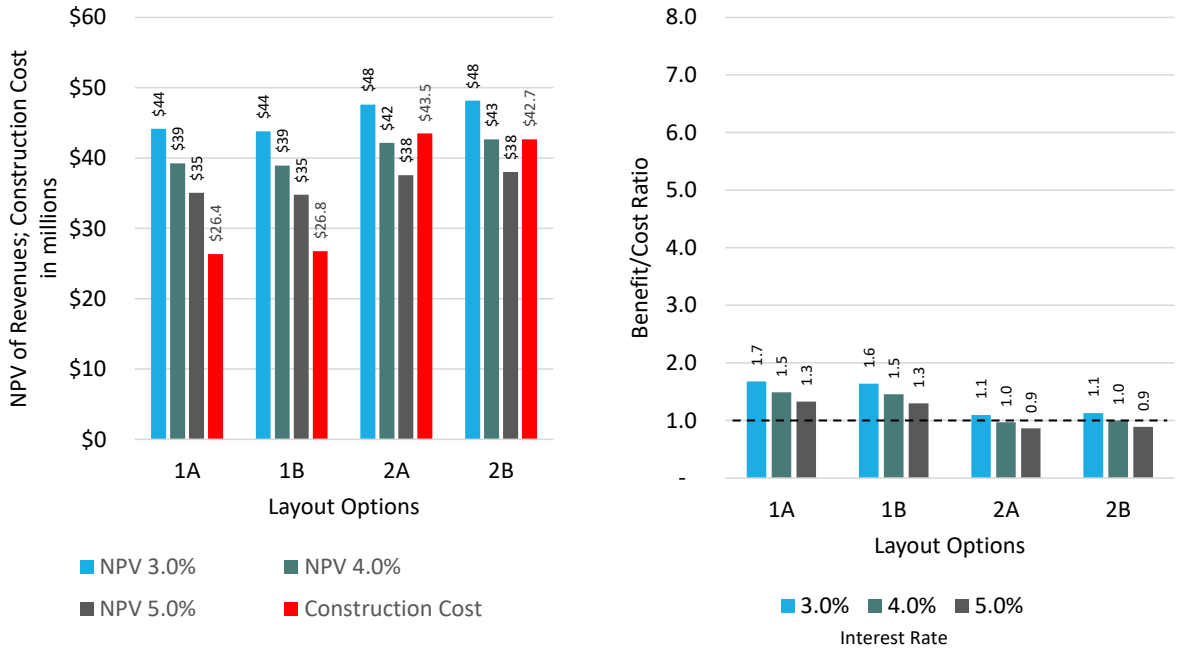
Source: BST Associates

5.3.3.2. Phase 2 results

For Phase 1 and 2 (combined), construction cost is lower than the NPV of net revenues for open layout options but not for all mixed layout options. B/C ratios are:

- Open slip layout options (1A and 1B) exceed breakeven under all interest rates.
- Mixed slip options (2A and 2B) meet or exceed breakeven at 3% and 4% interest rates but not at 5%.

FIGURE 14. BENEFIT/COST RATIOS (PHASE 2)



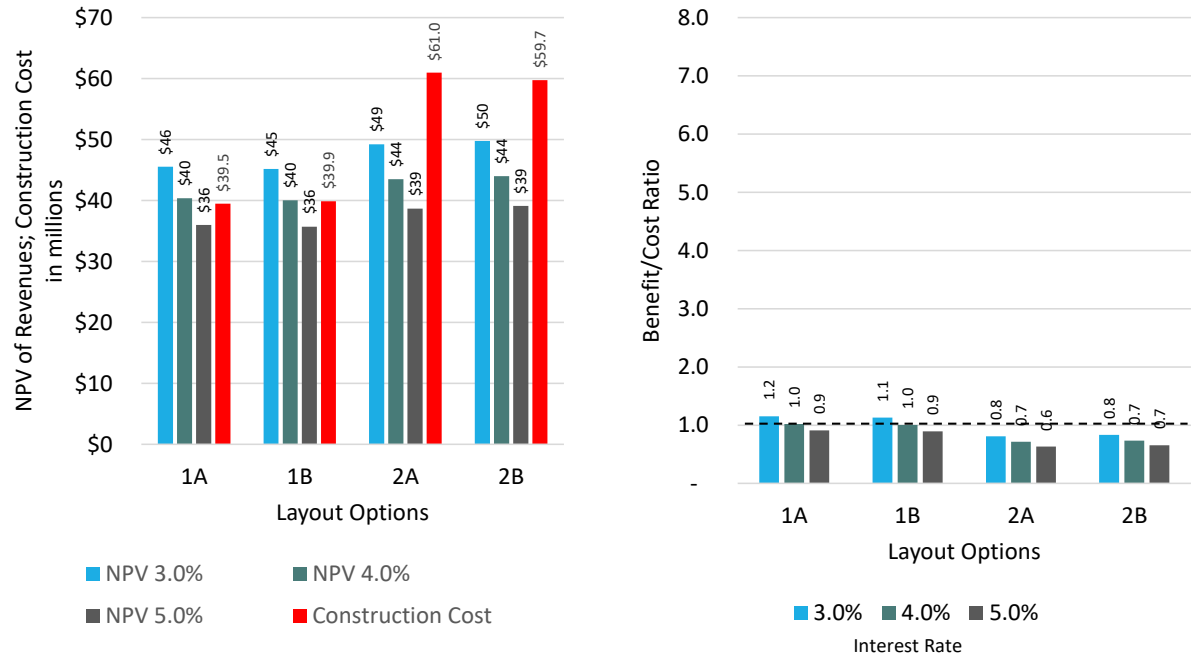
Source: BST Associates

5.3.3.3. Phase 3 results

For Phases 1, 2 and 3 (combined), the estimated construction cost is higher than the NPV of net revenues for options 2A and 2B and for options 1A and 1B at 5%. *B/C ratios are:*

- Open slip layout options (1A and 1B) meet or exceed the breakeven point at 3% and 4% interest rates and are below breakeven at 5%.
- Mixed slip options (2A and 2B) do not exceed the break-even point under any interest rate.

FIGURE 15. BENEFIT/COST RATIOS (PHASE 1)



Source: BST Associates

5.3.3.4. Covered versus Open Slips

Open slips produce better financial performance than covered slips. The average cost per slip was estimated by Moffatt & Nichol at:

- Open slips - approximately $78,020
- Covered slips - approximately $216,752

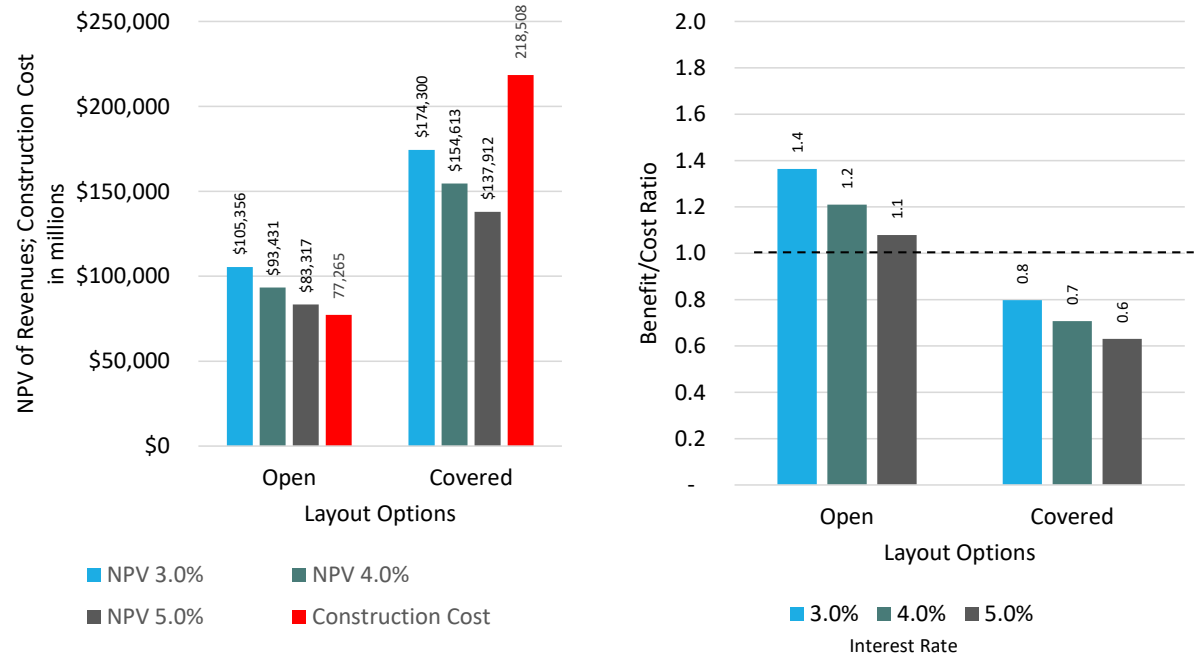
Benefits per slip are estimated at

- Open slips – range from $105,356 (3% rate), $93,431 (4% rate), $83,317 (5% rate)
- Covered slips – range from $174,300 (3% rate), $154,613 (4% rate), $137,912 (5% rate)

Benefit cost ratios;

- Open slips surpass the break-even point with all interest rates.
- Covered slips do not meet the break-even point with any of the interest rates.
    - The rates for new covered moorage would need to be approximately 39% above current monthly covered rates to break-even.

FIGURE 16. BENEFIT/COST - COVERED VS OPEN SLIPS



Source: BST Associates, Moffatt & Nichol (costs)

5.3.4. Financing

This section reviews potential financing methods.

5.3.4.1. LTGO Bonds

City of Des Moines Marina improvements have been traditionally undertaken using LTGO (Limited Tax General Obligation Bonds), which are backed by the property taxes of the City, but paid using net revenues from the marina. As noted above, marina debt payments averaged $800,000 per year from 2012 to 2020. Existing debt is paid off in 2022 and 2028.

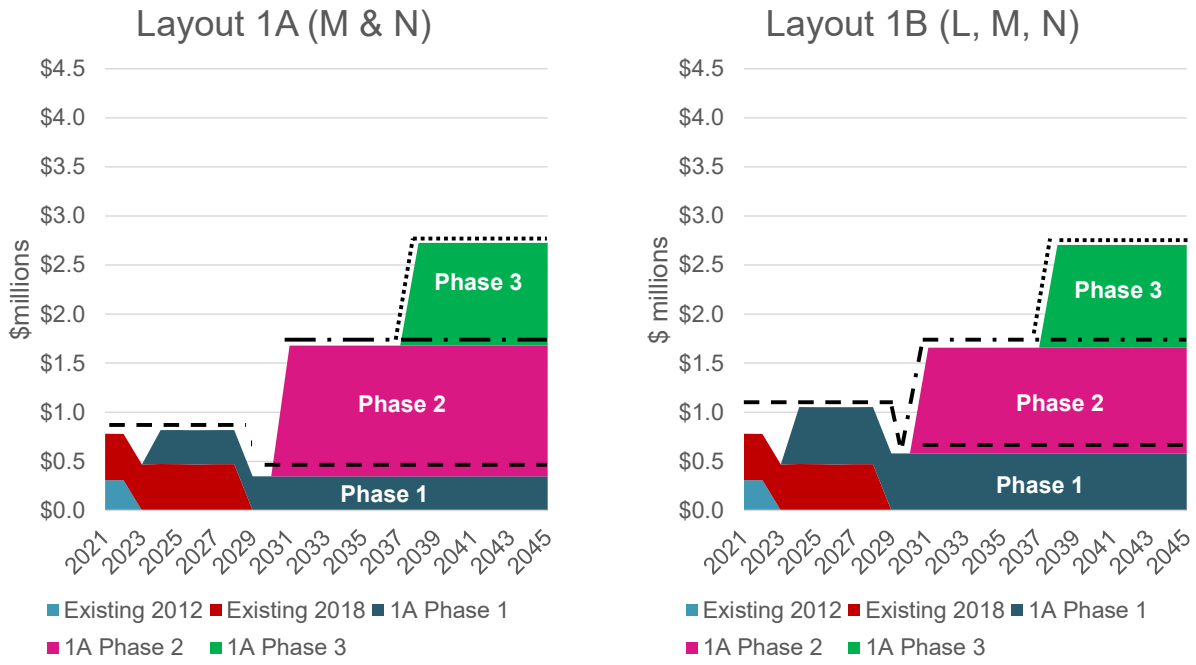
5.3.4.1.1. Open Slip Layouts

If LTGO bonds are used to pay for the debt, the expected debt per phase of construction for the open slip layouts, based on 30-year bonds at 3% interest, is as follows:

- Phase 1: $350,000/year (1A); $580,000/year (1B)
- Phase 1 & 2 Cumulative debt: $1.7 million/year (1A): $1.7 million/year (1B)
- Phase 1, 2 & 3 Cumulative debt: $2.7 million/year (1A): $2.7 million/year (1B)

Phase 1 is achievable under the City's requirements and could be increased. However, accommodating the cumulative debt for Phase 2 and 3 are not achievable.

FIGURE 17. DEBT SERVICE FOR OPEN SLIP LAYOUTS



Source: BST Associates, Moffatt & Nichol (costs)

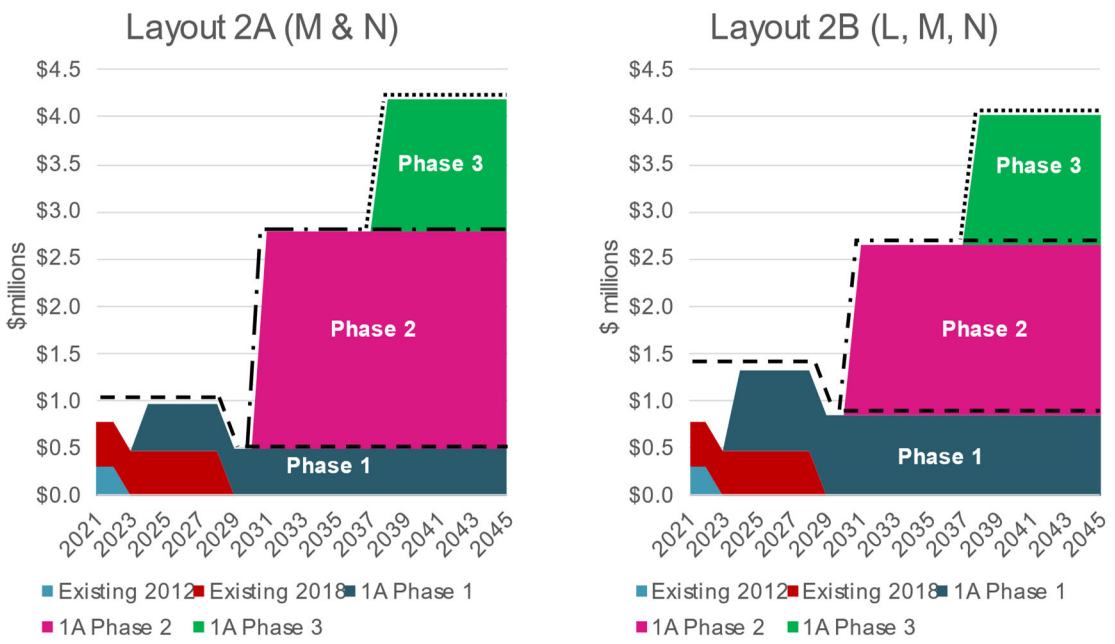
5.3.4.1.2. Mixed Slip Layouts

If LTGO bonds are used to pay for the debt, the expected debt per phase of construction, based on 30-year bonds at 3% interest, is as follows:

- Phase 1: $490,000/year (1A); $860,000/year (1B)
- Phase 1 & 2 Cumulative debt: $2.8 million/year (2A); $2.7 million/year (2B)
- Phase 1, 2 & 3 Cumulative debt: $4.2 million/year (2A); $4.0 million/year (2B)

Phase 1 is achievable under the City's requirements and the project size (number of floats). However, accommodating the cumulative debt for Phase 2 and 3 are not achievable.

FIGURE 18. DEBT SERVICE FOR MIXED SLIP LAYOUTS



Source: BST Associates, Moffatt & Nichol (costs)

5.4. Finance Conclusions

Rebuilding the City of Des Moines Marina is an expensive undertaking, ranging from $30 million (open slips) to $60 million (mixed slips).

None of the layouts meet all of the City financial requirements through all three phases of development but the open slip options are much closer than the mixed slip options.

- Phase 1
  - All Layouts meet financial requirements (B/C ratio equal to or greater than 1)
- Phase 2
  - All open slip Layouts (1A and 1B) meet financial requirements
  - Mixed Layouts (2A and 2B) meet financial requirements if interest rates are 3% or 4% but not 5%
- Phase 3
  - Open slip Layouts (1A and 1B) meet financial requirements if interest rates are 3% or 4% but not 5%
  - Mixed Layouts (2A and 2B) do not meet financial requirements under any interest rate.

Phase 2 and 3 require additional infrastructure that is not included in the cost estimates:

- Seawall reconstruction
- Drystack building

We recommend proceeding with Layout 1B in Phase 1 of construction (L, M, and N docks)

- Maximizes the number of slips replaced in Phase 1
- Meets market and financial requirements

There is time to re-evaluate Phase 2 and 3 (for docks A through K) prior to finalizing the concept in the future. The City could also consider other options for supporting marina development:

- Privatization
- Allocation of other City revenues to marina construction (leasehold excise and sales taxes)
- Grants, among other funding sources

6. Estimate of Construction Costs

6.1. Basis of Costs

For the financial analysis of the four alternatives, concept level estimates of construction costs were developed for the in-water marina improvements. Each major cost item is described below, with cost estimate breakdown tables provided in Appendix B.

6.1.1. Demolition

Work would include the demolition of the existing floating docks including creosote treated timber guide pile and timber covered roof structures. Treated timber pile and polystyrene floatation in the timber and concrete floats require special disposal at appropriate facilities. It is assumed that the covered roof structures would be reduced to pieces that can be transported from the site by barges for disposal or recycle.

6.1.2. Floating Docks

A timber dock system with recycled plastic composite lumber (RPL) decking and encapsulated Styrofoam billet tubs is the basis for the construction costs of the new marina docks. It is a similar system to the floats that were installed on J Dock (as part of repairs due to a fire in 2014), however grating would be included in the dock system where applicable for light penetration in order to address resource agency concerns of overwater coverage for the open moorage system.

FIGURE 19. FLOATING DOCK SYSTEM USED FOR BASIS OF COSTS

6.1.3. Guide Pile

Steel guide pile would be used to anchor the floating dock system. For the conceptual design, the pile are assumed to be 12 inch diameter, 50 feet long. Pile plans are typically based on review of load cases on the floating dock system – environmental loading such as wind, wave and current loads, and berthing loads.

For the conceptual design, the pile plan was based on review of the existing marina float system for piles located along the main walkways, and lengths of fingers.

6.1.4. Gangway

Each gangway would be 80 feet long and nominally 4 feet wide. These structures are typically aluminum construction. The cost used in estimates of construction are for the gangway structure only. For M and N docks, the existing abutment would be used and are considered adequate. For the remaining docks, it is assumed that the abutment structure (point of connection of the gangway at the top of ramp slope) would be provided as part of other infrastructure improvements.

6.1.5. Covered Structure

For layouts that include covered moorage, roof structures are assumed to be metal frame construction with a vinyl roof. The system could be similar to the covered moorage that was replaced at J Dock in 2014. It is assumed that covered moorage would require single loaded slips in order to provide the needed floatation for the roof under snow load conditions. Costs for fire protection systems required in the covered moorage areas are accounted in utility improvements for each dock.

6.1.6. Mechanical

For the potable water system, linear foot lengths were used to estimate costs. Lengths were taken from a typical dock to create a unit cost per float, modified by the particular length for each float.

A square foot cost method was used to estimate costs of fire protection systems. Square foot values are based off areas taken from the submitted drawings. Cost estimates are done using Excel spreadsheets that roll up costs for material and labor into a subtotal for mechanical costs.

6.1.7. Electrical

For the electrical power system, shore power quantities and associated circuit breakers, based upon number of slips, and linear foot lengths were used to estimate costs. Lengths were taken from a typical dock to create a unit cost per float, modified by the particular length for each float. For small quantity items, actual quantities were used, such as panelboard or cable carrier modifications.

Cost estimates are done using Excel spreadsheets that roll up costs for material and labor into a subtotal for mechanical costs. Prices were taken from RS Means Cost Estimate, Costs from Platt Electric and Grainger website (www.platt.com and www.grainger.com) and prices directly from the manufacturer or manufacturer's representative.

7. Environmental Compliance Approach

The current understanding is that the project is intended to replace the existing docks with more functional and environmentally friendly materials, while resulting in no net loss to ecological function. This includes removing creosote-treated piles from the environment, removing some or all the existing covered moorage, and installing grated decking where feasible. These types of projects may qualify for a more streamlined environmental review process, including programmatic permits and exemptions for repair and replacement of existing structures. This chapter describes the environmental compliance approach, covering the topics of permitting, eelgrass and macroalgae impacts, and Endangered Species Act (ESA) mitigation considerations for replacement of the L, M, and N docks.

For future phases of the Des Moines Marina Planning program, it is assumed a similar approach will be taken to permitting as is being done for the L, M, and N docks replacement. A multi-phase programmatic permitting approach was considered, but due to the uncertainty of timing and funding for future phases, it is not recommended.

7.1. Permitting

The permitting approach anticipated for the dock replacement is to apply for programmatic permits and exemptions as applicable to streamline the environmental review process. These types of permits and approvals require less documentation to be submitted and typically result in a shorter permit review duration. Early agency outreach is encouraged to confirm the permitting approach and documentation requirements. Table 1 includes a summary of anticipated environmental permits and approvals.

Table 1. Environmental Permits and Approvals

Approvals	Agency	Trigger	Notes
Federal			
Nationwide Permit (NWP) 3	U.S. Army Corps of Engineers (USACE)	Maintenance activities	A Joint Aquatic Resources Permit Application (JARPA) form will be prepared for an NWP 3. If any new or expanded in-water or overwater structures are proposed, an individual permit will be required.
Endangered Species Act (ESA) Concurrence	National Marine Fisheries Service and U.S. Fish and Wildlife Service	Potential impacts to ESA-listed species and/or habitat	A Short-Form Biological Evaluation (BE) will be required to assess potential impacts from in-water activities. This will also include an assessment of potential mitigation requirements based on the Puget Sound Nearshore Habitat Conservation Calculator.
National Historic Preservation Act Section 106 Compliance	Washington Department of Archaeology and Historic Preservation	Potential impacts to archaeological, cultural, or historic resources	Preliminary archaeological review indicates that a Cultural Resources Assessment memorandum may not be required for the project. Documentation of limited potential for encountering artifacts will be included in the JARPA and State Environmental Policy Act (SEPA) Checklist.
State			
Hydraulic Project Approval (HPA)	Washington Department of Fish and Wildlife (WDFW)	Work within waters of the state	Application materials will be submitted via the WDFW Aquatic Protection Permitting System (APPS) online project portal upon issuance of the SEPA determination.
Clean Water Act Section 401 Water Quality Certification (WQC)	Ecology	Potential water quality impacts to waters of the state	A pre-filing notice will be submitted to Ecology to support Coastal Zone Management Act (CZMA) and Section 401 review. Section 401 compliance will be covered under the NWP 3; an individual WQC is not required due to limited in-water work and impacts.
CZMA Consistency Determination	Ecology	USACE permit requirement	CZMA compliance will be covered under the NWP 3.
Aquatic Use Authorization	Washington Department of Natural Resources (DNR)	Work occurring on or over state-owned aquatic lands	JARPA Attachment E will be completed and submitted to DNR with the JARPA. The City will be responsible for aquatic lease terms negotiations.
Local			
SEPA Categorical Exemption	City of Des Moines (City)	Projects requiring local review in Washington State that qualify as exempt	A SEPA Categorical Exemption will be requested for repair, remodeling, and maintenance per Washington Administrative Code 197-11-800(3) (as adopted by the City). If the City requires full SEPA review, a SEPA Checklist will be prepared and submitted to the City.

Approvals	Agency	Trigger	Notes
Shoreline Substantial Development Permit (SSDP) Exemption	City	Repair and maintenance activities located within the shoreline buffer	An SSDP exemption request letter will be submitted to the City for normal maintenance activities occurring within the shoreline buffer that are exempt per the City's Shoreline Master Plan Chapter 7.2(2).
Floodplain Code Compliance	City	In-water structures within floodplain	A Floodplain Code Consistency Memorandum will be submitted to the City.

Note: Local Building, Demolition, and Grading Permits and other miscellaneous trade permits will be obtained by the project engineer.

7.1.1. Federal Permits and Approvals

Nationwide Permit 3

The USACE will be the federal lead agency for the project due to in-water work occurring in waters of the U.S. It is anticipated that the Project will qualify for NWP 3 for repair, rehabilitation, or replacement of previously authorized structures. Per the USACE regional conditions for NWP 3, if the activity meets the conditions of Section 401 of the CWA, Section 401 WQC is incorporated into the NWP and an individual authorization is not required.

A JARPA would be prepared and submitted to USACE requesting an NWP for the Project. The review time frame for NWPs is generally 9 to 12 months from complete application determination. However, recent delays in ESA consultation have been extending this timeframe to 18 months in some cases. The NWP process does not include a public notice process.

If the project does not meet the requirements of the NWPs, an Individual Permit may be required. The review time frame for Individual Permits is typically 18 months or more from a complete application determination and includes a public notice process. These time frames are contingent on the consultation process with other agencies and can increase with project complexity.

ESA Section 7 Consultation

ESA-listed aquatic species are present in Puget Sound, including ESA-listed salmonid species that use the area for migration to and from the Pacific Ocean. To demonstrate ESA Section 7 compliance for the proposed in-water work, a short-form Biological Evaluation will be prepared to initiate informal consultation with the Services (informal consultation is typically applicable to NWPs compared to full consultation which requires preparation of a Biological Assessment). The process for informal consultation is initiated by USACE during permit review and ends with a letter issued from the Services demonstrating compliance with ESA. The time frame for ESA review is incorporated with the USACE permit time frame, as USACE permits are not issued until consultation is complete. The ESA consultation process does not include a public notice.

Note that recent budget and staffing issues within the Services have resulted in significant delays in ESA consultation, adding months to the permit review time frame.

NHPA Section 106 Consultation

USACE will lead the NHPA Section 106 process, which requires consideration of effects to historic properties (historic and prehistoric sites, structures, districts, or objects eligible for listing in the National Register of Historic Places [NRHP]) and consultation with affected Tribes. Preliminary archaeological review indicates that a Cultural Resources Assessment memorandum may not be required for the project. Documentation of limited potential for encountering artifacts will be included in the JARPA and SEPA Checklist.

7.1.2. State Permits and Approvals

Hydraulic Project Approval

WDFW regulates work that uses, diverts, obstructs, or changes the natural flow or bed of any of the marine or fresh waters of the state, including projects landward of the mean higher high water mark (MHHW) that will directly impact fish life and habitat. Because project activities include work in and adjacent to waters of the state, a WDFW HPA will be required. HPA review begins once a SEPA Categorical Exemption or determination is issued and takes up to 45 days to complete. No public notice is required.

Because limited eelgrass is known to be present in the area, the Project will also require coordination with WDFW to discuss potential impacts to eelgrass and macroalgae from overwater structures as well as any required mitigation.

Clean Water Act Section 401 and CZMA Consistency

Ecology is the local lead agency for Clean Water Act Section 401 compliance and CZMA consistency. Clean Water Act Section 401 compliance is required for projects that propose discharge of dredge or fill material in waters of the U.S. and for projects requiring compliance with Washington State Water Quality Surface Water Standards per Washington Administrative Code (WAC) 173-201A.

Under NWP 3, individual Section 401 review is required if the project involves activities below the OHWM with new work being proposed outside the original footprint. Due to the limited shift in location of the docks within an active marina, it is assumed that individual Section 401 review will not be required. CZMA review is triggered by projects with a federal nexus that are proposed within any of Washington's 15 coastal counties. An individual CZM Consistency Determination is required for projects under NWP if Ecology Section 401 review is required.

Ecology recently updated the protocols for these reviews and is requiring a pre-filing application to be submitted 30 days prior to submittal of the JARPA. The pre-filing process includes a pre-application meeting and review of conceptual materials to determine if Clean Water Act Section 401 or CZMA compliance will be required. Once the 30-day period is over, a letter stating that the project will comply with Washington State water quality standards is submitted to Ecology with the JARPA.

Aquatic Use Authorization

There are DNR state-owned aquatic lands located on the west side of the marina that overlap portions of the L, M, and N docks. The DNR Aquatics Leasing Program reviews all proposals for work occurring on or over state-owned aquatic lands. As such, any work occurring on or over state-owned aquatic lands will need to comply with DNR stewardship measures. A JARPA and JARPA Attachment E will be submitted to DNR to initiate project review and lease negotiations. The existing aquatic lease will be updated to show the new dock configuration. Lease negotiations will be led by the City. The aquatic use authorization and updated lease are issued upon issuance of all environmental permits and approvals.

7.1.3. Local Permits and Approvals

SEPA Categorical Exemption

The City is the lead agency for local permits and approvals. Preliminary coordination with the City of Des Moines indicates that the Project may comply with the regulations for a SEPA categorical exemption criteria for repair, remodeling, and maintenance activities per Washington Administrative Code (WAC) 197-11-800(3) (as adopted by the City). Once confirmed by the City during early agency outreach, a letter requesting a categorical exemption will be prepared and submitted to the City for review. There is no public notice process associated with a SEPA Categorical Exemption. SEPA Categorical Exemptions are typically issued within 1 to 2 months.

If the City determines that SEPA review is required, a SEPA Checklist would be prepared and submitted to the City. An Environmental Impact Statement level of review is not anticipated for the project.

SSDP Exemption

The City administers the Shoreline Master Program for projects occurring within the 200-foot shoreline environment. The project will be regulated under the City of Des Moines Shoreline Master Program (SMP; City of Des Moines 2011). The Project occurs within the High Intensity shoreline environment (City of Des Moines 2011). It is anticipated that the project will meet the criteria for an SSDP exemption per SMP Chapter 7.2(2). An exemption request and form would be prepared and included in the SEPA categorical exemption request letter submitted to the City for review. The SSDP exemption would be issued concurrent with the SEPA categorical exemption described above. SSDP exemptions are typically issued within 1 to 2 months.

Floodplain Compliance

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps, the project lies within a Zone AE floodplain (FEMA 2019). Zone AE designated areas have a 1% annual flood chance and base flood elevations are determined. In this area, the base flood elevation is 13 feet North American Datum of 1988. Due to its location within a floodplain, the project must comply with City of Des Moines floodplain requirements. This will include complying with the FEMA development regulations and demonstrating no net loss of floodplain habitat and no impacts to adjacent properties in a Zero Rise Analysis. A Floodplain Compliance Memorandum will be prepared and submitted to demonstrate compliance with the City's floodplain regulations.

7.2. Eelgrass and Macroalgae

On September 30, 2021, Anchor QEA and Solmar Hydro conducted a boat-based video survey along L, M, and N Docks to confirm the bathymetric survey results at the request of the WDFW. Per WAC 220 660-350, eelgrass and macroalgae beds are saltwater habitats of special concern. WDFW requested that a video survey be conducted to confirm the bathymetric survey results and provide photographic evidence demonstrating presence or absence of eelgrass or macroalgae beds within the Project area (Arber 2021). The eelgrass and macroalgae survey was completed consistent with the requirements per WAC 220-660-350(3).

Isolated shoots of eelgrass and sparse patches of other aquatic vegetation documented during the survey provide limited habitat functions because they are isolated and separate from the surrounding nearshore environment. Divers were not present to confirm whether the eelgrass shoots were rooted, so it is possible that some of the shoots were not rooted. The isolated shoots of eelgrass documented during the survey do not provide habitat functions or values such as sediment stabilization, support of a diverse nearshore epibenthic community, or food or refuge for crabs or juvenile fish, including salmonids. A dense, well-established eelgrass bed exists approximately 500 feet north of the marina and was observed during the 2008 survey (Anchor Environmental 2008). This established eelgrass bed is the likely source of the eelgrass shoots found inside the marina. It should also be noted that there is no herring spawning for several miles on either side of the marina; the nearest spawning area is in Quartermaster Harbor, across the water between Maury and Vashon islands.

Previous eelgrass surveys that were completed at the marina found similar results. A survey completed in 2008 found a small number of rooted shoots on the slope at the southern edge of the marina, but all other eelgrass observed inside the marina was unrooted and drifting (Anchor Environmental 2008). Similarly, the September 2021 bathymetric survey indicated that there are no eelgrass beds present within the marina.

Because of the negligible amount of eelgrass and macroalgae documented within the survey area, the lack of high ecological value it provides, and the likelihood that it will not survive or colonize within the marina, no mitigation for potential project impacts is proposed.

Subsequent coordination with WDFW indicated that if any patches of eelgrass containing 3 or more shoots will be impacted by the project, they may require additional surveys and documentation and may also consider mitigation depending on the final project alignment and conservation measures.

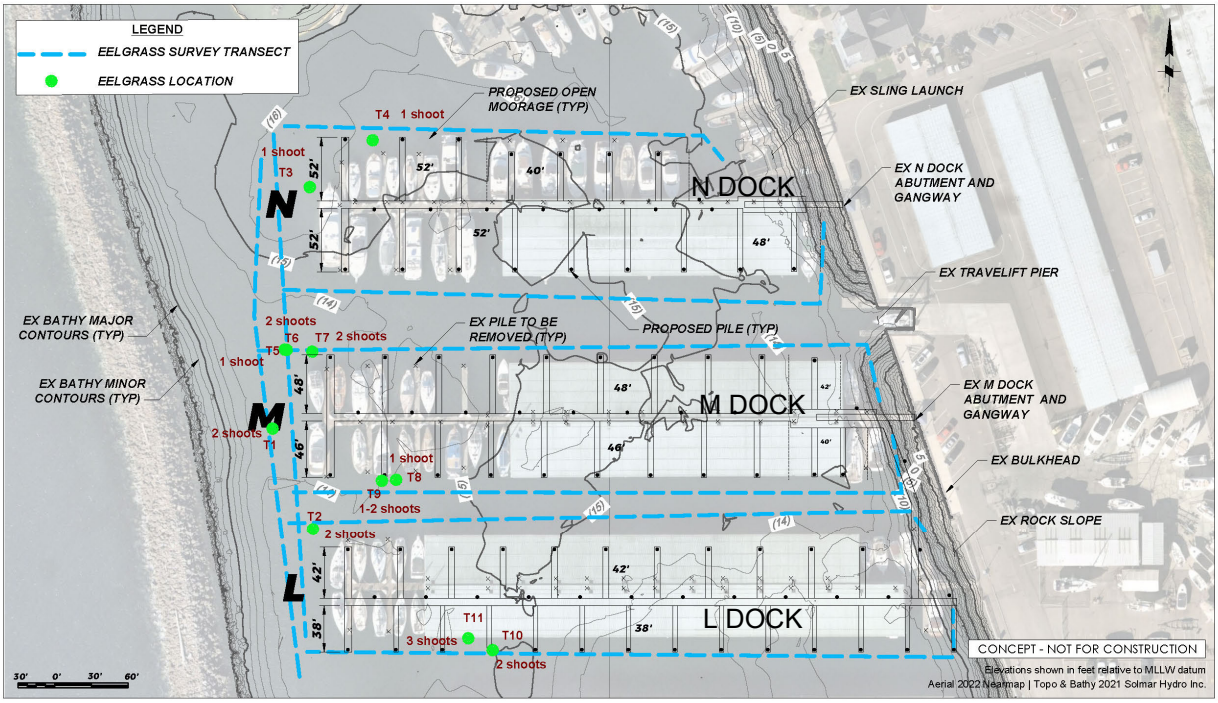


FIGURE 20. EELGRASS AND MACROALGAE SURVEY RESULTS (SEPTEMBER 2021)

7.3. ESA Mitigation Considerations

The National Marine Fisheries Service (NMFS) is in the process of preparing and issuing a Biological Opinion to cover repair and maintenance activities occurring along the shorelines of Puget Sound (expected June 30, 2022). In the interim, NMFS has been batching projects for ESA consultation and requiring mitigation for repair and maintenance activities. Mitigation calculations are completed using the NMFS Puget Sound Nearshore Habitat Conservation Calculator. The calculator is based on previous region-specific and Habitat Equivalency Analysis models.

The City is currently considering 4 potential options for replacing the L, M, and N Docks (Options 1A, 1B, 2A, and 2B). Options 1A and 1B consider open moorage and Options 2A and 2B consider partial covered moorage. Preliminary calculations using the Puget Sound Nearshore Habitat Conservation Calculator have indicated that Options 1A and 1B would result in net credits due to the removal of covered moorage, resulting in a significant decrease in overwater cover. These credits can be banked under this program and may be applied to future projects, such as future phases of the Des Moines Marina Planning program. Options 2A and 2B propose partial covered moorage, but even with the reduction in overwater cover will result in net debits, requiring mitigation. Mitigation can be provided through a variety of measures, including onsite mitigation, offsite mitigation, or payment to a mitigation bank or in-lieu fee program. The results of the preliminary calculations completed for the 4 options are not final and may be adjusted based on future project design refinements and/or coordination with NMFS.

8. Summary

8.1. Finances

Complete phased replacement of the City of Des Moines Marina is an expensive undertaking, ranging from $30 million (open slips) to $60 million (mixed slips). None of the layouts meet all of the City financial requirements through all three phases of development but the open slip options are much closer than the mixed slip options.

- Phase 1: All Layouts meet financial requirements (B/C ratio equal to or greater than 1)
- Phase 2: All open slip Layouts (1A and 1B) meet financial requirements. Mixed Layouts (2A and 2B): Meet financial requirements if interest rates are 3% or 4% but not 5%
- Phase 3: Open slip Layouts (1A and 1B) meet financial requirements if interest rates are 3% or 4% but not 5%. Mixed Layouts (2A and 2B) do not meet financial requirements under any interest rate.

We recommend proceeding with Layout 1B in Phase 1 of construction (L, M, and N docks) as it maximizes the number of slips replaced in Phase 1 and meets market and financial requirements. It is noted that the City Council had concurred with this recommendation at the February 10, 2022 Council meeting.

8.2. Marina Dock Design

Type of floating dock system to be used in the final design of the marina replacement project would be heavy pressure treated timber floats. The timber floats are least capital costs, can incorporate grated decking, repairs can be accomplished using marina staff, and the marina staff is familiar/experienced with this type of system. As described earlier for the marina layouts, the first phase would utilize the existing gangway abutment locations for Dock M and N. Other improvements would include 80 foot long gangways – one for Dock N and a shared gangway access for Docks L and M.

9. References

Reid Middleton (2020). Des Moines Marina - Marina Service Life Report, Des Moines, Washington. Prepared for the City of Des Moines. December 8, 2020.

Waggoner Marina Services (2021). Des Moines Marina Redevelopment Study. Prepared for the City of Des Moines. Draft March 27, 2021.

APPENDICES

APPENDIX A: MARINAS INCLUDED IN MOORAGE RATE COMPARISON

Open Moorage:

- Arabella's Landing
- Foss Harbor Marina
- Hylebos Marina
- Marina at Browns Point
- Delin Docks
- Dock Street Marina
- Chinook Landing
- Elliott Bay Marina
- Shilshole Bay Marina
- South Park Marina
- Harbor Island Marina
- Fishermen's Terminal
- Salmon Bay Marina
- Carillon Point Marina
- Edmonds Marina
- Everett - Main and North Marinas
- Anacortes Marina
- Cap Sante Marina
- La Conner Marina

Covered moorage:

- Marina at Browns Point
- Narrows Marina
- Tyee Marina
- Salmon Bay Marina
- Stimson Marina
- Edmonds Marina
- Everett Marina
- Anacortes Marina
- La Conner Marina

APPENDIX B: ESTIMATE OF CONSTRUCTION COSTS FOR LAYOUTS 1A, 1B, 2A, AND 2B

LAYOUT 1A
PH 1 - M and N Docks only
ALL OPEN SLIPS

Description	Unit	Unit Cost	DOCK														Phase 1	Phase 2	Phase 3	TOTAL
			N	M	L	K	J	I	H	G	F	E	D	C	B	A				
		Dock Length (ft)	370	455	505	495	0	480	451	445	0	423	415	275	260	250	825	2376	1623	4824
		Total Slips:	32	42	47	46	0	46	50	50	0	50	46	34	34	34	74	239	198	511
		Covered Slips:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demolition																				
Floats (incl utilities, remove & dispose)	SF	$ 10	9,000	8,830	10,740	10,040	9,420	9,010	8,690	8,090	7,860	7,680	6,020	4,310	4,010	2880	$ 178,300	$ 638,500	$ 249,000	$ 1,065,800
Piles (creosote timber pull & dispose)	EA	$ 2,000	27	33	33	33	27	27	25	23	23	21	16	12	5	5	$ 120,000	$ 382,000	$ 118,000	$ 620,000
Roof Structures (remove & dispose)	SF	$ 2	15,240	25,590	32,030	32,620	28,350	29,380	28,270	23,630	22,710	20,470	0	0	0	0	$ 81,660	$ 393,980	$ 40,940	$ 516,580
Gangway (remove & dispose/recycle)	EA	$ 1,000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	$ 2,000	$ 7,000	$ 5,000	$ 14,000
PROPOSED																				
Floats (installed)	SF	$ 155	6,317	7,308	8,068	8,448		8,334	6,601	6,597		5,993	5,542	4,247	4,029	3865	$ 2,111,875	$ 5,897,363	$ 3,669,780	$ 11,679,018
Piles (installed)	EA	$ 6,400	25	32	35	35		35	39	39		20	19	15	15	15	$ 364,800	$ 1,171,200	$ 537,600	$ 2,073,600
Utilities																				
Elec Upland Improv for Docks P2	LS	$ 442,000				1											$ -	$ 442,000	$ -	$ 442,000
Elec Upland Improv for Docks P3	LS	$ 409,000										1					$ -	$ -	$ 409,000	$ 409,000
Elec	LS	1	172,000	210,000	458,000	419,000	0	394,000	469,000	458,000	0	421,000	435,000	411,000	395,000	404,000	$ 382,000	$ 2,198,000	$ 2,066,000	$ 4,646,000
Water	LS	1	218,460	260,472	280,077	280,077	0	261,592	250,949	244,787	0	243,667	207,817	138,358	138,358	138,358	$ 478,932	$ 1,317,482	$ 866,558	$ 2,662,972
80' Gangway	EA	$ 80,000	1	1	1			1	1				1	1		1	$ 160,000	$ 240,000	$ 240,000	$ 640,000
Utility Cable Management Tray System	EA	$ 100,000	1	1	1			1	1				1	1		1	$ 200,000	$ 300,000	$ 300,000	$ 800,000
																Subtotal	$ 4,079,567	$ 12,987,525	$ 8,501,878	$ 25,568,970
																Mobe/Demobe 10%	$ 407,957	$ 1,298,752	$ 850,188	$ 2,556,897
																Mitigation 2.0%	$ 89,750	$ 285,726	$ 187,041	$ 562,517
																Tax 10.1%	$ 462,305	$ 1,471,772	$ 963,450	$ 2,897,527
																Contingency 25.0%	$ 1,259,895	$ 4,010,944	$ 2,625,639	$ 7,896,478
																Project TOTALS	**$ 6,299,474**	**$ 20,054,718**	**$ 13,128,196**	**$ 39,482,388**

LAYOUT 1B
PH 1 - L, M and N Docks
ALL OPEN SLIPS

Description	Unit	Unit Cost	DOCK														Phase 1	Phase 2	Phase 3	TOTAL
			N	M	L	K	J	I	H	G	F	E	D	C	B	A				
		Dock Length (ft)	370	455	505	495	0	480	451	445	0	423	415	275	260	250	1330	1871	1623	4824
		Guest Slips:	42	41	50	46	0	46	48	50	0	50	46	34	34	34	173	190	198	511
		Covered Slips:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demolition																				
Floats (incl utilities, remove & dispose)	SF	$ 10	9,000	8,830	10,740	10,040	9,420	9,010	8,690	8,090	7,860	7,680	6,020	4,310	4,010	2880	$ 285,700	$ 531,100	$ 249,000	$ 1,065,800
Piles (creosote timber pull & dispose)	EA	$ 2,000	27	33	33	33	27	27	25	23	23	21	16	12	5	5	$ 186,000	$ 316,000	$ 118,000	$ 620,000
Roof Structures (remove & dispose)	SF	$ 2	15,240	25,590	32,030	32,620	28,350	29,380	28,270	23,630	22,710	20,470	0	0	0	0	$ 145,720	$ 329,920	$ 40,940	$ 516,580
Gangway (remove & dispose/recycle)	EA	$ 1,000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	$ 3,000	$ 6,000	$ 5,000	$ 14,000
																	$ -	$ -	$ -	$ -
PROPOSED																	$ -	$ -	$ -	0
Floats (installed)	SF	$ 155	6,317	8,280	7,622	8,879		8,421	7,082	6,668		5,925	5,542	4,247	4,029	3865	$ 3,443,945	$ 4,812,750	$ 3,659,240	$ 11,915,935
Piles (installed)	EA	$ 6,400	25	32	38	35		36	37	39		20	19	15	15	15	$ 608,000	$ 940,800	$ 537,600	$ 2,086,400
Utilities																	$ -	$ -	$ -	$ -
Elec Upland Improv for Docks P2		$ 442,000						1									$ -	$ 442,000	$ -	$ 442,000
Elec Upland Improv for Docks P3		$ 409,000											1				$ -	$ -	$ 409,000	$ 409,000
Elec	LS	1	172,000	210,000	458,000	419,000	0	394,000	469,000	458,000	0	421,000	435,000	411,000	395,000	404,000	$ 840,000	$ 1,740,000	$ 2,066,000	$ 4,646,000
Water	LS	1	218,460	260,472	280,077	280,077	0	261,592	250,949	244,787	0	243,667	207,817	138,358	138,358	138,358	$ 759,009	$ 1,037,405	$ 866,558	$ 2,662,972
																	$ -	$ -	$ -	$ -
80' Gangway	EA	$ 80,000	1	1	1			1	1				1	1		1	$ 240,000	$ 160,000	$ 240,000	$ 640,000
Utility Cable Management Tray System	EA	$ 100,000	1	1	1			1	1				1	1		1	$ 300,000	$ 200,000	$ 300,000	$ 800,000
																Subtotal	$ 6,811,374	$ 10,515,975	$ 8,491,338	$ 25,818,687
																Mobe/Demobe 10%	$ 681,137	$ 1,051,598	$ 849,134	$ 2,581,869
																Mitigation 2.0%	$ 149,850	$ 231,351	$ 186,809	$ 568,011
																Tax 10.1%	$ 771,879	$ 1,191,691	$ 962,255	$ 2,925,825
																Contingency 25.0%	$ 2,103,560	$ 3,247,654	$ 2,622,384	$ 7,973,598
																Project TOTALS	**$ 10,517,800**	**$ 16,238,269**	**$ 13,111,921**	**$ 39,867,990**

LAYOUT 2A
PH 1 - M and N Docks only
PARTIAL COVERED SLIPS (Docks D thru M)

Description	Unit	Unit Cost	DOCK N	M	L	K	J	I	H	G	F	E	D	C	B	A	Phase 1	Phase 2	Phase 3	TOTAL
		Dock Length (ft)	370	455	505	495	0	480	451	445	0	423	415	275	260	250	825	2376	1623	4824
		Total Slips:	42	47	45	44	0	44	48	48	0	48	44	34	34	34	74	224	194	492
		Covered Slips:	0	15	17	18	0	19	22	18	0	22	18	0	0	0	15	54	40	149
Demolition																				
Floats (incl utilities, remove & dispose)	SF	$ 10	9,000	8,830	10,740	10,040	9,420	9,010	8,690	8,090	7,860	7,680	6,020	4,310	4,010	2,880	$ 178,300	$ 638,500	$ 249,000	$ 1,065,800
Piles (creosote timber pull & dispose)	LA	$ 2,000	27	33	33	33	27	27	25	23	23	21	16	12	5	5	$ 120,000	$ 382,000	$ 118,000	$ 620,000
Roof Structures (remove & dispose)	SF	$ 2	15,240	25,590	32,030	32,620	28,350	29,380	28,270	23,630	22,710	20,470	0	0	0	0	$ 81,660	$ 393,980	$ 40,940	$ 516,580
Gangway (remove & dispose/recycle)	EA	$ 1,000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	$ 2,000	$ 7,000	$ 5,000	$ 14,000
PROPOSED																				
Floats (installed)	SF	$ 155	6,317	8,883	9,652	10,248		9,918	8,257	7,929		7,465	6,758	4,247	4,029	3,865	$ 2,356,000	$ 7,130,543	$ 4,086,420	$ 13,572,963
Roof Structures (installed)	SF	$ 70	0	17,160	19,310	24,070		21,700	17,780	14,330		14,910	12,100	0	0	0	$ 1,201,200	$ 6,803,300	$ 1,890,700	$ 9,895,200
Piles (installed)	EA	$ 6,400	25	36	40	41		39	42	42		34	31	15	15	15	$ 390,400	$ 1,305,600	$ 704,000	$ 2,400,000
Utilities																				
Elec Upland Improv for Docks P2		$ 442,000			1												$ -	$ 442,000	$ -	$ 442,000
Elec Upland Improv for Docks P3		$ 409,000											1				$ -	$ -	$ 409,000	$ 409,000
Elec	LS	1	172,000	210,000	458,000	419,000	0	394,000	469,000	458,000	0	421,000	435,000	411,000	395,000	404,000	$ 382,000	$ 2,198,000	$ 2,066,000	$ 4,646,000
Water	LS	1	218,460	260,472	280,077	280,077	0	261,592	250,949	244,787	0	243,667	207,817	138,358	138,358	138,358	$ 478,932	$ 1,317,482	$ 866,558	$ 2,662,972
Sprinkler System	SF	$ 12.7	0	17,160	19,310	24,070		21,700	17,780	14,330		14,910	12,100	0	0	0	$ 217,932	$ 1,234,313	$ 343,027	$ 1,795,272
																	$ -	$ -	$ -	$ -
80' Gangway	EA	$ 80,000	1	1	1			1	1				1	1		1	$ 160,000	$ 240,000	$ 240,000	$ 640,000
Utility Cable Management Tray System	EA	$ 100,000	1	1	1			1	1				1	1		1	$ 200,000	$ 300,000	$ 300,000	$ 800,000
																Subtotal	$ 5,768,424	$ 22,392,718	$ 11,318,645	$ 39,479,787
																Mobe/Demobe 10%	$ 576,842	$ 2,239,272	$ 1,131,865	$ 3,947,979
																Mitigation 2.0%	$ 126,905	$ 492,640	$ 249,010	$ 868,555
																Tax 10.1%	$ 653,689	$ 2,537,588	$ 1,282,651	$ 4,473,928
																Contingency 25.0%	$ 1,781,465	$ 6,915,554	$ 3,495,543	$ 12,192,562
																Project TOTALS	**$ 8,907,326**	**$ 34,577,771**	**$ 17,477,714**	**$ 60,962,811**

Layout 2B
PH 1 - L, M and N Docks
PARTIAL COVERED SLIPS (Docks D thru M)

Description	Unit	Unit Cost	DOCK														Phase 1	Phase 2	Phase 3	TOTAL
			N	M	L	K	J	I	H	G	F	E	D	C	B	A				
		Dock Length (ft)	370	455	505	495	0	480	451	445	0	423	415	275	260	250	1330	1871	2623	4824
		Total Slips:	42	42	49	44	0	44	46	48	0	48	44	34	34	34	178	182	194	499
		Covered Slips:	0	14	20	18	0	19	21	18	0	22	18	0	0	0	34	76	40	150
Demolition																				
Floats (incl utilities, remove & dispose)	SF	$ 10	9,000	8,830	10,740	10,040	9,420	9,010	8,690	8,090	7,860	7,680	6,020	4,310	4,010	2,880	$ 285,700	$ 531,100	$ 249,000	$ 1,065,800
Piles (creosote timber pull & dispose)	EA	$ 2,000	27	33	33	33	27	27	25	23	23	21	16	12	5	5	$ 186,000	$ 316,000	$ 118,000	$ 620,000
Roof Structures (remove & dispose)	SF	$ 2	15,240	25,590	32,030	32,620	28,350	29,380	28,270	23,630	22,710	20,470	0	0	0	0	$ 145,720	$ 329,920	$ 40,940	$ 516,580
Gangway (remove & dispose/recycle)	EA	$ 1,000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	$ 3,000	$ 6,000	$ 5,000	$ 14,000
																	$ -	$ -	$ -	
PROPOSED																	$ -	$ -	$ -	
Floats (installed)	SF	$ 155	6,317	9,749	9,383	10,643		10,005	8,810	8,000		7,397	6,758	4,247	4,029	3,865	$ 3,944,595	$ 5,805,990	$ 4,075,880	$ 13,826,465
Roof Structures (installed)	SF	$ 70	0	17,100	18,600	23,615		22,020	18,800	14,330		14,900	12,100	0	0	0	$ 2,499,000	$ 5,513,550	$ 1,890,000	$ 9,902,550
Piles (installed)	EA	$ 6,400	25	36	42	41	0	39	42	42	0	34	31	15	15	15	$ 659,200	$ 1,049,600	$ 704,000	$ 2,412,800
Utilities																	$ -	$ -	$ -	
Elec Upland Improv for Docks P2		$ 442,000						1									$ -	$ 442,000	$ -	$ 442,000
Elec Upland Improv for Docks P3		$ 409,000												1			$ -	$ -	$ 409,000	$ 409,000
Elec	LS	1	172,000	210,000	458,000	419,000	0	394,000	469,000	458,000	0	421,000	435,000	411,000	395,000	404,000	$ 840,000	$ 1,740,000	$ 2,066,000	$ 4,646,000
Water	LS	1	218,460	260,472	280,077	280,077	0	261,592	250,949	244,787	0	243,667	207,817	138,358	138,358	138,358	$ 759,009	$ 1,037,405	$ 866,558	$ 2,662,972
Sprinkler System	SF	$ 12.7	0	17,100	18,600	23,615		22,020	18,800	14,330		14,900	12,100	0	0	0	$ 453,390	$ 1,000,316	$ 342,900	$ 1,796,606
																	$ -	$ -	$ -	$ -
80' Gangway	EA	$ 80,000	1	1	1			1	1				1	1		1	$ 240,000	$ 160,000	$ 240,000	$ 640,000
Utility Cable Management Tray System	EA	$ 100,000	1	1	1			1	1				1	1		1	$ 300,000	$ 200,000	$ 300,000	$ 800,000
																Subtotal	$ 10,029,914	$ 17,600,781	$ 11,058,278	$ 38,688,973
																Mobe/Demobe 10%	$ 1,002,991	$ 1,760,078	$ 1,105,828	$ 3,868,897
																Mitigation 2.0%	$ 220,658	$ 387,217	$ 243,282	$ 851,157
																Tax 10.1%	$ 1,136,610	$ 1,994,556	$ 1,253,146	$ 4,384,312
																Contingency 25.0%	$ 3,097,543	$ 5,435,658	$ 3,415,134	$ 11,948,335
																Project TOTALS	**$ 15,487,717**	**$ 27,178,289**	**$ 17,075,668**	**$ 59,741,674**