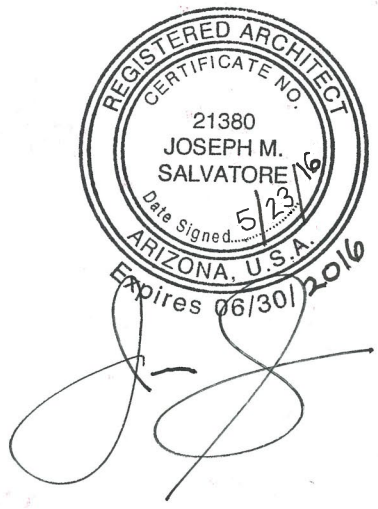
# Lake Havasu City

## Aquatics and Community Center Building

**Facility Assessment Report** | May 23, 2016

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May 20, 2016

# Lake Havasu City Aquatic Center Facility Assessment Report

In the spring of 2016, Lake Havasu City engaged Architekton to perform a facility assessment of the Lake Havasu City Aquatic and Community Center and to provide an Operations and Marketing Analysis of the center. The City tasked Architekton to review several features and market viability of the existing center.

Architekton's assessment team was comprised of **Architekton** (reviewing the facilities' architecture building systems), **Henderson Engineers** (reviewing the facilities' mechanical, electrical and plumbing systems), **Aqua Design International** (reviewing facilities' aquatic systems) and **Ballard King** (providing operations and marketing analyses of the facilities).

**Facility Assessment**

This report provides a facility condition and assessment report for the Aquatic Center and Grounds in the Lake Havasu City at Rotary Park. The team was to review and report upon the following components of the existing facility:

- Roof – Condition and expected remaining life
- Ozone system – Viability, Condition and expected remaining life
- Large flume slide - Viability, Condition and expected remaining life
- Pool deck - Condition and expected remaining life
- Small Shipwreck slide - Viability, Condition and expected remaining life
- Wave making system - Viability, Condition and expected remaining life
- Air quality and handling - Viability, Condition and expected remaining life
- Plumbing - Viability, Condition and expected remaining life
- Heating and cooling systems (HVAC systems and water heating systems) – Current efficiencies values and systems performance against current technologies, existing systems viability, condition and expected remaining life
- Electrical systems and emergency generator – Capacities, viability, condition and expected remaining life
- Automatic chemical application system - Viability, Condition and expected remaining life
- Solar collection system - Viability, Condition and expected remaining life
- Pool liner - condition and expected remaining life
- Moveable bulkhead - condition and expected remaining life
- Misc.: Catering Kitchen - condition and expected remaining life

**Amenities Assessment**
This section of the report will also review the center's offering of amenities/ programs to the public as compared to current standards offered at similar facilities based upon Ballard King's national experience focusing on:

- Physical Condition of the amenities
- The need for renovation or improvement of existing spaces
- The need for new spaces

**Process**
The design team congregated at the site on April 7 and 8, 2016.
The reviewers were:

- Joseph M. Salvatore, AIA, LEED AP – Architecture systems
- Michael Rosso, RA – Architecture Systems
- Asif Kazimi, PE – MEP Systems
- Kenneth Keane, PE – MEP Systems
- Ken Paulson – Aquatic Systems
- Ken Ballard – Operations and Marketing strategies

Each team member set off to begin the review of the systems of their expertise. Around midday on April 7, the center's staff took the entire team on a tour of the facility to review their experiences with the facility and all of its systems. The tours continued on the next day and ended with a conference discussing the facility's operations and programming.

Each team member took the information gathered during the two-day site visit and wrote their findings in this report. This report is organized into five sections:

1. Market Analysis

2. Existing Facility Operations Review

3. Architectural Systems Study

4. Mechanical, Electrical, Plumbing Systems Study

5. Aquatic Systems Study

The **Market Analysis** section is authored by Ballard King analyzes the population demographics, sports participation probabilities, non-sports participation statistics, aquatics participation, and community center benchmarks for the city resulting in Market Conclusions.

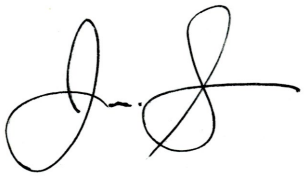
The **Existing Facility Operations Review** section is authored by Ballard King and examines the center's use and budget, resulting in several conclusions. It continues on to analyze the center's amenities and provides several recommendations.

The **Architecture Systems Study** authored by Architekton reviews the physical building and makes recommendations for actions required to ensure the continued functionality of the building for many more years of use. It also addresses recommendations to enhance the center's ability to maintain it attractiveness to current and future patrons.

The **Mechanical, Electrical Plumbing Systems Study** authored by Henderson Engineers, Inc. examines those systems with the operational input from the city staff and makes recommendations to ensure the continued functionality of each system for many more years of use.

The **Aquatic Systems Study** authored by Aqua Design International examines those systems with the operational input from the city staff and makes recommendations to ensure the continued functionality of each system for many more years of use.

Sincerely,



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# Contents

# Market Analysis

## Section I – Demographic Summary & Market Review

Ballard*King & Associates (B*K) is assisting Architekton with the completion of a feasibility study for a possible renovation/expansion of Lake Havasu City Aquatic/Community Center.

The following is a summary of the basic demographic characteristics of the identified service areas for the center along with recreation and leisure participation standards as produced by the National Sporting Goods Association and the National Endowment for the Arts.

**Service Areas:** The primary goal of a renovated or expanded Aquatic/Community Center would be to serve the residents of Lake Havasu City and the immediate surrounding area, as a result a 15-mile radius from the center has been identified as the Primary Service Area for the facility. Understanding that the current facility can at times draw participants from beyond this radius, a Secondary Service Area that is a 60-mile radius and includes Kingman, Needles, Bullhead City and Parker has been identified.

Primary Service Areas are defined as the distance people will travel on a regular basis (a minimum of once a week) to utilize a facility or its programs. Use by individuals outside of this area are usually more limited and will focus more on special activities or events (tournaments, etc.).

Service areas can vary in size with the types of components in the facility. A center with active elements (pool, weight cardiovascular equipment area, gym, track, etc.) will have a larger service area than a more passively oriented facility. Specialized facilities such as a competitive aquatic venue will have a bigger service area, making it more of a regional destination.

Service areas can flex or contract based upon a facility's proximity to major thoroughfares. Other factors impacting the use as it relates to driving distance are the presence of alternative service providers in the service area. Alternative service providers can have an effect upon membership, daily admissions and the associated penetration rates for programs and services.

**Table A – Service Area Comparison Chart:**

| | Primary Service Area | Secondary Service Area |
|---|---|---|
| **Population:** | | |
| | 56,228[1] | 215,182[2] |
| 2015 Estimate | 58,820 | 223,677 |
| 2020 Estimate | 60,364 | 230,696 |
| **Households:** | | |
| 2010 Census | 24,939 | 91,422 |
| 2015 Estimate | 26,250 | 94,740 |
| 2020 Estimate | 27,015 | 98,050 |
| **Families:** | | |
| 2010 Census | 16,369 | 58,747 |
| 2015 Estimate | 17,108 | 60,447 |
| 2020 Estimate | 17,531 | 62,269 |
| **Average Household Size:** | | |
| 2010 Census | 2.25 | 2.32 |
| 2015 Estimate | 2.23 | 2.31 |
| 2020 Estimate | 2.23 | 2.3 |
| **Ethnicity (2015 Estimate):** | | |
| Hispanic | 13.3% | 18.0% |
| White | 88.6% | 82.9% |
| Black | 1.0% | 1.6% |
| American Indian | 1.4% | 3.1% |
| Asian | 1.1% | 1.3% |
| Pacific Islander | 0.1% | 0.2% |
| Other | 5.2% | 7.5% |
| Multiple | 2.6% | 3.5% |
| **Median Age:** | | |
| 2010 Census | 50.6 | 48.6 |
| 2015 Estimate | 52.5 | 50.5 |
| 2020 Estimate | 54.2 | 51.8 |
| **Median Income:** | | |
| 2015 Estimate | $39,557 | $36,011 |
| 2020 Estimate | $47,079 | $41,006 |

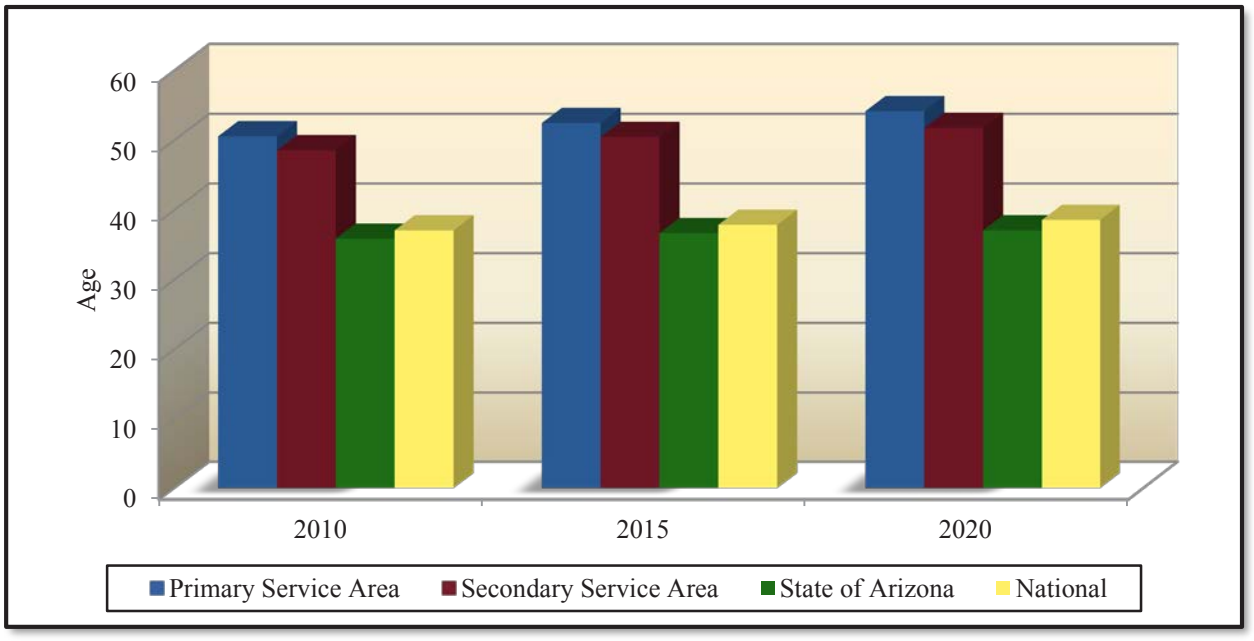
[1] From the 2000-2010 Census the Primary Service Area experienced a 24.2% increase in population.
[2] From the 2000-2010 Census the Secondary Service Area experienced a 21.2% increase in population.

**Age and Income:** It is important to compare the median age and median household income levels to the national levels. Age and income are primary determiners of participation in recreation activities. The lower the median age, the higher the participation rates are for most activities. The level of participation also increases as the median income level goes up.

**Table B – Median Age:**

| | 2010 Census | 2015 Projection | 2020 Projection |
|---|---|---|---|
| Primary Service Area | 50.6 | 52.5 | 54.2 |
| Secondary Service Area | 48.6 | 50.5 | 51.8 |
| State of Arizona | 35.9 | 36.7 | 37.1 |
| Nationally | 37.1 | 37.9 | 38.6 |

**Chart A – Median Age:**




The median age in the State of Arizona is lower than the National number. In contrast the median age of the Secondary Service Area is significantly higher than the National number with the Primary Service Area being higher than that of the Secondary. This significantly higher median age points to a large number of seniors and retirees in the market.

**Households with Children:** The following chart provides the number of households and percentage of households in the Primary and Secondary Service Areas with children.

**Table C – Households w/ Children**

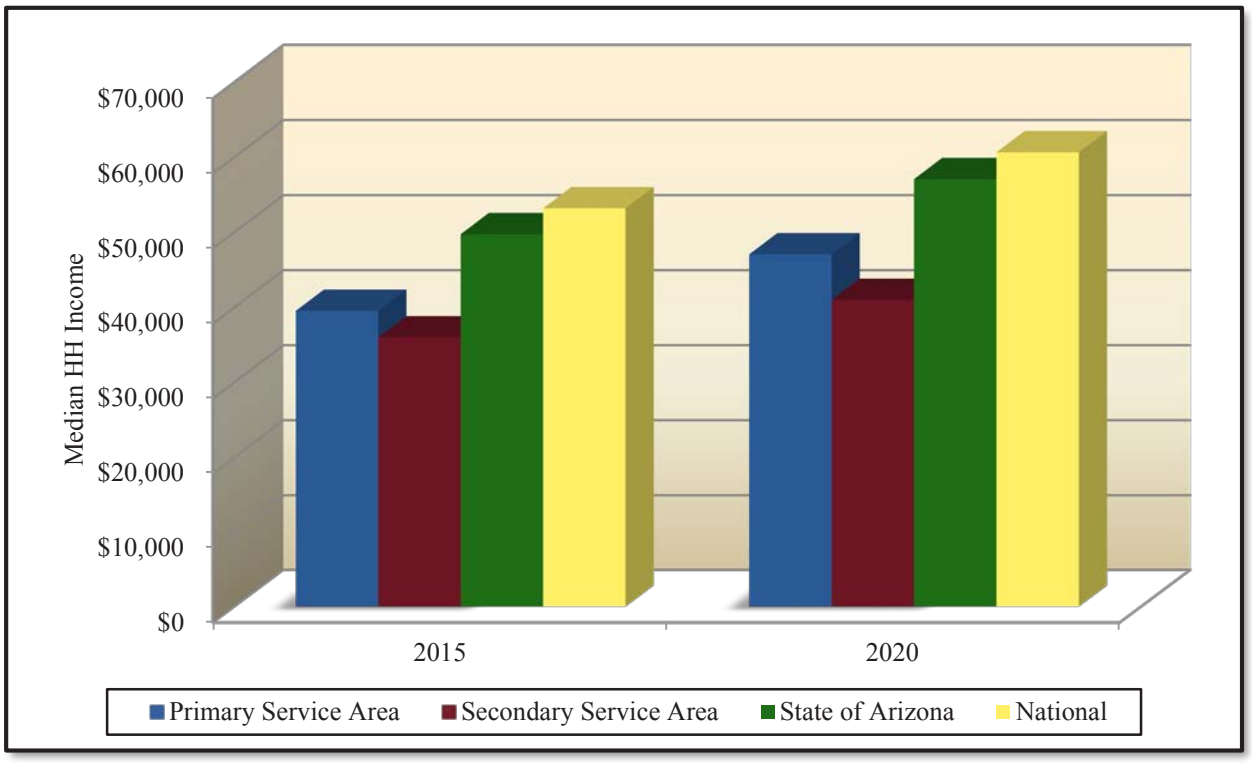
| | Number of Households w/ Children | Percentage of Households w/ Children |
|---|---|---|
| Primary Service Area | 5,466 | 21.9% |
| Secondary Service Area | 21,758 | 23.8% |

The information contained in Table-B indicates that despite the high median age in the service areas there are still families with children as potential users of facilities and programs.

**Table D – Median Household Income:**

| | 2015 Projection | 2020 Projection |
|---|---|---|
| Primary Service Area | $39,557 | $47,079 |
| Secondary Service Area | $36,011 | $41,006 |
| State of Arizona | $49,762 | $57,103 |
| Nationally | $53,217 | $60,683 |

**Chart B – Median Household Income:**



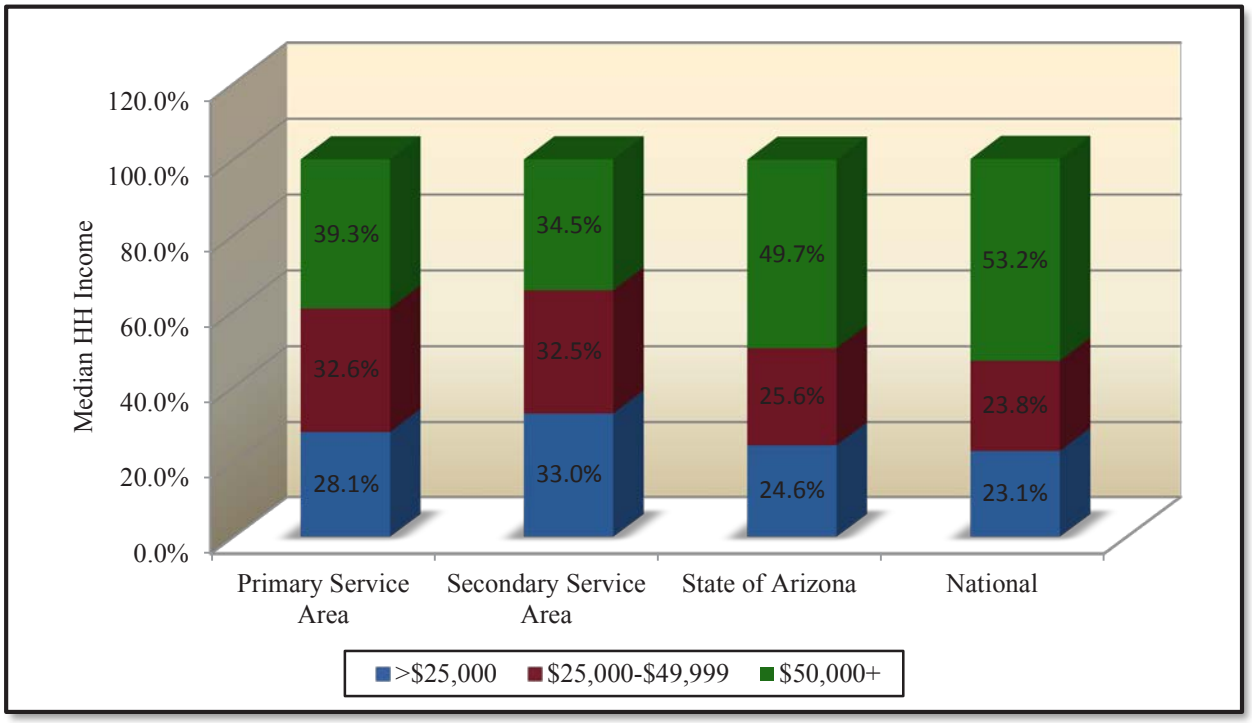
Based upon 2015 projections for median household income the following narrative is available:

In the Primary Service Area, the percentage of households with median income over $50,000 per year is 39.3% compared to 53.2% on a national level. Furthermore, the percentage of the households in the service area with median income less than $25,000 per year is 28.1% compared to a level of 23.1% nationally.

In the Secondary Service Area, the percentage of households with median income over $50,000 per year is 34.5% compared to 53.2% on a national level. Furthermore, the percentage of the households in the service area with median income less than $25,000 per year is 33.0% compared to a level of 23.1% nationally.

The median income level in the State of Arizona is less than the National number. The income level in both the Primary Service Area and the Secondary Service Area are both less than the State and National number. The income level must be balanced with the overall cost of living to determine ability to pay for entertainment and recreation services. It is also important to note that it is not unusual to see a lower level of earned income in communities with a high number of retirees but this does not mean that there is not disposable income for recreation purposes.

**Chart C – Median Household Income Distribution**



**Household Budget Expenditures:** In addition to studying Median Age and Median Income, it is important to examine Household Budget Expenditures. In particular, looking at housing information; shelter, utilities, fuel and public services along with entertainment & recreation can provide a snapshot into the cost of living and spending patterns in the services areas. The table below looks at that information and compares the service areas.

**Table E – Household Budget Expenditures[3]:**

| Primary Service Area | SPI | Average Amount Spent | Percent |
|---|---|---|---|
| Housing | 69 | $14,868.13 | 28.8% |
| *Shelter* | *67* | *$11,028.57* | *21.4%* |
| *Utilities, Fuel, Public Service* | *76* | *$3,839.56* | *7.4%* |
| Entertainment & Recreation | 74 | $2,441.40 | 4.7% |

| Secondary Service Area | SPI | Average Amount Spent | Percent |
|---|---|---|---|
| Housing | 63 | $13,564.83 | 29.1% |
| *Shelter* | *61* | *$10,099.05* | *21.7%* |
| *Utilities, Fuel, Public Service* | *69* | *$3,465.78* | *7.4%* |
| Entertainment & Recreation | 66 | $2,192.85 | 4.7% |

| State of Arizona | SPI | Average Amount Spent | Percent |
|---|---|---|---|
| Housing | 91 | $19,620.26 | 30.1% |
| *Shelter* | *91* | *$15,007.51* | *23.0%* |
| *Utilities, Fuel, Public Service* | *91* | *$4,612.75* | *7.1%* |
| Entertainment & Recreation | 90 | $2,986.92 | 4.6% |

**SPI:** Spending Potential Index as compared to the National number of 100.

**Average Amount Spent:** The average amount spent per household.

**Percent:** Percent of the total 100% of household expenditures.

**Note:** Shelter along with Utilities, Fuel, Public Service are a portion of the Housing percentage.

[3] Consumer Spending data are derived from the 2004 and 2005 Consumer Expenditure Surveys, Bureau of Labor Statistics. ESRI forecasts for 2015 and 2020.

**Chart D – Household Budget Expenditures Spending Potential Index:**

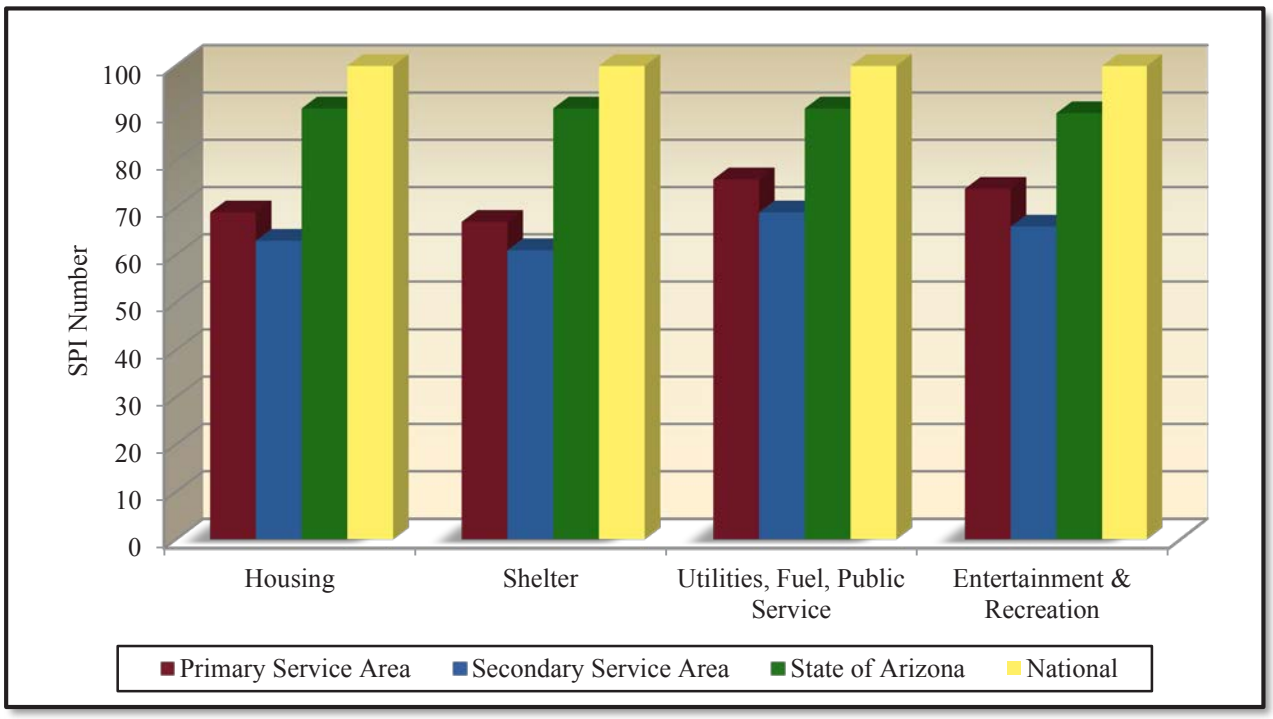



Chart D, illustrates the Household Budget Expenditures Spending Potential Index in the service areas. The SPI for the State is lower than the National number, while the Primary and Secondary Service Areas are significantly less than the State number. The SPI follows a consistent pattern with median household income.

*Further Narrative on Housing:*

The total number of housing units in the Primary Service Area, according to the 2010 Census, is 35,768 and 69.7% of those are occupied, or 24,939 housing units. Of the available units the bulk are for seasonal/recreation/occasional use, 22.9%.

The total number of housing units in the Secondary Service Area, according to the 2010 Census, is 128,978 and 70.9% of those are occupied, or 91,422 housing units. Of the available units the bulk are for seasonal/recreation/occasional use, 18.7%.

**Recreation Expenditures Spending Potential Index:** Finally, through the demographic provider that B*K utilizes for the market analysis portion of the report, it is possible to examine the overall propensity for households to spend dollars on recreation activities. The following comparisons are possible.

**Table F – Recreation Expenditures Spending Potential Index[4]:**

| Primary Service Area | SPI | Average Spent |
|---|---|---|
| Fees for Participant Sports | 65 | $78.66 |
| Fees for Recreational Lessons | 55 | $67.80 |
| Social, Recreation, Club Membership | 64 | $109.58 |
| Exercise Equipment/Game Tables | 78 | $60.28 |
| Other Sports Equipment | 83 | $6.67 |

| Secondary Service Area | SPI | Average Spent |
|---|---|---|
| Fees for Participant Sports | 62 | $74.61 |
| Fees for Recreational Lessons | 49 | $60.60 |
| Social, Recreation, Club Membership | 58 | $99.92 |
| Exercise Equipment/Game Tables | 70 | $53.96 |
| Other Sports Equipment | 73 | $5.81 |

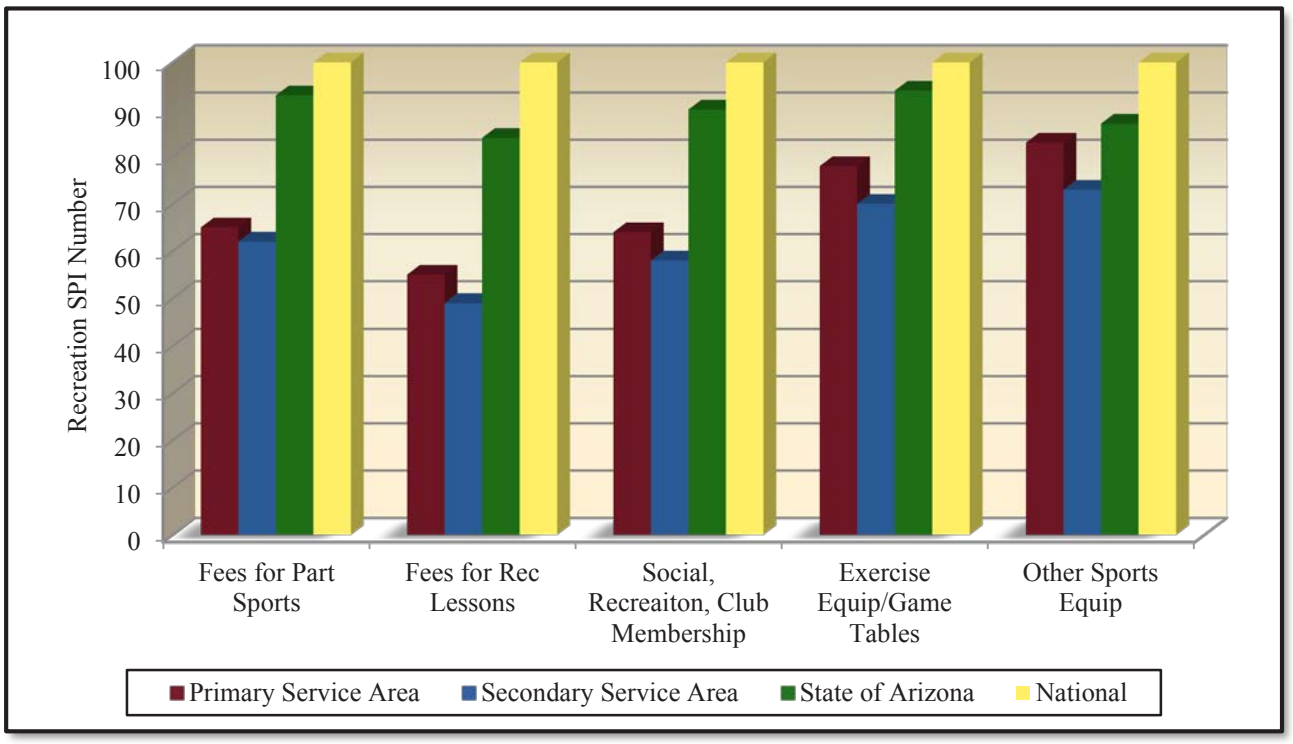
| State of Arizona | SPI | Average Spent |
|---|---|---|
| Fees for Participant Sports | 93 | $112.67 |
| Fees for Recreational Lessons | 84 | $102.72 |
| Social, Recreation, Club Membership | 90 | $154.00 |
| Exercise Equipment/Game Tables | 94 | $72.55 |
| Other Sports Equipment | 87 | $6.97 |

**Average Amount Spent:** The average amount spent for the service or item in a year.

**SPI:** Spending potential index as compared to the national number of 100.

[4] Consumer Spending data are derived from the 2006 and 2007 Consumer Expenditure Surveys, Bureau of Labor Statistics.

**Chart E – Recreation Spending Potential Index:**

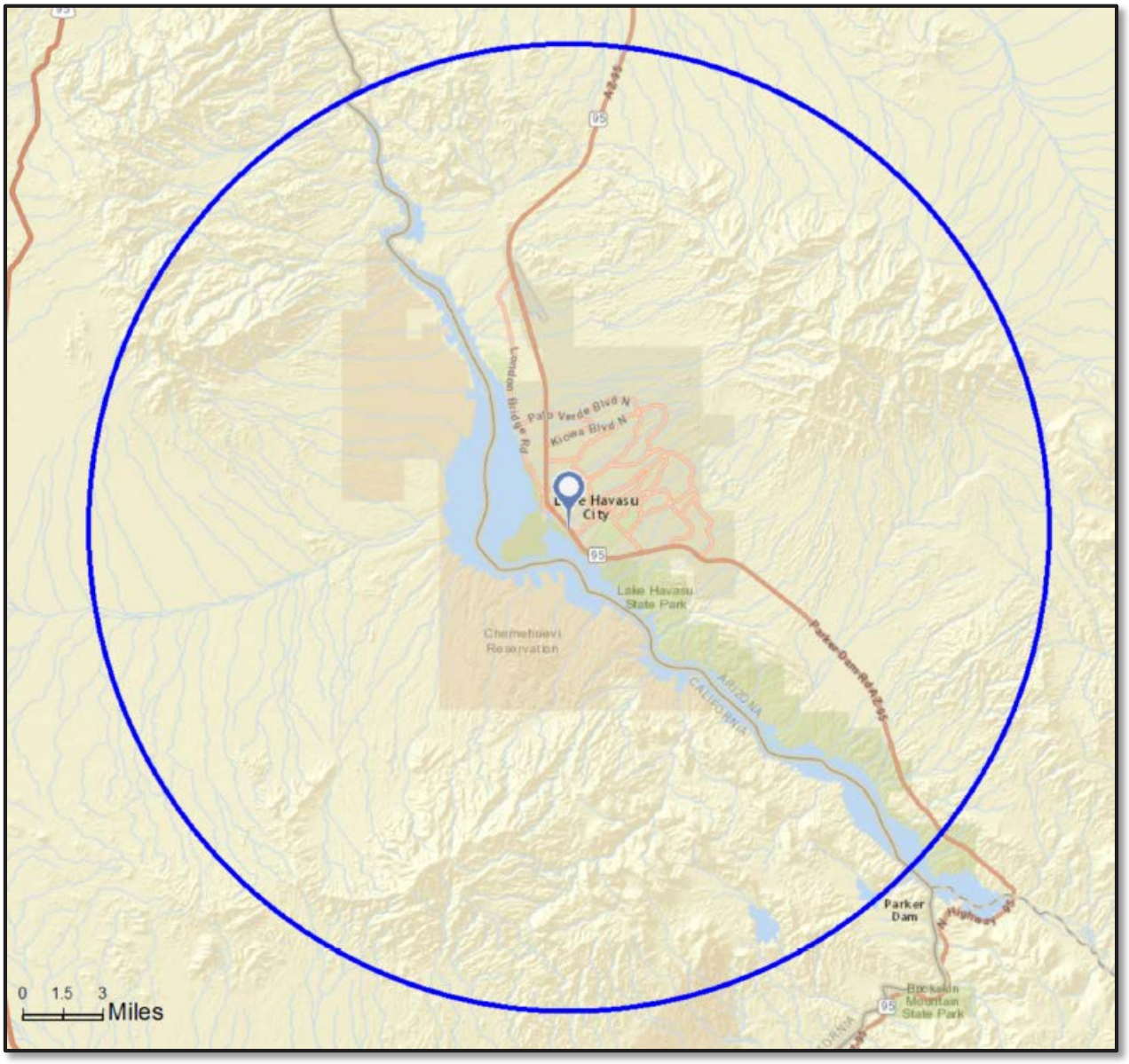



The Spending Potential Index for Recreation is very similar to the Household Budgetary Spending. It is also important to note that these dollars are currently being spent.

*Service Area Description:*

*Primary Service Area* – 15-Mile Radius

**Map A – Primary Service Area Map:**



**Population Distribution by Age:** Utilizing census information for the Primary Service Area, the following comparisons are possible.

## Table G – 2015 Primary Service Area Age Distribution

(ESRI estimates)

| Ages | Population | % of Total | Nat. Population | Difference |
|---|---|---|---|---|
| -5 | 2,468 | 4.2% | 6.3% | -2.1% |
| 5-17 | 7,128 | 12.1% | 16.6% | -4.5% |
| 18-24 | 3,664 | 6.2% | 10.1% | -3.9% |
| 25-44 | 10,818 | 18.4% | 26.1% | -7.7% |
| 45-54 | 7,429 | 12.6% | 13.4% | -0.8% |
| 55-64 | 9,704 | 16.5% | 12.8% | +2.7% |
| 65-74 | 10,033 | 17.1% | 8.6% | +8.5% |
| 75+ | 7,577 | 12.9% | 6.2% | +6.7% |

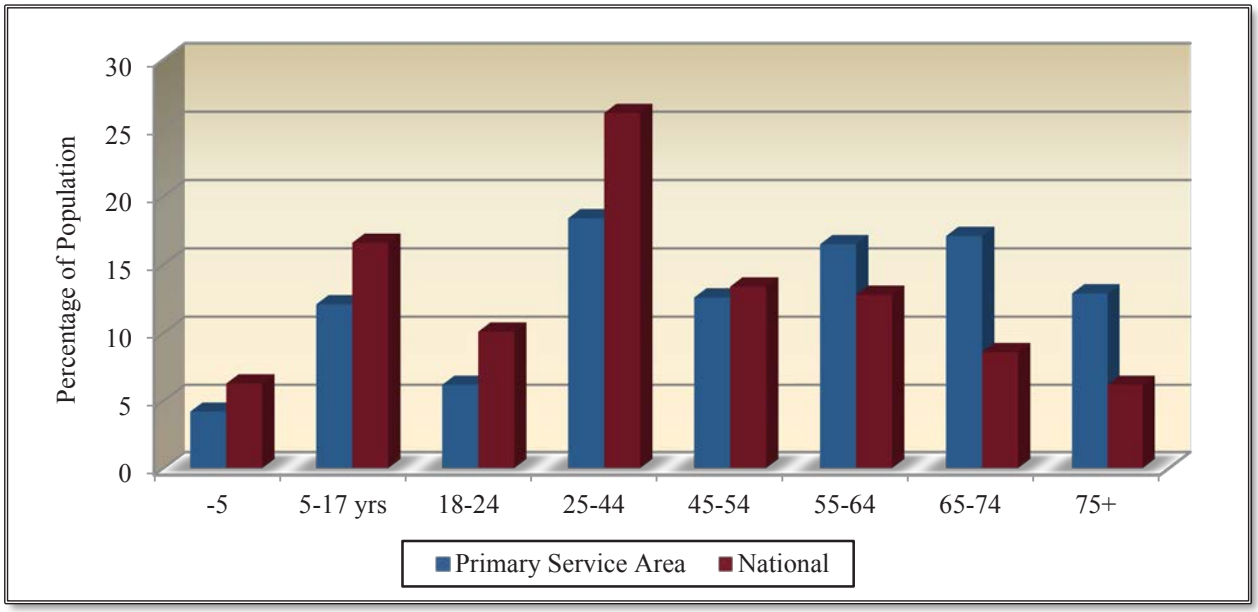
**Population:** 2015 census estimates in the different age groups in the Primary Service Area.

**% of Total:** Percentage of the Primary Service Area/population in the age group.

**National Population:** Percentage of the national population in the age group.

**Difference:** Percentage difference between the Primary Service Area population and the national population.

## Chart F – 2015 Primary Service Area Age Group Distribution



The demographic makeup of the Primary Service Area, when compared to the characteristics of the national population, indicates that there are some differences with an equal or larger population in the 55-64, 65-74 and 75+ age groups and a smaller population in the -5, 5-17, 18-24, 25-44 and 45-54 age groups. The largest positive variance is in the 65-74 age group with +8.5%, while the greatest negative variance is in the 25-44 age group with -7.7%.

**Population Distribution Comparison by Age:** Utilizing census information from the Primary Service Area, the following comparisons are possible.

**Table H – 2015 Primary Service Area Population Estimates**
(U.S. Census Information and ESRI)

| Ages | 2010 Census | 2015 Projection | 2020 Projection | Percent Change | Percent Change Nat'l |
|---|---|---|---|---|---|
| -5 | 2,515 | 2,468 | 2,436 | -3.1% | +0.3% |
| 5-17 | 7,423 | 7,128 | 7,254 | -2.2% | -0.7% |
| 18-24 | 3,399 | 3,664 | 3,210 | -5.6% | +1.7% |
| 25-44 | 10,497 | 10,818 | 11,268 | +7.3% | +7.1% |
| 45-54 | 8,023 | 7,429 | 6,597 | -17.8% | -9.7% |
| 55-64 | 9,185 | 9,704 | 9,921 | +8.0% | +17.4% |
| 65-74 | 8,845 | 10,033 | 10,811 | +22.2% | +50.1% |
| 75+ | 6,342 | 7,577 | 8,867 | +39.8% | +22.0% |

**Chart G – Primary Service Area Population Growth**

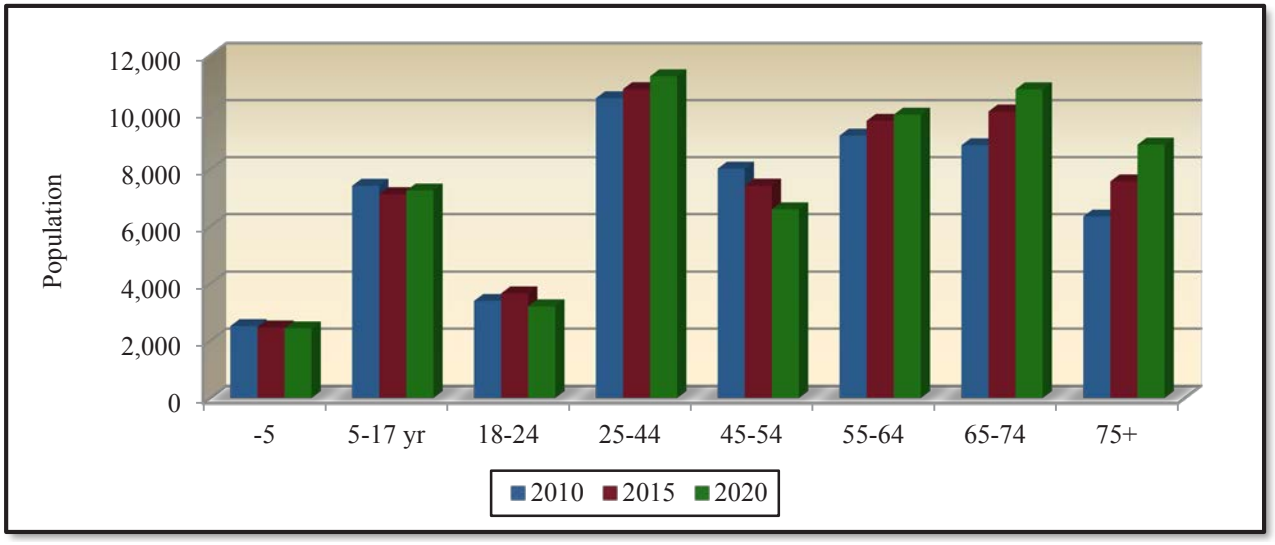



Table H, illustrates the growth or decline in age group numbers from the 2010 census until the year 2020. It is projected that half of the age categories will see a decrease, the categories of 25-44, 55-64, 65-74 and 75+ age group will see an increase. It must be remembered that the population of the United States as a whole is aging and it is not unusual to find negative growth numbers in the younger age groups and significant net gains in the 45 plus age groupings in communities which are relatively stable in their population numbers.

**Ethnicity and Race:** Below is listed the distribution of the population by ethnicity and race for the Primary Service Area for 2015 population projections. Those numbers were developed from 2010 Census Data.

**Table I – Primary Service Area Ethnic Population and Median Age 2015**
(Source – U.S. Census Bureau and ESRI)

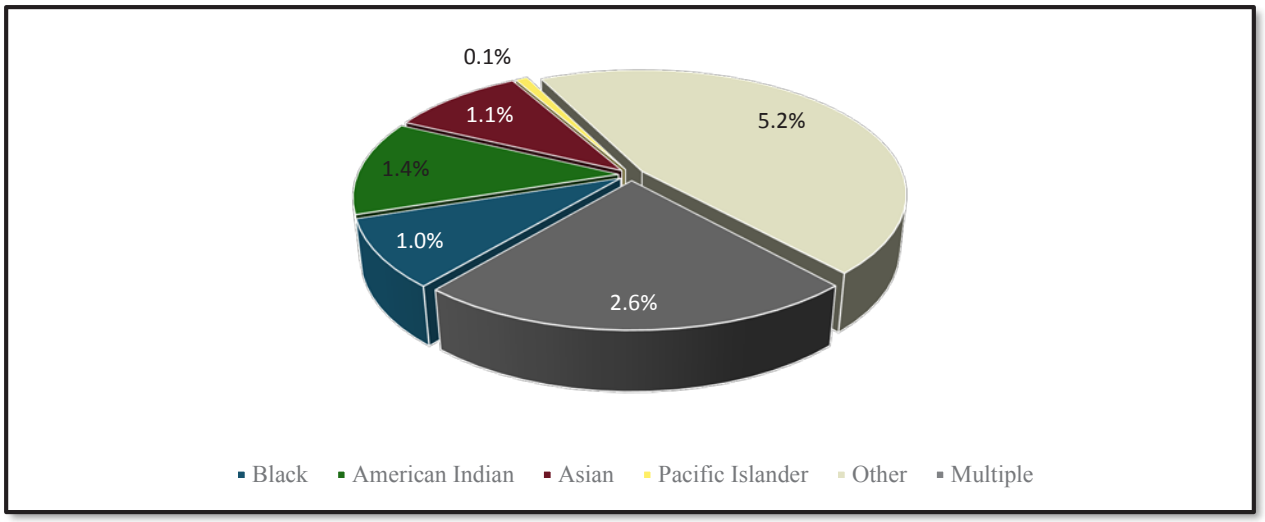
| Ethnicity | Total Population | Median Age | % of Population | % of AZ Population |
|---|---|---|---|---|
| Hispanic | 7,805 | 27.7 | 13.3% | 30.8% |

**Table J – Primary Service Area Population by Race and Median Age 2015**
(Source – U.S. Census Bureau and ESRI)

| Race | Total Population | Median Age | % of Population | % of AZ Population |
|---|---|---|---|---|
| White | 52,137 | 55.0 | 88.6% | 71.3% |
| Black | 571 | 39.1 | 1.0% | 4.4% |
| American Indian | 796 | 42.1 | 1.4% | 4.7% |
| Asian | 627 | 42.0 | 1.1% | 3.2% |
| Pacific Islander | 81 | 37.8 | 0.1% | 0.2% |
| Other | 3,062 | 26.2 | 5.2% | 12.4% |
| Multiple | 1,545 | 23.2 | 2.6% | 3.8% |

2015 Primary Service Area Total Population: 58,802 Residents

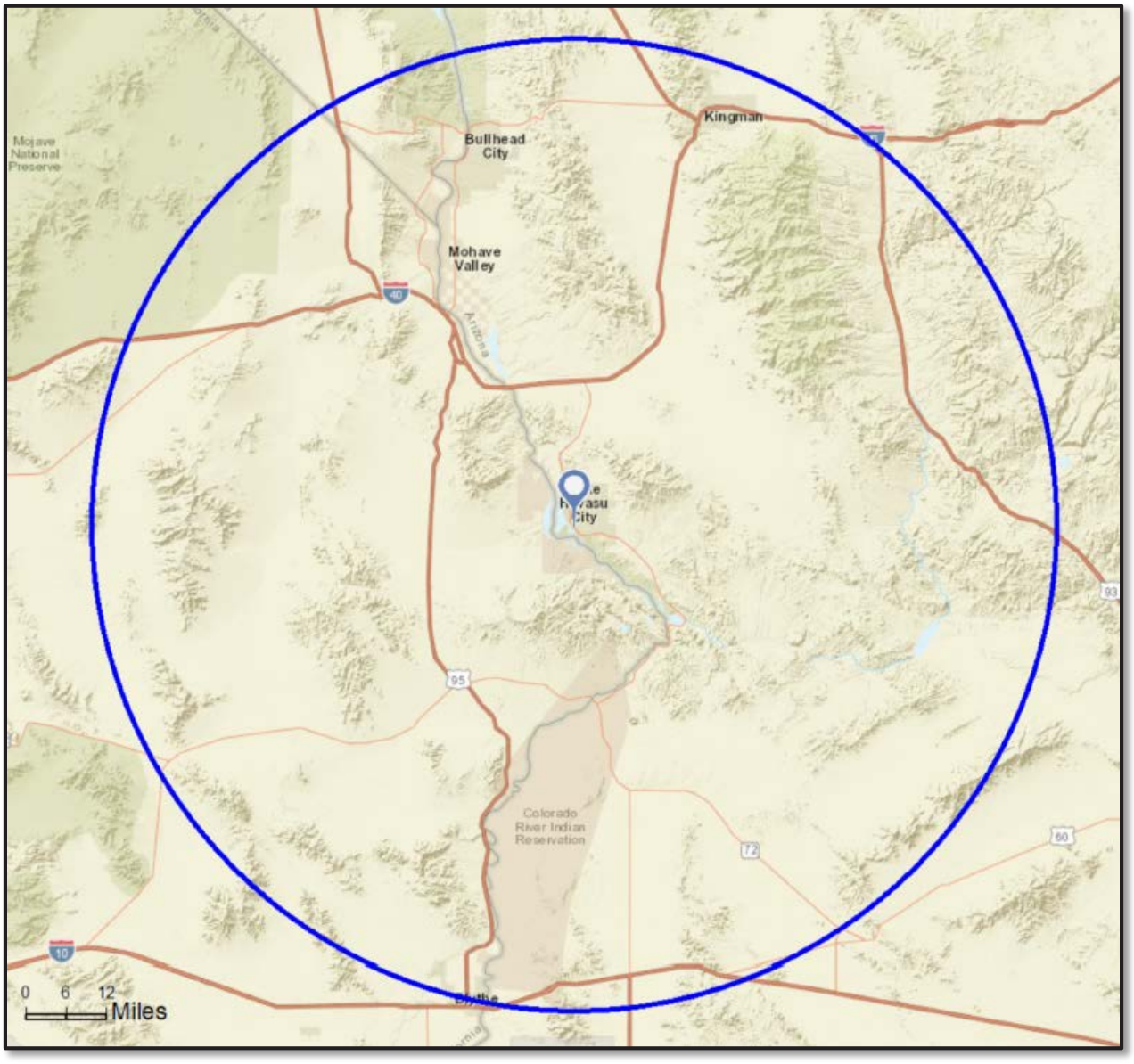
**Chart H – 2015 Primary Service Area Non-White Population by Race**



*Service Area Description:*

*Secondary Service Area* – 60-Mile Radius

**Map B – Secondary Service Area Map:**



**Population Distribution by Age:** Utilizing census information for the Secondary Service Area, the following comparisons are possible.

**Table K – 2015 Secondary Service Area Age Distribution**
(ESRI estimates)

| Ages | Population | % of Total | Nat. Population | Difference |
|---|---|---|---|---|
| -5 | 8,533 | 3.8% | 6.3% | -2.5% |
| 5-17 | 29,003 | 13.0% | 16.6% | -3.6% |
| 18-24 | 15,322 | 6.9% | 10.1% | -3.2% |
| 25-44 | 42,861 | 19.2% | 26.1% | -6.9% |
| 45-54 | 28,403 | 12.7% | 13.4% | -0.7% |
| 55-64 | 36,736 | 16.4% | 12.8% | +4.6% |
| 65-74 | 36,727 | 16.4% | 8.6% | +7.8% |
| 75+ | 24,063 | 10.8% | 6.2% | +4.6% |

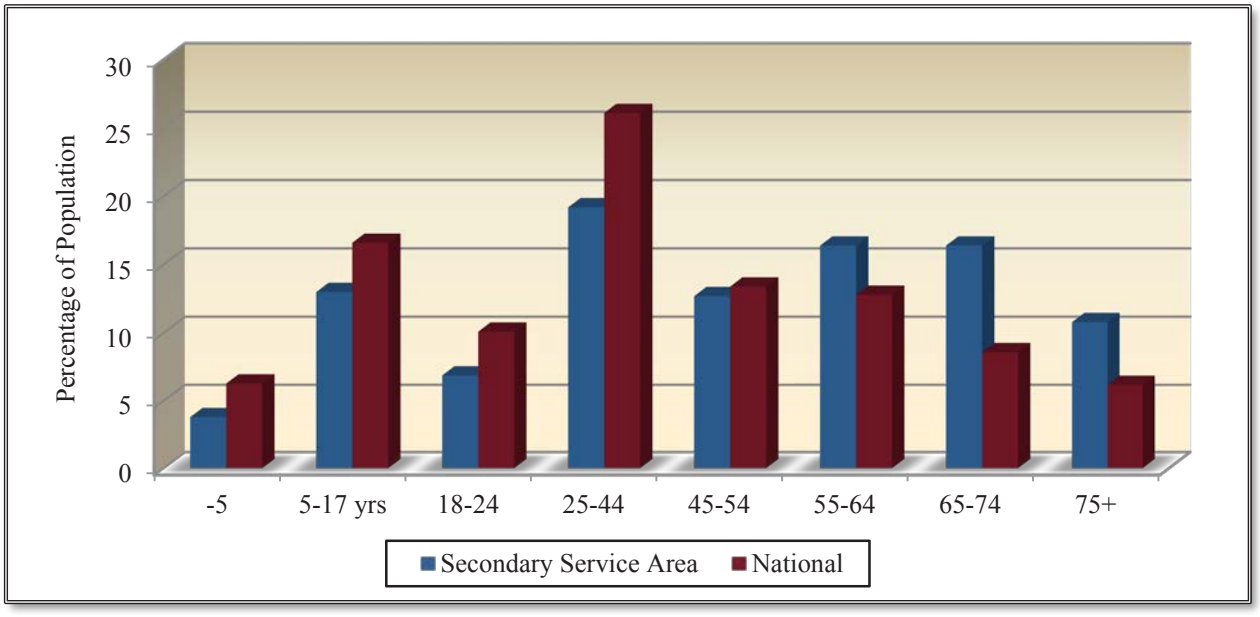
**Population:** 2015 census estimates in the different age groups in the Secondary Service Area.

**% of Total:** Percentage of the Secondary Service Area/population in the age group.

**National Population:** Percentage of the national population in the age group.

**Difference:** Percentage difference between the Secondary Service Area population and the national population.

**Chart I – 2015 Secondary Service Area Age Group Distribution**



The demographic makeup of the Secondary Service Area, when compared to the characteristics of the national population, indicates that there are some differences with an equal or larger population in the 55-64, 65-74 and 75+ age groups and a smaller population in the -5, 5-17, 18-24, 25-44 and 45-54 age groups. The largest positive variance is in the 65-74 age group with +7.8%, while the greatest negative variance is in the 25-44 age group with -6.9%.

The population distribution in the Secondary Service Area is very similar to that of the Primary Service Area.

**Population Distribution Comparison by Age:** Utilizing census information from the Secondary Service Area, the following comparisons are possible.

**Table L – 2015 Secondary Service Area Population Estimates**
(U.S. Census Information and ESRI)

| Ages | 2010 Census | 2015 Projection | 2020 Projection | Percent Change | Percent Change Nat'l |
|---|---|---|---|---|---|
| -5 | 8.912 | 8,533 | 8,434 | -5.4% | +0.3% |
| 5-17 | 30,606 | 29,003 | 29,400 | -3.9% | -0.7% |
| 18-24 | 14,336 | 15,322 | 13,720 | -4.3% | +1.7% |
| 25-44 | 41,162 | 42,861 | 44,746 | +8.7% | +7.1% |
| 45-54 | 31,101 | 28,403 | 25,644 | -17.5% | -9.7% |
| 55-64 | 34,447 | 36,736 | 37,676 | +9.4% | +17.4% |
| 65-74 | 31,980 | 36,727 | 40,344 | +26,2% | +50.1% |
| 75+ | 20,606 | 24,063 | 28,678 | +39.2% | +22.0% |

**Chart J – Secondary Service Area Population Growth**

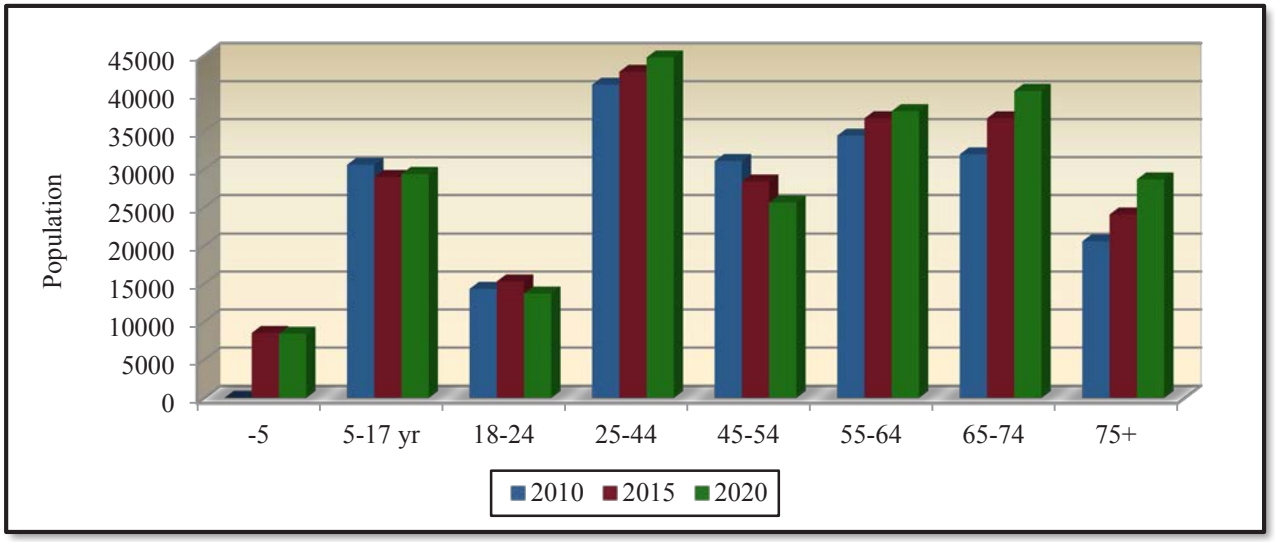



Table-L illustrates the growth or decline in age group numbers from the 2010 census until the year 2020. It is projected that half of the age categories will see an increase, the categories; -5, 5-17, 18-24 and 45-54 age groups will see a decrease. It must be remembered that the population of the United States as a whole is aging and it is not unusual to find negative growth numbers in the younger age groups and significant net gains in the 45 plus age groupings in communities which are relatively stable in their population numbers.

**Ethnicity and Race:** Below is listed the distribution of the population by ethnicity and race for the Secondary Service Area for 2015 population projections. Those numbers were developed from 2010 Census Data.

**Table M – Secondary Service Area Ethnic Population and Median Age 2015**
(Source – U.S. Census Bureau and ESRI)

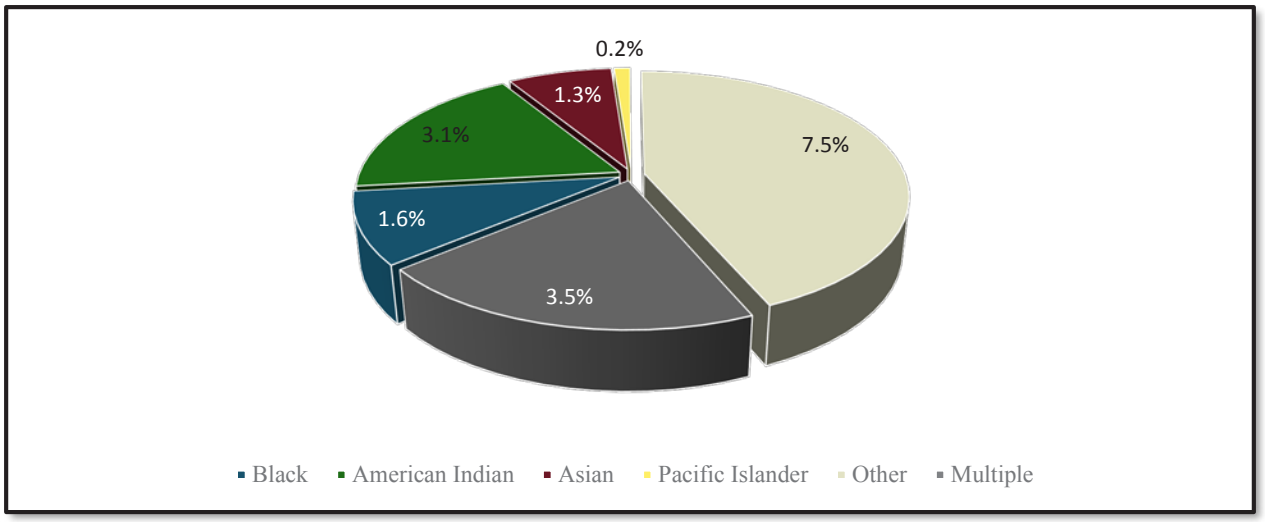
| Ethnicity | Total Population | Median Age | % of Population | % of AZ Population |
|---|---|---|---|---|
| Hispanic | 40,309 | 29.1 | 18.0% | 30.8% |

**Table N – Secondary Service Area Population by Race and Median Age 2015**
(Source – U.S. Census Bureau and ESRI)

| Race | Total Population | Median Age | % of Population | % of AZ Population |
|---|---|---|---|---|
| White | 185,428 | 53.8 | 82.9% | 71.3% |
| Black | 3,508 | 40.1 | 1.6% | 4.4% |
| American Indian | 6,937 | 33.5 | 3.1% | 4.7% |
| Asian | 2,878 | 46.8 | 1.3% | 3.2% |
| Pacific Islander | 422 | 39.8 | 0.2% | 0.2% |
| Other | 16,763 | 28.6 | 7.5% | 12.4% |
| Multiple | 7,741 | 23.3 | 3.5% | 3.8% |

2015 Secondary Service Area Total Population: 223,677 Residents

**Chart K – 2015 Secondary Service Area Non-White Population by Race**



**Tapestry Segmentation**

Tapestry segmentation represents the 4th generation of market segmentation systems that began 30 years ago. The 65-segment Tapestry Segmentation system classifies U.S. neighborhoods based on their socioeconomic and demographic compositions. While the demographic landscape of the U.S. has changed significantly since the 2000 Census, the tapestry segmentation has remained stable as neighborhoods have evolved.

The value of including this information for the Service Areas is that it allows the organization to understand better the consumers/constituents in their service areas and supply them with the right products and services.

The Tapestry segmentation system classifies U.S. neighborhoods into 65 individual market segments. More than 60 attributes including; income, employment, home value, housing types, education, household composition, age and other key determinates of consumer behavior are used to identify neighborhoods.

The following pages and tables outline the top 5 tapestry segments in each of the service areas and provides a brief description of each. This information combined with the key indicators and demographic analysis of each service area help further describe the markets that the Primary Service Area looks to serve with programs, services, and special events.

For comparison purposes, the following are the top 10 Tapestry segments, along with percentage in the United States. The Primary and Secondary Services may or may not reflect these segments:

| | |
|---|---|
| 1. Green Acres (6A) | 3.2% |
| 2. Southern Satellites (10A) | 3.2% |
| 3. Savvy Suburbanites (1D) | 3.0% |
| 4. Salt of the Earth (6B) | 2.9% |
| 5. Soccer Moms (4A) | 2.8% |
| | **15.1%** |
| 6. Middleburg (4C) | 2.8% |
| 7. Midlife Constants (5E) | 2.5% |
| 8. Comfortable Empty Nesters (5A) | 2.5% |
| 9. Heartland Communities (6F) | 2.4% |
| 10. Old and Newcomers (8F) | 2.3% |
| | **12.5%** |

**Table O – Primary Service Area Tapestry Segment Comparison**
(ESRI estimates)

| | Primary Service Area | | *Demographics* | |
|---|---|---|---|---|
| | Percent | Cumulative Percent | Median Age | Median HH Income |
| Midlife Constants (5E) | 29.4% | 29.4% | 45.9 | $48,000 |
| Senior Escapes (9D) | 19.9% | 49.3% | 52.6 | $35,000 |
| Rural Resort Dwellers (6E) | 18.9% | 68.2% | 52.4 | $46,000 |
| Silver & Gold (9A) | 11.6% | 79.8% | 61.8 | $63,000 |
| The Great Outdoors (6C) | 6.5% | 86.3% | 46.3 | $53,000 |

**Midlife Constants (5E) –** Residents are seniors, at or approaching retirement, with below average labor force participation and above average net worth. Although located in predominately metropolitan areas, they live outside the central cities, in smaller communities. Primarily married couples, with a growing share of singles. There is little diversity in this segment. Leisure activities include scrapbooking, movies at home, reading, fishing and golf.

**Senior Escapes (9D) –** These neighborhoods are heavily concentrated in the warmer states of FL, CA and AZ. Many homes began as seasonal getaways and now serve as primary residences. Over a quarter of the population are 65-74 years old. Most are white and fairly conservative in their political and religious views. They are very conscious of their health and buy specialty foods and dietary supplements. There is a significant Hispanic (13.0%) population.

**Rural Resort Dwellers (6E) –** These communities are centered in resort areas, many in the Midwest, where the change in seasons supports a variety of outdoor activities. Retirement looms for many of these blue collar, older householders, but workers are postponing retirement or returning to work to maintain their current lifestyles. In this older market, 42% of households consist of married couples with no children at home, while another 28% are single person.

**Silver & Gold (9A) –** Almost the oldest senior market the difference of 10 years in median age reveals a socioeconomic difference. This is the most affluent senior market and is still growing. The affluence affords them the opportunity to retire to sunnier climates that feature exclusive communities and vacation homes. These consumers have the free time, stamina and resources to enjoy the good life.

**The Great Outdoors (6C) –** These neighborhoods are found in pastoral settings throughout the United States. Consumers are educated empty nesters living an active but modest lifestyle. Although retirement beckons, most of these residents still work, with incomes slightly above the U.S. level. Over 55% of households are married-couple families; 36% are couples with no children living at home. They enjoy outdoor activities such as hiking, hunting, fishing, and boating.

**Table P – Secondary Service Area Tapestry Segment Comparison**
(ESRI estimates)

| | Secondary Service Area | | *Demographics* | |
|---|---|---|---|---|
| | Percent | Cumulative Percent | Median Age | Median HH Income |
| Senior Escapes (9D) | 38.4% | 38.4% | 52.6 | $35,000 |
| Midlife Constants (5E) | 9.4% | 47.8% | 45.9 | $48,000 |
| Down the Road (10D) | 7.1% | 54.9% | 34.3 | $36,000 |
| Rural Resort Dwellers (6E) | 6.7% | 61.6% | 52.4 | $46,000 |
| The Great Outdoors (6C) | 6.1% | 67.7% | 46.3 | $53,000 |

**Senior Escapes (9D) –** These neighborhoods are heavily concentrated in the warmer states of FL, CA and AZ. Many homes began as seasonal getaways and now serve as primary residences. Over a quarter of the population are 65-74 years old. Most are white and fairly conservative in their political and religious views. They are very conscious of their health and buy specialty foods and dietary supplements. There is a significant Hispanic (13.0%) population.

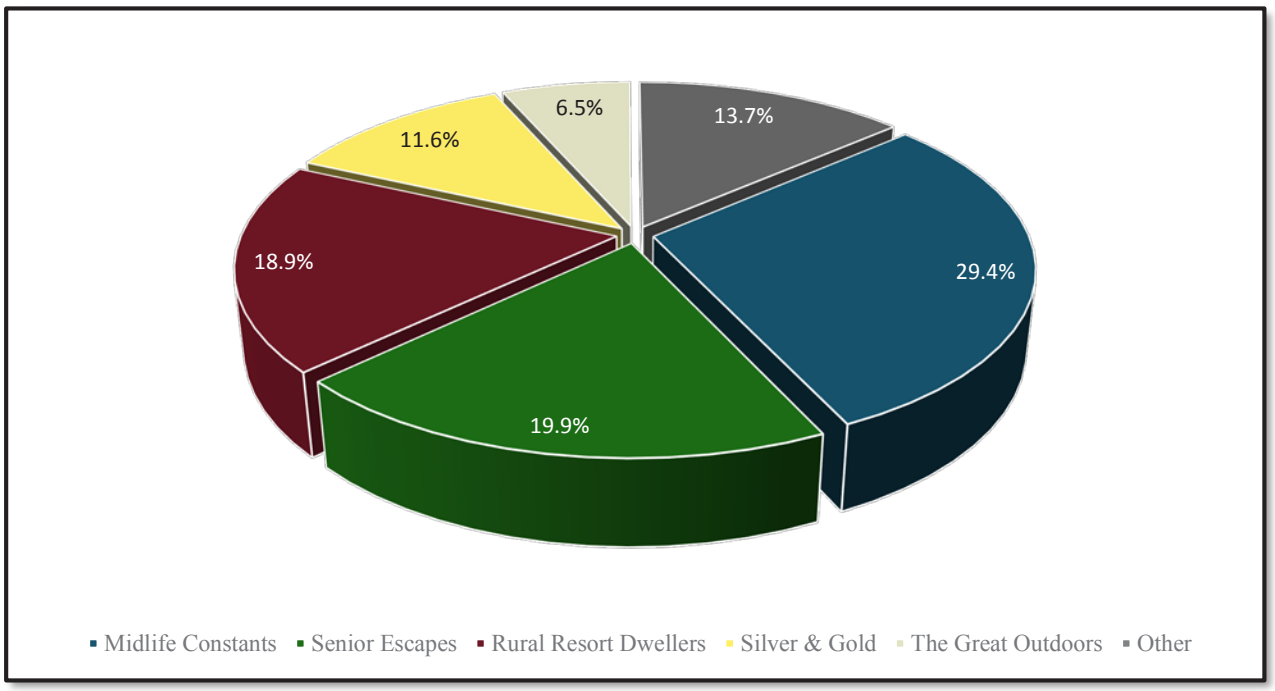
**Midlife Constants (5E) –** Residents are seniors, at or approaching retirement, with below average labor force participation and above average net worth. Although located in predominately metropolitan areas, they live outside the central cities, in smaller communities. Primarily married couples, with a growing share of singles. There is little diversity in this segment. Leisure activities include scrapbooking, movies at home, reading, fishing and golf.

**Down the Road (10D) –** This segment is a mix of low-density, semirural neighborhoods in large metropolitan areas; half are located in the South, with the rest chiefly in the West and Midwest. These are younger, diverse communities, with the highest proportion of American Indians of any segment. These family-oriented consumers value their traditions. This market has higher unemployment, much lower median household income and home value, and a fifth of households with income below poverty level.

**Rural Resort Dwellers (6E) –** These communities are centered in resort areas, many in the Midwest, where the change in seasons supports a variety of outdoor activities. Retirement looms for many of these blue collar, older householders, but workers are postponing retirement or returning to work to maintain their current lifestyles. In this older market, 42% of households consist of married couples with no children at home, while another 28% are single person.

**The Great Outdoors (6C) –** These neighborhoods are found in pastoral settings throughout the United States. Consumers are educated empty nesters living an active but modest lifestyle. Although retirement beckons, most of these residents still work, with incomes slightly above the U.S. level. Over 55% of households are married-couple families; 36% are couples with no children living at home. They enjoy outdoor activities such as hiking, hunting, fishing, and boating.

**Chart L – Primary Service Area Tapestry Segment Representation by Percentage:**



**Demographic Summary**

The following summarizes the demographic characteristics of the service areas.

- There is a significant population in the Primary Service Area and it is expected to grow at a steady rate.
- The Primary Service Area has a median age that is much older than the national number and higher than the state.
- The Primary Service Area has a median household income level that is lower than the state and as a result has a lower Recreation Spending Potential Index. However, the cost of living in the area is also much lower. This statistic also does not account for retirement income which impacts that number.
- The Primary Service Area has fewer households with children than the national numbers and there is expected to be negative growth in the youth age groups in the coming years while the senior age groups will continue to grow at a very fast rate.
- There is very little racial and ethnic diversity in the Primary Service Area.
- The Secondary Service Area is much larger with similar demographic characteristics.
- There are estimated to be approximately 15,000 seasonal residents in Lake Havasu City. These are numbers that are in addition to the full-time population figures that are indicated in this report.
- The population characteristics do not account for the high number of visitors that come to Lake Havasu for boating and other recreational activities. These are generally younger aged individuals and can include a high number of young adults during the spring.

**Sports Participation Numbers:**

In addition to analyzing the demographic realities of the service areas, it is possible to project possible participation in recreation and sport activities.

**Participation Numbers:** On an annual basis the National Sporting Goods Association (NSGA) conducts an in-depth study and survey of how Americans spend their leisure time. This information provides the data necessary to overlay rate of participation onto the Primary Service Area to determine market potential.

B*K takes the national average and combines that with participation percentages of the Primary Service Area based upon age distribution, median income, region and National number. Those four percentages are then averaged together to create a unique participation percentage for the service area. This participation percentage when applied to the population of the Primary Service Area then provides an idea of the market potential for various activities.

**Community Recreation Related Activities Participation:** These activities are typical components of an active community center.

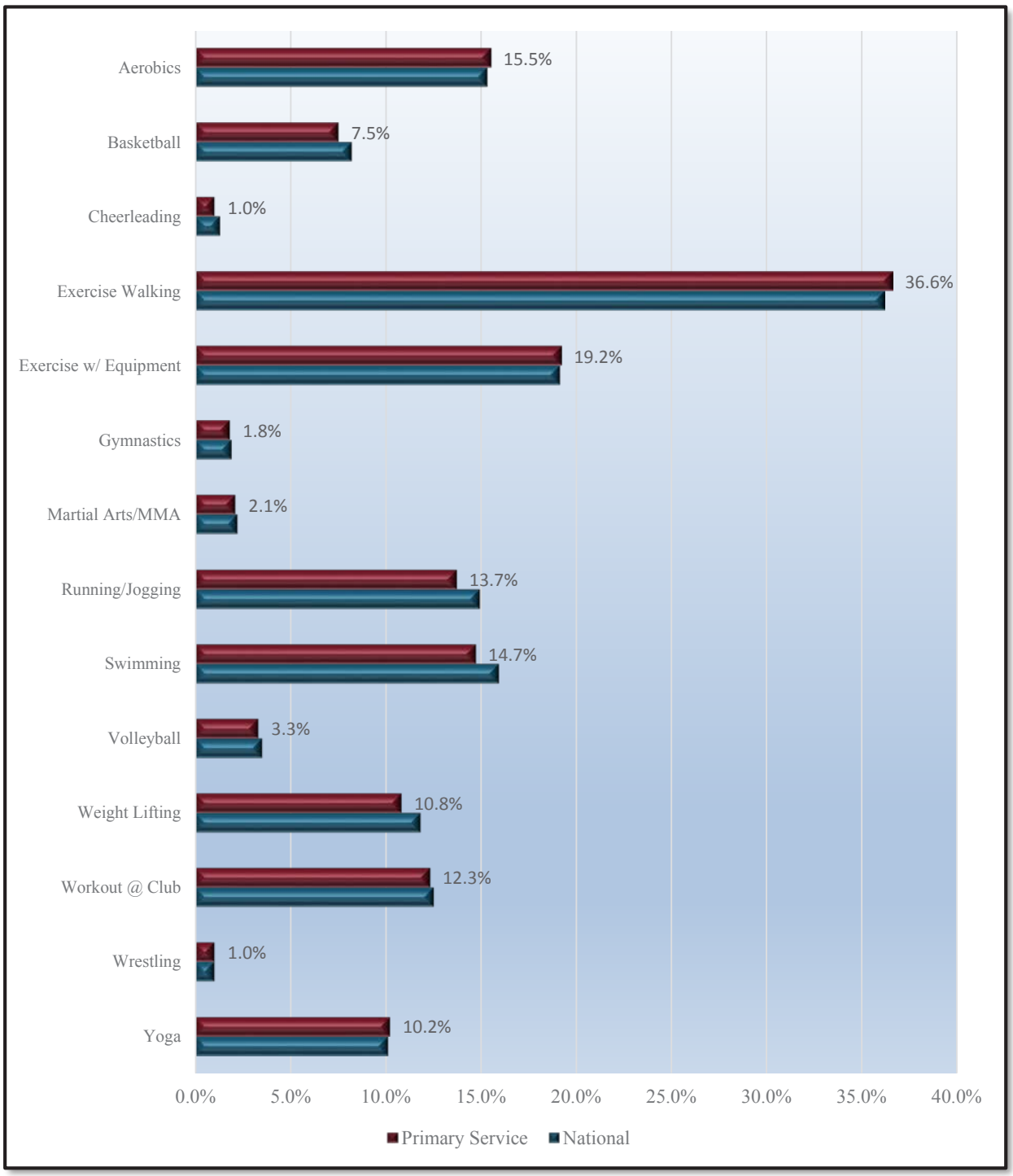
**Table Q – Recreation Activity Participation Rates for the Primary Service Area**

| Indoor Activities | Age | Income | Region | Nation | Average |
|---|---|---|---|---|---|
| Aerobics | 14.8% | 12.9% | 18.9% | 15.3% | 15.5% |
| Basketball | 5.9% | 7.3% | 8.5% | 8.2% | 7.5% |
| Cheerleading | 0.9% | 0.9% | 1.0% | 1.3% | 1.0% |
| Exercise Walking | 36.8% | 32.3% | 41.2% | 36.2% | 36.6% |
| Exercise w/ Equipment | 19.6% | 15.1% | 23.0% | 19.1% | 19.2% |
| Gymnastics | 1.4% | 1.6% | 2.1% | 1.9% | 1.8% |
| Martial Arts / MMA | 1.6% | 2.6% | 2.1% | 2.2% | 2.1% |
| Running/Jogging | 11.4% | 10.2% | 18.5% | 14.9% | 13.7% |
| Swimming | 14.3% | 12.6% | 16.2% | 15.9% | 14.7% |
| Volleyball | 2.6% | 3.2% | 3.8% | 3.5% | 3.3% |
| Weight Lifting | 10.3% | 8.9% | 12.2% | 11.8% | 10.8% |
| Workout @ Clubs | 12.0% | 9.0% | 15.7% | 12.5% | 12.3% |
| Wrestling | 0.7% | 1.3% | 1.1% | 1.0% | 1.0% |
| Yoga | 8.8% | 9.6% | 12.2% | 10.1% | 10.2% |

| | Age | Income | Region | Nation | Average |
|---|---|---|---|---|---|
| Did Not Participate | 22.9% | 24.5% | 21.0% | 22.6% | 22.7% |

**Age:** Participation based on individuals ages 7 & Up of the Primary Service Area.
**Income:** Participation based on the 2013 estimated median household income in the Primary Service Area.
**Region:** Participation based on regional statistics (Mountain).
**National:** Participation based on national statistics.
**Average:** Average of the four columns.

## Chart M – Comparison of National & Primary Service Area Participation Percentage:



**Anticipated Participation Numbers by Activity:** Utilizing the average percentage from Table-Q above plus the 2010 census information and census estimates for 2015 and 2020 (over age 7) the following comparisons are available.

**Table R – Participation Rates Primary Service Area**

| Indoor Activity | Average | 2010 Part. | 2015 Part. | 2020 Part. | Difference |
|---|---|---|---|---|---|
| Aerobics | 15.5% | 8,150 | 8,558 | 8,806 | +656 |
| Basketball | 7.5% | 3,935 | 4,132 | 4,252 | +317 |
| Cheerleading | 1.0% | 535 | 561 | 578 | +43 |
| Exercise Walking | 36.6% | 19,278 | 20,245 | 20,831 | +1,553 |
| Exercise w/ Equipment | 19.2% | 10,111 | 10,618 | 10,925 | +814 |
| Gymnastics | 1.8% | 922 | 968 | 996 | +74 |
| Martial Arts / MMA | 2.1% | 1,113 | 1,169 | 1,202 | +90 |
| Running/Jogging | 13.7% | 7,233 | 7,596 | 7,816 | +583 |
| Swimming | 14.7% | 7,763 | 8,152 | 8,388 | +625 |
| Volleyball | 3.3% | 1,726 | 1,812 | 1,865 | +139 |
| Weight Lifting | 10.8% | 5,679 | 5,963 | 6,136 | +457 |
| Workout @ Clubs | 12.3% | 6,476 | 6,801 | 6,998 | +522 |
| Wrestling | 1.0% | 538 | 565 | 581 | +43 |
| Yoga | 10.2% | 5,356 | 5,624 | 5,787 | +431 |

| | Average | 2010 Part. | 2015 Part. | 2020 Part. | Difference |
|---|---|---|---|---|---|
| Did Not Participate | 22.7% | 11,973 | 12,573 | 12,937 | +964 |

**Note:** The estimated participation numbers indicated above are for activities that could take place in and around an active aquatic/community center. These figures do not necessarily translate into attendance figures for various activities or programs. The "Did Not Participate" statistics refers to all 55 activities outlined in the NSGA 2014 Survey Instrument.

**Swimming Participation:** In addition to developing a unique participation percentage for the Primary Service Area, B*K also examines the frequency of participation in swimming according to the 2014 NSGA Survey. The chart below outlines that data.

**Table S – Participation Frequency Swimming**

| | Frequent | Occasional | Infrequent |
|---|---|---|---|
| Swimming Frequency | 110+ | 25-109 | 6-24 |
| Swimming Percentage of Population | 6.4% | 45.0% | 48.6% |

In the chart above one can look at each activity and how it is defined with respect to visits being Frequent, Occasional or Infrequent and then the percentage of population that participates.

**Table T – Participation Numbers**

| | Frequent | Occasional | Infrequent | Total |
|---|---|---|---|---|
| Swimming | 112 | 67 | 15 | |
| Population | 522 | 3,668 | 3,962 | |
| **Visits** | **58,464** | **245,756** | **59,430** | **363,650** |

The table above takes the frequency information one step further and identifies the number of times an individual may participate in the activity, applies the percentage from Table-Q to the 2015 swimming population in Table-R and then gives a total number of aquatic facility visits. Those visits are not specific to one facility, but rather specific to the Primary Service Area population.

*Frequent Users:* Competitive swimmers, multi-sport athletes and individuals that participate in lap swimming for exercise fall into this group. Their preference is 50M or 25Y lap lanes, and they have little concern for the social aspects of aquatics.

*Occasional Users:* Some multi-sport athletes, some lap swimmers and individuals using the pool for other fitness purposes such as water walking or group exercise fall into this group. Also included in this group are some families. Their preference is the inclusion of lap lanes, but also shallow and deep water and varied water temperatures.

*Infrequent Users:* Families and non-lap swimmers fall into this group. Their preference has little to do with exercise in the water. They are looking for shallow water, interactive play features and warm water. Being in the water is merely enough for this group, and the social aspect is significantly more important than exercise or competition.

**Swimming Cross-Participation:** As part of the annual survey conducted by the NSGA cross participation analysis is conducted. The chart below indicates the other activities that swimmers participated in, compares that rate of participation to the national number and also provides an index.

**Table U – Swimming Cross-Participation**

| Activity | % Swimmer Part. | Total US Part. | Index |
|---|---|---|---|
| Exercise Walking | 45.5% | 36.2% | 126 |
| Running/Jogging | 28.7% | 14.9% | 192 |
| Exercising w/ Equip. | 28.1% | 19.1% | 147 |
| Bicycle Riding | 27.7% | 12.3% | 224 |
| Aerobic Exercising | 22.9% | 15.3% | 149 |
| Weightlifting | 19.1% | 11.8% | 162 |
| Basketball | 18.8% | 8.2% | 229 |
| Work Out @ Club | 18.7% | 12.5% | 150 |
| Yoga | 17.6% | 10.1% | 174 |
| Tennis | 11.8% | 4.3% | 275 |
| Soccer | 11.7% | 4.7% | 251 |
| Volleyball | 11.0% | 3.5% | 311 |
| Baseball | 9.9% | 3.9% | 251 |
| Ice/Figure Skating | 7.5% | 2.5% | 296 |
| Softball | 6.7% | 3.3% | 202 |
| Gymnastics | 4.8% | 1.9% | 253 |
| Martial Arts/MMA | 3.8% | 2.2% | 175 |
| Wrestling | 2.6% | 1.0% | 266 |
| Lacrosse | 1.7% | 1.0% | 179 |
| Hockey (ice) | 1.4% | 1.2% | 117 |

**Activity:** Various activities that could take place around a pool or recreation facility.
**% of Swimmer Part.:** Percent of swimmers that participate in the corresponding activity.
**Total US Part.:** Total percent of US population that participates in an activity.
**Index:** National index is 100.

Based upon the 20 activities listed above the rate of swimmer participation in those activities is greater than the national participation rate in all activities.

**Participation by Ethnicity and Race:** The table below compares the overall rate of participation nationally with the rate for Hispanics and African Americans. Utilizing information provided by the National Sporting Goods Association's 2014 survey, the following comparisons are possible.

**Table V – Comparison of National, African American and Hispanic Participation Rates**

| Indoor Activity | Primary Service Area | National Participation | African American Participation | Hispanic Participation |
|---|---|---|---|---|
| Aerobics | 15.5% | 15.3% | 12.0% | 15.4% |
| Basketball | 7.5% | 8.2% | 11.9% | 7.2% |
| Cheerleading | 1.0% | 1.3% | 1.4% | 1.2% |
| Exercise Walking | 36.6% | 36.2% | 23.6% | 30.3% |
| Exercise w/ Equipment | 19.2% | 19.1% | 12.2% | 16.1% |
| Gymnastics | 1.8% | 1.9% | 3.4% | 2.4% |
| Martial Arts / MMA | 2.1% | 2.2% | 1.7% | 2.2% |
| Running/Jogging | 13.7% | 14.9% | 10.3% | 16.9% |
| Swimming | 14.7% | 15.9% | 5.9% | 12.0% |
| Volleyball | 3.3% | 3.5% | 3.3% | 3.4% |
| Weight Lifting | 10.8% | 11.8% | 8.2% | 12.3% |
| Workout @ Clubs | 12.3% | 12.5% | 9.0% | 12.0% |
| Wrestling | 1.0% | 1.0% | 1.0% | 1.9% |
| Yoga | 10.2% | 10.1% | 6.5% | 10.3% |

**Primary Service Part:** The unique participation percentage developed for the Primary Service Area.

**National Rate:** The national percentage of individuals who participate in the given activity.

**African American Rate:** The percentage of African-Americans who participate in the given activity.

**Hispanic Rate:** The percentage of Hispanics who participate in the given activity.

There is a reasonably small Hispanic population in the Primary Service Area. As such these numbers play less of a factor with regards to overall participation.

**Summary of Sports Participation:** The following chart summarizes participation in both indoor and outdoor activities utilizing information from the 2014 National Sporting Goods Association survey.

**Table W – Sports Participation Summary**

| Sport | Nat'l Rank[5] | Nat'l Participation (in millions) | Primary Service | Primary Service Area Percentage |
|---|---|---|---|---|
| Exercise Walking | 1 | 104.3 | 1 | 36.6% |
| Exercising w/ Equipment | 2 | 55.1 | 2 | 19.2% |
| Swimming | 3 | 45.9 | 4 | 14.7% |
| Aerobic Exercising | 4 | 44.2 | 3 | 15.5% |
| Running/Jogging | 5 | 43.0 | 5 | 13.7% |
| Workout @ Club | 8 | 35.9 | 6 | 12.3% |
| Weight Lifting | 11 | 34.0 | 7 | 10.8% |
| Yoga | 13 | 29.2 | 8 | 10.2% |
| Basketball | 14 | 23.7 | 9 | 7.5% |
| Volleyball | 24 | 10.2 | 10 | 3.3% |
| Martial Arts / MMA | 36 | 6.3 | 11 | 2.1% |
| Gymnastics | 39 | 5.4 | 12 | 1.8% |
| Cheerleading | 46 | 3.6 | 13 | 1.0% |
| Wrestling | 50 | 2.9 | 13 | 1.0% |

**Nat'l Rank:** Popularity of sport based on national survey.

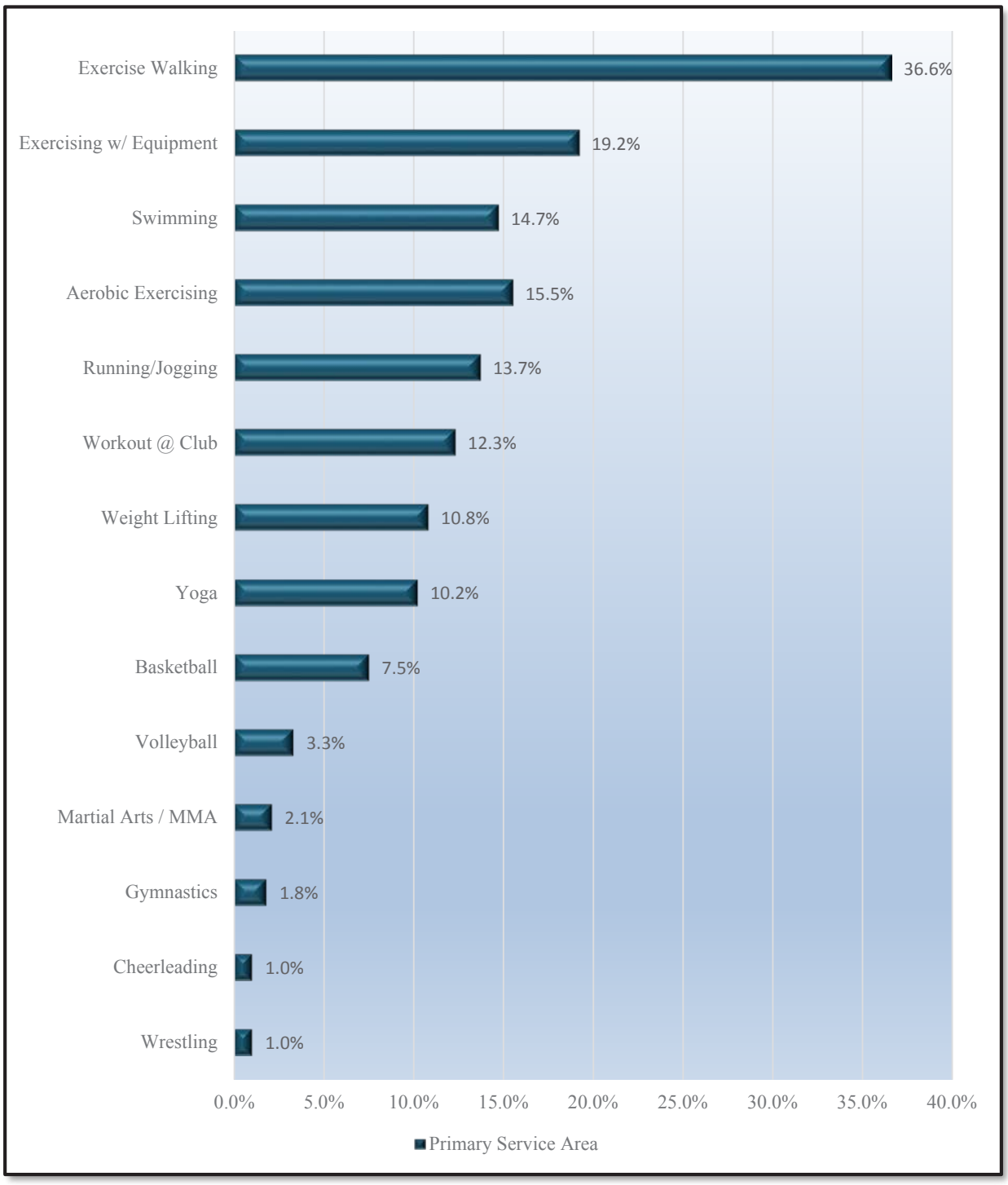
**Nat'l Participation:** Percent of population that participate in this sport on national survey.

**Primary Service Rank:** The rank of the activity within the Primary Service Area.

**Primary Service %:** Ranking of activities based upon average from Table-Q.

[5] This rank is based upon the 54 activities reported on by NSGA in their 2014 survey instrument.

## Chart N – Sports Participation in Primary Service Area



**Market Potential Index for Adult Participation:** In addition to examining the participation numbers for various indoor activities through the NSGA 2014 Survey and the Spending Potential Index for Entertainment & Recreation, B*K can access information about Sports & Leisure Market Potential. The following information illustrates participation rates for adults in various activities in the Primary Service Area.

**Table X – Market Potential Index for Adult Participation in Activities**

| Adults participated in: | Expected Number of Adults | Percent of Population | MPI |
|---|---|---|---|
| Aerobics | 3,643 | 7.4% | 83 |
| Basketball | 2,812 | 5.7% | 69 |
| Bicycling (road) | 4,310 | 8.8% | 89 |
| Jogging/Running | 4,355 | 8.8% | 69 |
| Pilates | 1,279 | 2.6% | 93 |
| Swimming | 8,086 | 16.4% | 104 |
| Volleyball | 1,310 | 2.7% | 75 |
| Walking for Exercise | 14,264 | 29.0% | 103 |
| Weight Lifting | 4,850 | 9.9% | 93 |
| Yoga | 2,970 | 6.0% | 84 |

**Expected # of Adults:** Number of adults, 18 years of age and older, participating in the activity in the Primary Service Area.

**Percent of Population:** Percent of the service area that participates in the activity.

**MPI:** Market potential index as compared to the national number of 100.

This table indicates that the overall propensity for adults to participate in the various activities listed is greater than the national number of 100 in only 2 of 10 instances. In many cases when a participation number is lower than the National number, primary factors include a lack of facilities or an inability to pay for services and programs.

**Sports Participation Trends:** Below are listed a number of sports activities and the percentage of growth or decline that each has experienced nationally over the last ten years (2005-2014).

**Table Y – National Activity Trend (in millions)**

*Increasing in Popularity*

| | 2005 Participation | 2014 Participation | Percent Change |
|---|---|---|---|
| Lacrosse[6] | 1.2 | 2.8 | 133.3% |
| Kayaking[7] | 5.9 | 9.0 | 52.5% |
| Running/Jogging | 29.2 | 43.0 | 47.3% |
| Hockey (ice) | 2.4 | 3.4 | 41.7% |
| Yoga[8] | 20.7 | 29.2 | 41.1% |
| Gymnastics[9] | 3.9 | 5.4 | 38.5% |
| Hiking | 29.8 | 41.1 | 37.9% |
| Aerobic Exercising | 33.7 | 44.2 | 31.2% |
| Exercise Walking | 86.0 | 104.3 | 21.3% |
| Tennis | 11.1 | 12.4 | 11.7% |
| Cheerleading | 3.3 | 3.6 | 9.1% |
| Workout @ Club | 34.7 | 35.9 | 3.5% |
| Canoeing[10] | 7.1 | 7.3 | 2.8% |
| Exercising w/ Equipment | 54.2 | 55.1 | 1.7% |
| Ice/Figure Skating[11] | 6.7 | 7.3 | 1.4% |

[6] Growth since 2007.
[7] Growth since 2007.
[8] Growth since 2007.
[9] Growth since 2009.
[10] Growth since 2006.
[11] Growth since 2013.

*Decreasing in Popularity*

| | 2005 Participation | 2014 Participation | Percent Change |
|---|---|---|---|
| Martial Arts / MMA[12] | 6.4 | 6.3 | -1.6% |
| Weight Lifting | 35.5 | 34.0 | -4.2% |
| Soccer | 14.1 | 13.4 | -5.0% |
| Boxing[13] | 3.8 | 3.4 | -10.5% |
| Camping | 46.0 | 39.5 | -14.1% |
| Bicycle Riding | 43.1 | 35.6 | -17.4% |
| Basketball | 29.9 | 23.7 | -20.7% |
| Swimming | 58.0 | 45.9 | -20.9% |
| Fishing (fresh water) | 37.5 | 29.4 | -21.6% |
| Baseball | 14.6 | 11.3 | -22.6% |
| Volleyball | 13.2 | 10.2 | -22.7% |
| Wrestling | 0.0 | 2.9 | -23.7% |
| Football (tackle) | 9.9 | 7.5 | -24.2% |
| Golf | 24.7 | 18.4 | -25.5% |
| Softball | 14.1 | 9.5 | -32.6% |
| Boating | 27.5 | 14.1 | -48.7% |
| Skateboarding | 12.0 | 5.4 | -55.0% |

**2014 Participation:** The number of participants per year in the activity (in millions) in the United States.

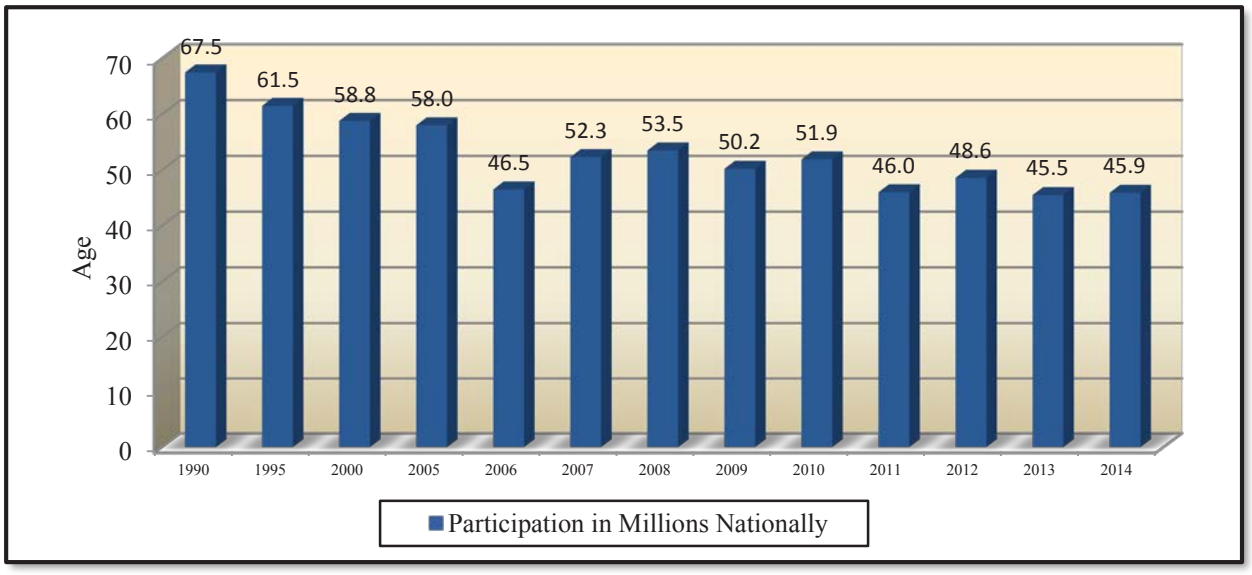
**2005 Participation:** The number of participants per year in the activity (in millions) in the United States.

**Percent Change:** The percent change in the level of participation from 2005 to 2014.

It is significant that swimming has declined in overall popularity in the United States by nearly 21% in the last ten years. However, there were still nearly 46 million people that participated in swimming in 2014.

[12] Growth since 2013.
[13] Growth since 2013.

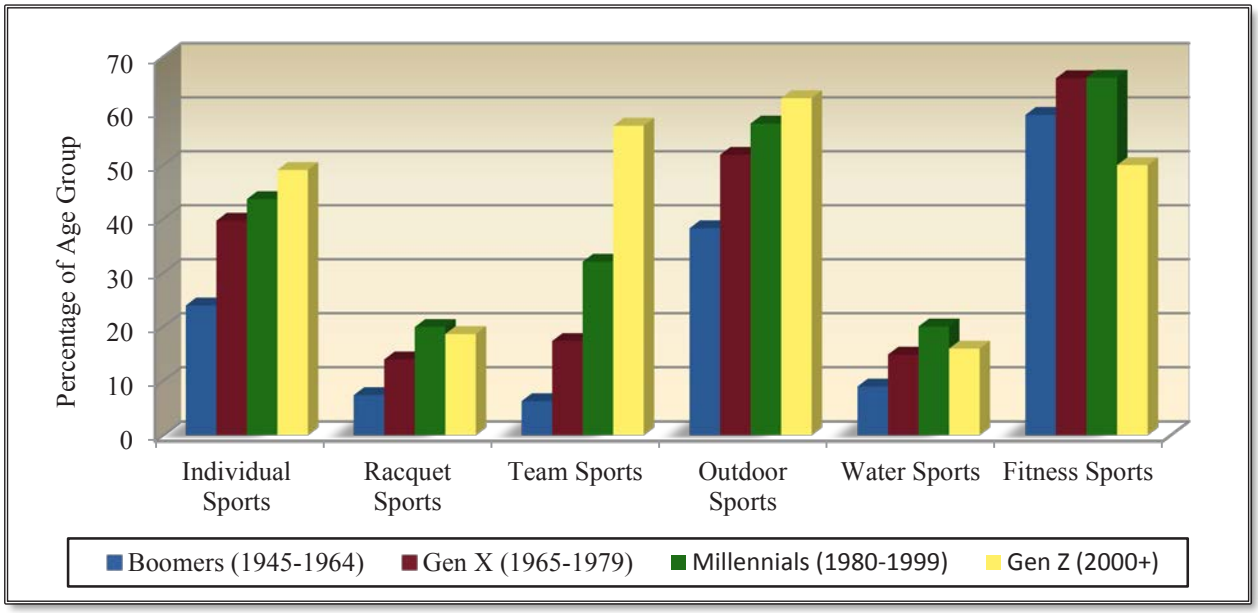
**Chart O – Participation in Swimming:**




While the national participation in swimming has been trending downward, USA Swimming has reported record registration numbers in the past 10 years. Additionally, swimming participation tends to see an increase in Olympic years. Although swimming has decreased the total number of participation is still in the top 3 of the National Sport Goods Association and is one of the few activities that individuals can participate in from birth to death.

**Sports & Fitness Industry Association:** Another source of sports participation statistics is through the SFIA. The following table indicates the rate of participation in different sports activities by age generation.

**Chart P – SFIA Sports Activity Participation by Generation**




**Aquatic Activity Trends:** The following table looks at the participation trends in these specific aquatic activities over the last 5 years

**Table Z – SFIA Aquatic Activity Trends (in millions)**

| | 2009 Participation | 2014 Participation | Percent Change |
|---|---|---|---|
| Triathlon | 1.1 | 2.2 | +91.9% |
| Swim for Fitness | 21.5 | 25.3 | +17.6% |
| Swimming on a Team | 2.4 | 2.7 | +14.7% |
| Aquatic Exercise | 9.0 | 9.1 | +1.8% |

Note: Swim for Fitness and Swimming on a Team statistics are from 2011 to 2014.

It is significant that each of the aquatic activities has seen an increase over the last five years.

**Non-Sport Participation Statistics:** It is important to note participation rates in non-sport activities as well. While there is not an abundance of information available for participation in these types of activities as compared to sport activities, there are statistics that can be utilized to help determine the market for cultural arts activities and events.

There are many ways to measure a nation's cultural vitality. One way is to chart the public's involvement with arts events and other activities over time. The NEA's Survey of Public Participation in the Arts remains the largest periodic study of arts participation in the United States, and it is conducted in partnership with the U.S. Census Bureau. The large number of survey respondents – similar in make-up to the total U.S. adult population – permits a statistical snapshot of American's engagement with the arts by frequency and activity type. The survey has taken place five times since 1982, allowing researchers to compare the trends not only for the total adult population but also for demographic subgroups.[14]

The participation numbers for these activities are national numbers.

[14] National Endowment for the Arts, *Arts Participation 2008 Highlights from a National Survey.*

**Table AA – Percentage of U.S. Adult Population Attending Arts Performances: 1982-2008**

| | | | | | Rate of Change | |
|---|---|---|---|---|---|---|
| | 1982 | 1992 | 2002 | 2008 | 2002-2008 | 1982-2008 |
| Jazz | 9.6% | 10.6% | 10.8% | 7.8% | -28% | -19% |
| Classical Music | 13.0% | 12.5% | 11.6% | 9.3% | -20% | -29% |
| Opera | 3.0% | 3.3% | 3.2% | 2.1% | -34% | -30% |
| Musical Plays | 18.6% | 17.4% | 17.1% | 16.7% | -2% | -10% |
| Non-Musical Plays | 11.9% | 13.5% | 12.3% | 9.4% | -24% | -21% |
| Ballet | 4.2% | 4.7% | 3.9% | 2.9% | -26% | -31% |

Smaller percentages of adults attended performing arts events than in previous years.

- Opera and jazz participation significantly decreased for the first time, with attendance rates falling below what they were in 1982.
- Classical music attendance continued to decline – at a 29% rate since 1982 – with the steepest drop occurring from 2002 to 2008
- Only musical play saw no statistically significant change in attendance since 2002.

**Chart Q – Percentage of U.S. Adult Population Attending Arts Performances:**

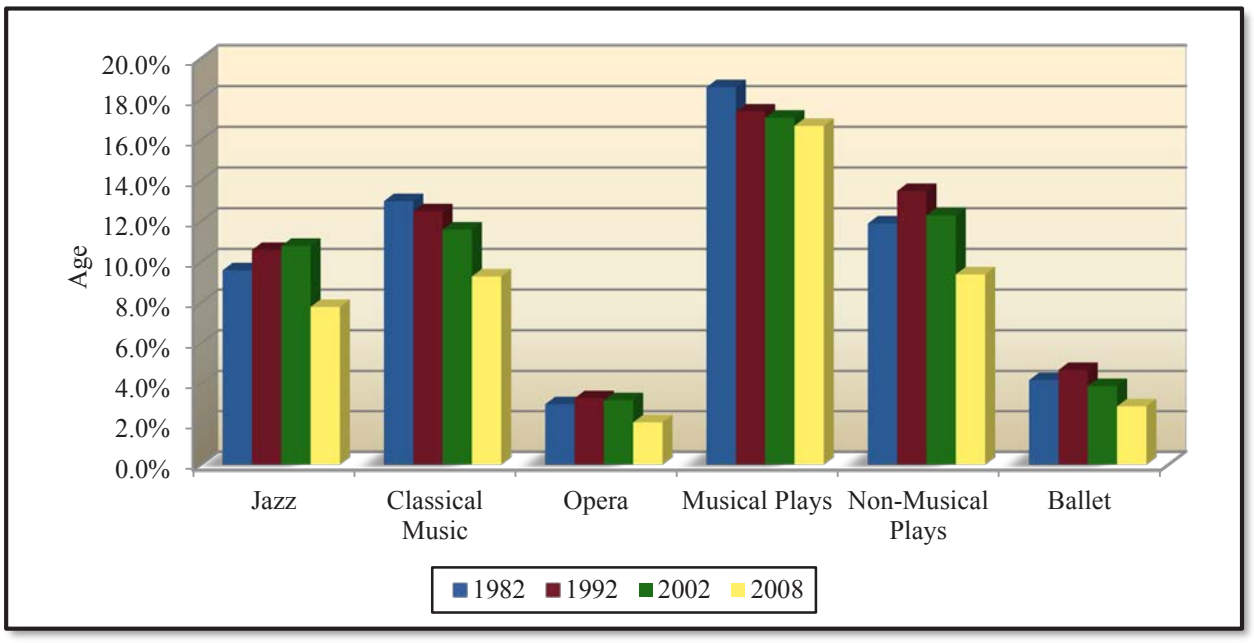


**Table AB – Percentage of U.S. Adult Population Attending Art Museums, Parks, and Festivals: 1982-2008**

| | | | | | Rate of Change | |
|---|---|---|---|---|---|---|
| | 1982 | 1992 | 2002 | 2008 | 2002-2008 | 1982-2008 |
| Art Museums/Galleries | 22.1% | 26.7% | 26.5% | 22.7% | -14% | +3% |
| Parks/Historical Buildings | 37.0% | 34.5% | 31.6% | 24.9% | -21% | -33% |
| Craft/Visual Arts Festivals | 39.0% | 40.7% | 33.4% | 24.5% | -27% | -37% |

Attendance for the most popular types of arts events – such as museums and craft fairs – also declined.

- After topping 26% in 1992 and 2002, the art museum attendance rate slipped to 23 percent in 2008 – comparable to the 1982 level.
- The proportion of the U.S. adults touring parks or historical buildings has diminished by one-third since 1982.

**Table AC – Median Age of Arts Attendees: 1982-2008**

| | | | | | Rate of Change | |
|---|---|---|---|---|---|---|
| | 1982 | 1992 | 2002 | 2008 | 2002-2008 | 1982-2008 |
| U.S. Adults, Average | 39 | 41 | 43 | 45 | +2 | +6 |
| Jazz | 29 | 37 | 43 | 46 | +4 | +17 |
| Classical Music | 40 | 44 | 47 | 49 | +2 | +9 |
| Opera | 43 | 44 | 47 | 48 | +1 | +5 |
| Musicals | 39 | 42 | 44 | 45 | +1 | +6 |
| Non-Musical Plays | 39 | 42 | 44 | 47 | +3 | +8 |
| Ballet | 37 | 40 | 44 | 46 | +2 | +9 |
| Art Museums | 36 | 39 | 44 | 43 | -1 | +7 |

Long-term trends suggest fundamental shifts in the relationship between age and arts attendance.

- Performing arts attendees are increasingly older than the average U.S. adult.
- Jazz concert-goers are no longer the youngest group of arts participants.
- Since 1982, young adult (18-24-year-old) attendance rates have declined significantly for jazz, classical music, ballet, and non-musical plays.
- From 2002 to 2008, however, 45-54-year-olds – historically a significant component of arts audiences – showed the steepest declines in attendance for most arts events.

**Chart R – Percentage of U.S. Adult Population Attending Arts Performances:**

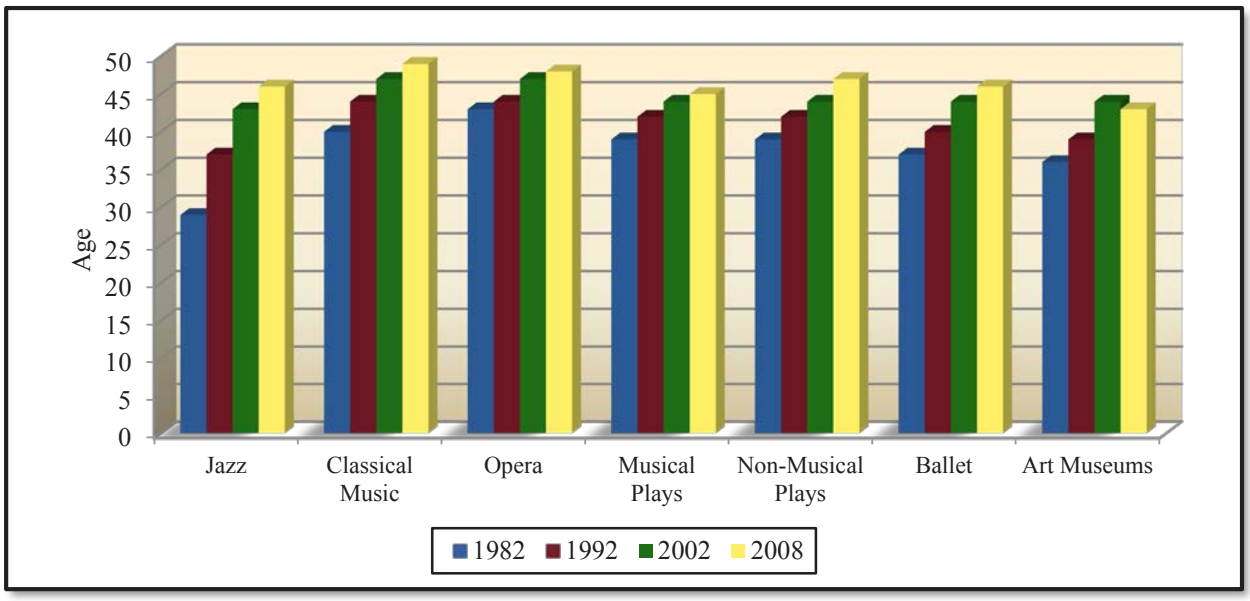


**Table AD – Percentage of U.S. Adult Population Performing or Creating Art: 1992-2008**

| | | | | Rate of Change | |
|---|---|---|---|---|---|
| | 1992 | 2002 | 2008 | 2002-2008 | 1982-2008 |
| Performing: | | | | | |
| Jazz | 1.7% | 1.3% | 1.3% | +0.0% | -0.4% |
| Classical Music | 4.2% | 1.8% | 3.0% | +1.2% | -1.2% |
| Opera | 1.1% | 0.7% | 0.4% | -0.3% | -0.7% |
| Choir/Chorus | 6.3% | 4.8% | 5.2% | +0.4% | -1.1% |
| Musical Plays | 3.8% | 2.4% | 0.9% | -1.5% | -2.9% |
| Non-Musical Plays | 1.6% | 1.4% | 0.8% | -0.6% | -0.8% |
| Dance | 8.1% | 4.3% | 2.1% | -2.2% | -6.0% |
| Making: | | | | | |
| Painting/Drawing | 9.6% | 8.6% | 9.0% | +0.4% | -0.6% |
| Pottery/Ceramics | 8.4% | 6.9% | 6.0% | -0.9% | -2.4% |
| Weaving/Sewing | 24.8% | 16.0% | 13.1% | -2.9% | -11.7% |
| Photography | 11.6% | 11.5% | 14.7% | +3.2% | +3.1% |
| Creative Writing | 7.4% | 7.0% | 6.9% | -0.1% | -0.5% |

Adults are creating or performing at lower rates – despite opportunities for displaying their work line.

- Only photography increased from 1992 to 2008 – reflecting, perhaps, greater access through digital media.
- The proportion of U.S. adults doing creative writing has hovered around 7.0 percent.
- The rate of classical music performance slipped from 1992 to 2002 then grew over the next six years.
- The adult participation rate for weaving or sewing was almost twice as great in 1992 as in 2008. This activity remains one of the most popular forms of art creation.

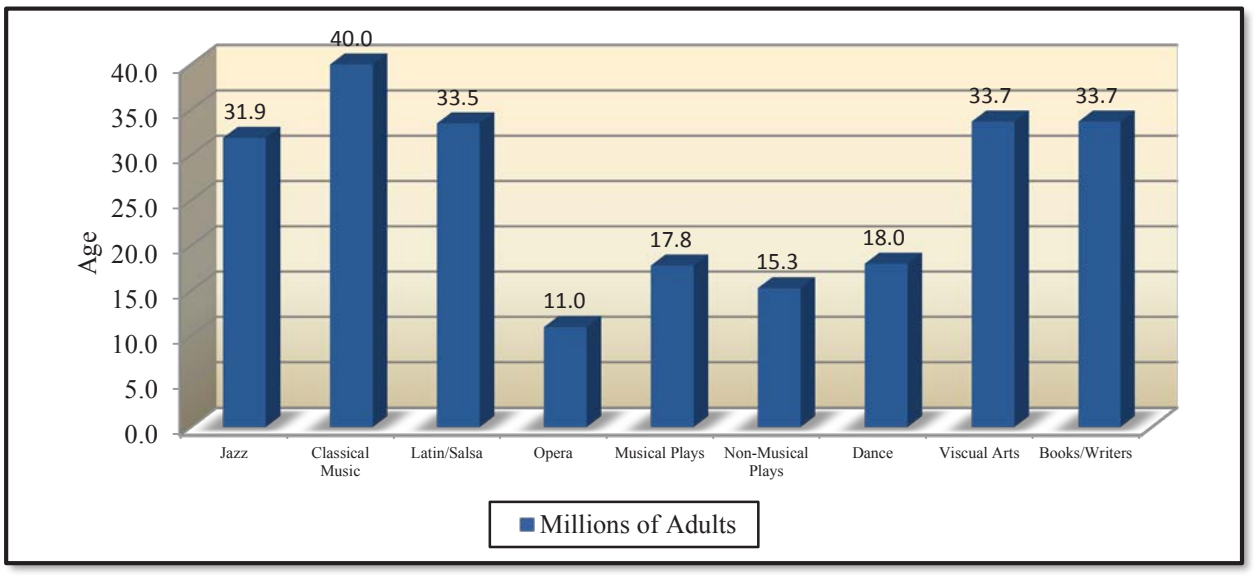
**Table AE – Percentage of U.S. Adult Population Viewing or Listening to Art Broadcasts or Recordings, 2008 (online media included)**

| | Percentage | Millions of Adults |
|---|---|---|
| Jazz | 14.2% | 31.9 |
| Classical Music | 17.8% | 40.0 |
| Latin or Salsa Music | 14.9% | 33.5 |
| Opera | 4.9% | 11.0 |
| Musical Plays | 7.9% | 17.8 |
| Non-Musical Plays | 6.8% | 15.3 |
| Dance | 8.0% | 18.0 |
| Programs about the visual arts | 15.0% | 33.7 |
| Programs about books/writers | 15.0% | 33.7 |

As in previous years, more Americans view or listen to broadcasts and recordings of arts events than attend them live.

- The sole exception is live theater, which still attracts more adults than broadcasts or recordings of plays or musicals (online media included).
- Classical music broadcasts or recordings attract the greatest number of adult listeners, followed by Latin or salsa music.
- 33.7 million Americans listened to or watched programs or recordings about books.

**Chart S – Percentage of U.S. Adult Population Attending Arts Performances:**



**Aquatic Participation Trends:** Swimming is one of the most popular sports and leisure activities, meaning that there is a significant market for aquatic pursuits. Approximately 16.2% of the population in the Mountain region of the country participates in aquatic activities. This is a significant segment of the population.

Despite the recent emphasis on recreational swimming the more traditional aspects of aquatics (including swim teams, instruction and aqua fitness) remain as an important part of most aquatic centers. The life safety issues associated with teaching children how to swim is a critical concern in most communities and competitive swim team programs through USA Swimming, high schools, masters, and other community based organizations continue to be important. Aqua fitness, from aqua exercise to lap swimming, has enjoyed strong growth during the last ten years with the realization of the benefits of water-based exercise.

A competitive pool allows for a variety of aquatic activities to take place simultaneously and can handle aqua exercise classes, learn to swim programs as well competitive swim training and meets (short course and possibly long course). In communities where there are a number of competitive swim programs, utilizing a pool with 8 lanes or more is usually important. A competitive pool that is designed for hosting meets will allow a community to build a more regional or even national identity as a site for competitive swimming. However, it should be realized that regional and national swim meets are difficult to obtain on a regular basis, take a considerable amount of time, effort and money to run; can be disruptive to the regular user groups and can be financial losers for the facility itself. On the other side such events can provide a strong economic stimulus to the overall community.

Competitive diving is an activity that is often found in connection with competitive swimming. Most high school and regional diving competition centers on the 1-meter board with some 3 meter events (non-high school). The competitive diving market, unlike swimming, is usually very small (usually 10% to 20% the size of the competitive swim market) and has been decreasing steadily over the last ten years or more. As a result, many states have or are considering the elimination of diving as a part of high school swimming. Diving programs have been more viable in markets with larger populations and where there are coaches with strong diving reputations. Moving from springboard diving to platform (5 meter and 10 meter, and sometimes 3 and 7.5 meters), the market for divers drops even more while the cost of construction with deeper pool depths and higher dive towers becomes significantly larger. Platform diving is usually only a competitive event in regional and national diving competitions. As a result, the need for inclusion of diving platforms in a competitive aquatic facility needs to be carefully studied to determine the true economic feasibility of such an amenity.

There are a couple of other aquatic sports that are often competing for pool time at competitive aquatic centers. However, their competition base and number of participants is relatively small. Water polo is a sport that continues to be reasonably popular on the west coast but is not nearly as strong in Arizona and uses a space of 25 yards or meters by 45-66 feet wide (the basic size of an

8 lane, 25-yard pool). However, a minimum depth of 6 foot 6 inches is required which is often difficult to find in more community based facilities. Synchronized swimming also utilizes aquatic facilities for their sport and they also require deeper water of 7-8 feet. This also makes the use of some community pools difficult.

Without doubt the hottest trend in aquatics is the leisure pool concept. This idea of incorporating slides, lazy rivers (or current channels), fountains, zero depth entry and other water features into a pool's design has proved to be extremely popular for the recreational user. The age of the conventional pool in most recreational settings has greatly diminished. Leisure pools appeal to the younger kids (who are the largest segment of the population that swims) and to families. These types of facilities are able to attract and draw larger crowds and people tend to come from a further distance and stay longer to utilize such pools. This all translates into the potential to sell more admissions and increase revenues. It is estimated conservatively that a leisure pool can generate up to 30% more revenue than a comparable conventional pool and the cost of operation while being higher, has been offset through increased revenues. Of note is the fact that patrons seem willing to pay a higher user fee with this type of pool that is in a park like setting than a conventional aquatics facility.

Another trend that is growing more popular in the aquatic's field is the development of a raised temperature therapy pool for relaxation, socialization, and rehabilitation. This has been effective in bringing in swimmers who are looking for a different experience and non-swimmers who want the advantages of warm water in a different setting. The development of natural landscapes has enhanced this type of amenity and created a pleasant atmosphere for adult socialization.

The multi-function indoor aquatic center concept of delivering aquatics services continues to grow in acceptance with the idea of providing for a variety of aquatics activities and programs in an open design setting that features a lot of natural light, interactive play features and access to an outdoor sun deck. The placing of traditional instructional/competitive pools, with shallow depth/interactive leisure pools and therapy water, in the same facility has been well received in the market. This idea has proven to be financially successful by centralizing pool operations for recreation service providers and through increased generation of revenues from patrons willing to pay for an aquatics experience that is new and exciting. Indoor aquatic centers have been instrumental in developing a true family appeal for community-based facilities. The keys to success for this type of center revolve around the concept of intergenerational use in a quality facility that has an exciting and vibrant feel in an outdoor like atmosphere.

Also changing is the orientation of aquatic centers from stand-alone facilities that only have aquatic features to more of a full-service recreation center that has fitness, sports and community based amenities. This change has allowed for a better rate of cost recovery and stronger rates of use of the aquatic portion of the facility as well as the other "dry side" amenities.

**Aquatic Facilities Market Orientation:** Based on the market information, the existing pools, and typical aquatic needs within a community, there are specific market areas that need to be addressed with any aquatic facility. These include:

1. **Leisure/recreation aquatic activities** - This includes a variety of activities found at leisure pools with zero depth entry, warm water, play apparatus, slides, seating areas and deck space. These are often combined with other non-aquatic areas such as concessions and birthday party or other group event areas.

2. **Instructional programming** - The primary emphasis is on teaching swimming and lifesaving skills to many different age groups. These activities have traditionally taken place in more conventional pool configurations but should not be confined to just these spaces. Reasonably warm water, shallow depth with deeper water (4 ft. or more), and open expanses of water are necessary for instructional activities. Easy pool access, a viewing area for parents, and deck space for instructors is also crucial.

3. **Fitness programming** - These types of activities continue to grow in popularity among a large segment of the population. From aqua exercise classes, to lap swimming times, these programs take place in more traditional settings that have lap lanes and large open expanses of water available at a 3 1/2 to 5 ft. depth.

4. **Therapy** – A growing market segment for many aquatic centers is the use of warm, shallow water for therapy and rehabilitation purposes. Many of these services are offered by medically based organizations that partner with the center for this purpose.

5. **Competitive swimming/diving** - Swim team competition and training for youth, adults and seniors requires a traditional 6 to 10 lane pool with a 1 and/or 3 meter diving boards at a length of 25 yards or 50 meters. Ideally, the pool depth should be no less than 4 ft. deep at the turn end and 6 feet for starts (7 is preferred). Spectator seating and deck space for staging meets is necessary. This market usually has strong demands for competitive pool space and time during prime times of center use.

6. **Specialized uses** – Activities such as water polo and synchronized swimming can also take place in competitive pool areas as long as the pool is deep enough (7 ft. minimum) and the pool area is large enough. However, these are activities that have small participant numbers and require relatively large pool areas. As a result, it may be difficult to meet the needs of specialized uses on a regular basis.

7. **Social/relaxation** - The appeal of using an aquatics area for relaxation has become a primary focus of many aquatic facilities. This concept has been very effective in drawing non-swimmers to aquatic facilities and expanding the market beyond the traditional

swimming boundaries. The use of natural landscapes and creative pool designs that integrate the social elements with swimming activities has been most effective in reaching this market segment.

8. **Special events/rentals** - There is a market for special events including kid's birthday parties, corporate events, community organization functions, and general rentals to outside groups. The development of this market will aid in the generation of additional revenues and these events/rentals can often be planned for after or before regular hours or during slow use times. It is important that special events or rentals not adversely affect daily operations or overall center use.

Specific market segments include:

1. **Families** - Within this market, an orientation towards family activities is essential. The ability to have family members of different ages participate in a fun and vibrant facility is essential.

2. **Pre-school children** - The needs of pre-school age children need to be met with very shallow or zero depth water which is warm and has play apparatus designed for their use. Interactive programming involving parents and toddlers can also be conducted in more traditional aquatic areas as well.

3. **School age youth** - A major focus of most pools is to meet the needs of this age group from recreational swimming to competitive aquatics. The leisure components such as slides, fountains, lazy rivers and zero depth will help to bring these individuals to the pool on a regular basis for drop-in recreational swimming. The lap lanes provide the opportunity and space necessary for instructional programs and aquatic team use.

4. **Teens** - Another aspect of many pools is meeting the needs of the teenage population. Serving the needs of this age group will require leisure pool amenities that will keep their interest (slides) as well as the designation of certain "teen" times of use.

5. **Adults** – This age group has a variety of needs from aquatic exercise classes to lap swimming, triathlon training and competitive swimming through the master's program.

6. **Seniors** - As the population of the United States and the service areas continue to age, meeting the needs of an older senior population will be essential. A more active and physically oriented senior is now demanding services to ensure their continued health. Aqua exercise, lap swimming, therapeutic conditioning and even learn to swim classes have proven to be popular with this age group.

7. **Special needs population** - This is a secondary market, but with the A.D.A. requirements and the existence of shallow warm water and other components, the amenities are present to develop programs for this population segment. Association with a hospital and other therapeutic and social service agencies will be necessary to reach this market.

8. **Special interest groups** - These include swim teams (and other aquatic teams), school district teams, day care centers and social service organizations. While the needs of these groups can be great, their demands on an aquatics center can often be incompatible with the overall mission of the facility. Care must be taken to ensure that special interest groups are not allowed to dictate use patterns for the center.

With the proper pools and strong utilization of the aquatics area, it is possible to meet most of the varied market orientations as outlined above.

**Recreation Activity and Facility Trends:** There continues to be very strong growth in the number of people participating in recreation and leisure activities. The Physical Activity Council in its 2013 study indicated that 33% of Americans (age 6 and older) are active to a healthy level. However, the study also indicated that 28% of Americans were inactive. It is estimated that one in five Americans over the age of six participates in some form of fitness related activity at least once a week. American Sports Data, Inc. reported that membership in U.S. health clubs has increased by 10.8% from 2009 to 2010, and memberships in health clubs reached an all-time high of 50.2 million in 2010. Statistics also indicate that approximately 12 out of every 100 people of the U.S. population (or 12%) belong to a health club. On the other side most public recreation centers attract between 20% and 30% of a market area (more than once) during the course of a year. All of this indicates the relative strength of a market for a community recreation facility. However, despite these increases the American population as a whole continues to lead a rather sedentary life with an average of 25% of people across the country reporting that they engage in no physical activity (according to The Center for Disease Control).

One of the areas of greatest participant growth over the last 10 years is in fitness related activities such as exercise with equipment, aerobic exercise and group cycling. This is also the most volatile area of growth with specific interest areas soaring in popularity for a couple of years only to be replaced by a new activity for the coming years. Also showing particularly strong growth numbers are ice hockey and running/jogging while swimming participation remains consistently high despite recent drops in overall numbers. It is significant that many of the activities that can take place in an indoor recreation setting are ranked in the top fifteen in overall participation by the National Sporting Goods Association.

Due to the increasing recreational demands there has been a shortage in most communities of the following spaces:

- Gymnasiums
- Pools (especially leisure pools)
- Weight/cardiovascular equipment areas
- Indoor running/walking tracks
- Meeting/multipurpose (general program) space
- Senior's program space
- Pre-school and youth space
- Teen use areas
- Fieldhouses

As a result, many communities have attempted to include these amenities in public community recreation facilities. With the growth in youth sports and the high demand for school gyms, most communities are experiencing an acute lack of gymnasium space. Weight/cardiovascular space is also in high demand and provides a facility with the potential to generate significant revenues.

The success of most recreation departments is dependent on meeting the recreational needs of a variety of individuals. The fastest growing segment of society is the senior population and meeting the needs of this group is especially important now and will only grow more so in the coming years. Indoor walking tracks, exercise areas, pools and classroom spaces are important to this age group. Marketing to the younger more active senior (usually age 55-70) is paramount, as this age group has the free time available to participate in leisure activities, the desire to remain fit, and more importantly the disposable income to pay for such services.

Youth programming has always been a cornerstone for recreation services and will continue to be so with an increased emphasis on teen needs and providing a deterrent to juvenile crime. With a continuing increase in single parent households and two working parent families, the needs of school age children for before and after school child care continues to grow as does the need for preschool programming.

As more and more communities attempt to develop community recreation facilities the issues of competition with other providers in the market area have inevitably been raised. The loudest objections have come from the private health club market and their industry voice IHRSA. The private sector has vigorously contended that public facilities unfairly compete with them in the market and have spent considerable resources attempting to derail public projects. However, the reality is that in most markets where public community recreation centers have been built, the private sector has not been adversely affected and in fact in many cases has continued to grow. This is due in large part to the fact that public and private providers serve markedly different markets. One of the other issues of competition comes from the non-profit sector (primarily YMCA's but also JCC's, and others), where the market is much closer to that of the public providers. While not as vociferous as the private providers, the non-profits have also often expressed concern over public community recreation centers. What has resulted from this is a

strong growth in the number of partnerships that have occurred between the public and non-profit sector in an attempt to bring the best recreation amenities to a community.

**Community Center Benchmarks:** Based on market research conducted by Ballard*King & Associates at community centers across the United States, the following represents the basic benchmarks.

- The majority of community centers that are being built today are between 65,000 and 75,000 square feet. Most centers include three primary components A) A pool area usually with competitive and leisure amenities, B) Multipurpose gymnasium space, and C) Weight/cardiovascular equipment area. In addition, most centers also have group exercise rooms, drop-in childcare, and classroom and/or community spaces.

- For most centers to have an opportunity to cover all of their operating expenses with revenues, they must have a service population of at least 30,000 and an aggressive fee structure.

- Most centers that are between 65,000 and 75,000 square feet have an operating budget of between $1,500,000 and $1,800,000 annually. Nearly 65% of the operating costs are from personnel services, followed by approximately 25% for contractual services, 8% for commodities, and 2% for capital replacement.

- For centers that serve a more urban population and have a market driven fee structure, they should be able to recover 70% to 100% of operating expenses. For centers in more rural areas the recovery rate is generally 50% to 75%. Facilities that can consistently cover all of their operating expenses with revenues are rare. The first true benchmark year of operation does not occur until the third full year of operation.

- The majority of centers of the size noted (and in an urban environment) above average daily paid attendance of 800 to as much as 1,000 per day. These centers will also typically sell between 800 and 1,500 annual passes (depending on the fee structure and marketing program).

- It is common for most centers to have a three-tiered fee structure that offers daily, extended visit (usually punch cards) passes, and annual passes. In urban areas it is common to have resident and non-resident fees. Non-resident rates can cost 25% to 50% higher than the resident rate and are usually a topic of discussion amongst elected officials. Daily rates for residents average between $3.00 and $6.00 for adults, $3.00 and $4.00 for youth and the same for seniors. Annual rates for residents average between $200 and $300 for adults, and $100 and $200 for youth and seniors. Family annual passes tend to be heavily discounted and run between $350 and $800.

- Most centers are open an average of 105 hours a week, with weekday hours being 5:00 am to 10:00 pm, Saturdays 8:00 am to 8:00 pm and Sundays from noon to 8:00 pm. There is now a trend to open earlier on Sundays as well. Often hours are shorter during the summer months.

Note: These statistics vary by regions of the country.

**Service Area Providers:** There are a limited number of facilities in the greater Lake Havasu area that are supplying aquatic, recreation, fitness, and sports activities. The following is a brief review of the major providers in the area.

*Aquatics*

- The Lake Havasu Aquatic/Community Center is the only indoor public pool in the Primary Service area as well as the Secondary Service Area.

- Kingman has an indoor wellness pool at the hospital.

- Many of the hotels and resorts in the Lake Havasu area have indoor pools but they are for the use of their guests only.

- There are a number of outdoor pools in the Primary and Secondary market areas.

*Recreation/Sports/Fitness*

- The Lake Havasu Aquatic/Community Center has the largest gym and meeting rooms in the area.
- There is a senior center in the community.
- There are a significant number of private fitness centers in the area. This includes Curves, Anytime Fitness, Titan Gym and Fitness Club, Planet Fitness, Pro Wellness, and the London Bridge Racquet and Fitness Club.

**Other Providers Conclusion:** After analyzing the existing aquatic facilities in the Lake Havasu City market area, with no indoor, public, aquatic facilities available anywhere in the Secondary Service Area, there is an outstanding market for the Lake Havasu City Aquatic/Community Center. In addition, the City has the largest gym and meeting facilities in the community. However, despite the fact that there are a significant number of private fitness center in the market, there is still an existing market for a public fitness center since they serve very different markets.

**Market Conclusion:**

Below are listed some of the market opportunities and challenges that exist with this project.

*Opportunities*

- There is a sizeable population in the Primary Service Area and the Secondary Service Area to support a renovated and/or expanded aquatic/community center.
- The population will continue to grow at a steady pace in the market area.
- The Lake Havasu Aquatic Center is the only indoor public pool in the market area.
- The gymnasium and meeting rooms are the largest in the area.
- The existing aquatic/community center is well known in the community.
- The second home owners and visitors to the area form another user group for the center.

*Challenges*

- The demographic characteristics of the Lake Havasu City market area indicate a very large senior population, households with lower income levels and only an acceptable level of disposable income for recreation purposes. There are also a limited number of households with children. These characteristics result in lower participation in recreation activities.
- The community has relatively low recreation expenditure levels.
- There will be large growth in the senior population in the coming years and the rate of participation in active recreational pursuits is generally lower with this age group.
- There are a significant number of private fitness facilities in the market.
- Funding not only the development but the operation of a renovated and/or expanded aquatic/community center will have to be clearly defined.

# Existing Facility Operations Review

The purpose of this review is to analyze the operations and management of the Lake Havasu City Aquatic/Community Center, identify factors within the center that need to be addressed or improved to increase the operational efficiency, and performance of the facility.

## Center Use and Budget

It should be noted that limited information was available regarding use statistics from the center and budget information beyond what is available from the City's budget document.

### Use Patterns

- The center's high season programmatically is during the winter months when there are a large number of snowbirds in the community. Program use of the center drops off during the late spring, summer and early fall months.
- Programmatically, the aquatic center appears to be dominated by seniors and aqua exercise classes during the winter months. There is also a strong learn to swim program for youth.
- Drop-in use at the aquatic center is primarily for open swim with the highest numbers being during May, June and July
- Community Center usage is heavily oriented toward rentals. With the ability to have alcohol for events, the revenues produced from rentals is greater than what most programs can generate.
- There are strong use numbers available from aquatics and rentals but little information appears to be available regarding overall facility use and pass holder utilization rates.

### Budget

- The center used to be an enterprise fund (even though the facility has never been able to cover its cost of operation by revenues generated from fees) but has moved to the City's general fund in the last few years. This has changed the focus from the priority to generate revenue to being more of a service oriented facility.
- Historically, the center has had operating losses (expenses minus revenues) of between $900,000 and $1,000,000 a year. The cost recovery rate has hovered in the 25% to 30% range which is generally low for this type of facility. However, cost recovery is hampered by the high senior population and lower income levels. In the future, with increasing costs of operation it may be difficult to maintain even this level of cost recovery. It should also be noted that some facility maintenance costs are not shown in the operating budget for the center but are located in the Operations Maintenance Services budget.
- Due in part to the down turn in the economy, there has been minimal levels of CIP funding for center improvements. There are a large number of deferred maintenance issues that need to be addressed as a result.
- The likely increase in the minimum wage to at least $10 an hour (to as much as $15) will have a significant impact on the center's operating budget in the future. The City should start increasing the rate for part-time staff incrementally on an annual basis in anticipation of this change. This factor alone could reduce the current cost recovery level from its current rate.
- For large events and activities that take place at the center (and for those that draw users to the facility from outside of Lake Havasu City), determining the possible economic impact on the community is recommended.
- The existing fee policy has an emphasis on low cost recovery for many programs and services. Utilizing the tiering of programs concept from the 2008 study, there needs to be more programs offered in the higher cost recovery categories.
- The rental rates for the center appear to be satisfactory for the market and the facility.
- As part of the existing IGA with the school district, the center receives very little revenue for school use of the pool.
- Expanding sponsorship opportunities for key programs and services (both existing and new) will not only help to promote the programs themselves but may also provide funding to maintain or add new programs.

**Organizational Structure**

- The Aquatic/Recreation Division is divided into three principal areas, aquatics, general programs and rentals. Considering the focus of the center and its programs and services, this makes sense. It should be realized that a significant percentage of the general programs take place outside of the center itself.
- Pay rates for full-time staff are acceptable but certainly not high. Part-time staff rates are generally low and results in higher staff turn-over as well as difficulty in attracting qualified employees (especially lifeguards).
- It is critical the Division have a dynamic manager that will provide leadership and direction for the center and its programs. This will be especially important if the facility undergoes a significant renovation and/or expansion.
- A long term management plan will need to be developed that ensures that the Division, its facilities and programs operate at a consistently high level. Key areas of responsibility that need to be clearly identified as part of this process include:
    - Facilities management
    - General programs coordination
    - Maintenance and coordination with Operations Maintenance Services
    - Marketing coordination
    - Safety/Security coordination
    - Staff training coordination
    - Contract management

  These areas of responsibility do not infer that there needs to be a full-time (or even a part-time) employee dedicated to each function. It may be possible for a couple of areas of responsibility to be shared by a single staff member. However, one individual should be the identified person that is responsible for each of these functions.
- There is a definite need to increase the level of programming at the center and this should be possible without adding any additional full-time staff. However, there will need to be an increase in part-time wages for instructors and other direct program staff or these programs will need to be contracted out to a third party.
- The center (and Division) has some very basic operating policies and procedures but it lacks strong, comprehensive, directives in these areas and these must be developed to cover all aspects of operations and management including safety and security, maintenance, financial matters, staffing, and even marketing.
- There is some basic record keeping regarding program statistics, budget expenditures, and revenue history, and quantifiable numbers on people that have been served. However, this needs to be more uniform in format across all program areas.

**Programs and Services**

- Recreation programming is focused in the following areas:
    - Aquatics – this is the greatest single program area at the center. Programs include learn to swim, aqua exercise, and swim team.
    - Special Events – this is also a large program area but many of these events take place outside of the center itself.
    - Youth Programs – these programs include after school (most of which occurs at the schools), summer camps, and school break camps.
    - Youth Athletics – these programs include flag football (not at the center) and basketball.
- Recreation programming is lacking in the following areas
    - Fitness and Wellness – other than in the area of aquatics, there are relatively few fitness and wellness activities that are offered at the center. This is a program area that is receiving greater emphasis from parks and recreation agencies.
    - Adult Programs – programs in this area are very limited and are primarily focused on pickleball.
    - Cultural Arts – there are very few cultural arts programs and services that are offered by the center.
    - Special Needs – again there appears to be few programs in this area. Most communities partner with other agencies for these types of activities.
    - Seniors – the aquatic area has a significant number of aqua exercise classes for seniors but there are few other programs on the community center side of the building. With the high senior population in the market, this age group should have greater attention, with a focus on the more active senior.

- When the center was an enterprise fund there was a focus on activities and events that generated strong revenues for the facility. As a result, the priorities for rentals were often higher than that of programs. This limited the development of programs at the center itself and in some cases pushed these activities to other facilities in community.
- If the community center is truly going to serve the recreational needs of the Lake Havasu area, then there will need to be a strong effort made to develop more programs in the center itself. This will require that in-house recreation programs have priority over rentals during certain times of the day, days of the week (weekdays), and times of the year.

**Recommendations**

- The City will need to determine its long term operational philosophy for the Aquatic/Community Center. This philosophy will need to assess the overall importance of cost recovery compared with service to the community. It is recommended that a balanced approach be adopted that places an importance on community service first but with a requirement that the center be as cost effective as possible in its operation and be able to generate revenues from use and programs where possible.
- The Division needs to follow-up on the Comprehensive Recreation Needs Assessment Study from 2008. Despite the age of this document, there are still many viable recommendations for improving management and operations of the facility.
- The center needs to develop basic performance measures for facility operations, budgeting, programs and services as well as marketing. These "indicators" become the basis for center financial assessment and service delivery and allow for comparisons from year to year.
- The center needs to produce an annual report that details use numbers for the facility and its programs, summarizes budget expenditures and revenues, compares facility performance with previous years and documents overall program numbers as well as numbers of people signed up for classes.
- There needs to be a strong effort to increase the overall number and variety of recreation programs that are offered through the facility. This will require the development of a 5- year program plan that outlines areas of program development focus (see above) during the time frame. This should then be followed up by a specific year to year program plan that identifies key programs to be started, the resources that are required, and the person responsible for making sure that this occurs.
- The program plan needs to be based on a strong public input process that involves surveys and focus groups to determine programmatic priorities in the community.
- With an effort to increase programming in the center, there must be a recognition that there will need to be a higher level of funding for this to occur. However, this funding should be for instructors and part-time staff that are directly related to the delivery of the service and not additional full-time staff.
- The center (as well as the Division) needs to revisit the fee policy (utilizing information for the 2008 study), with a greater emphasis on market driven fee based programs. Despite the lower income levels, there should not be an assumption that programs that command a higher value among users cannot also have a higher fee attached. Increasing the cost recovery rate for some programs will allow for additional programs to be offered.
- Developing strong program partners in the community and allowing these groups and organizations to utilize the center for some of their activities should be explored. There should be the recognition that the City cannot meet all of the program needs of the community by themselves.
- The center also needs to develop a basic marketing plan for the facility and its programs. This plan should focus on serving the needs of seniors, seasonal residents as well as visitors. It is highly recommended that that Department bring back the printed brochure as it appears as if registration numbers for programs has suffered since the brochure was discontinued.
- Priorities of use for each space in the center should be developed that ensures that program and rental needs are both being taken care of as well as drop-in use of the pool and gym.
- The staff should complete a capacity analysis for each major space in the building that examines the number of realistic hours that are available for use and how much (by percentage) the individual spaces are actually scheduled and utilized.

- A basic economic impact analysis should be completed for large events that take place in the community center.
- Within the Division, yearly budget priorities should be directed by long term operational and management goals that are updated on an annual basis. There must be realistic and measurable goals established and staff held accountable for reaching these goals.
- A stronger more concerted effort to find alternative funding sources for facility operations, programs and services will need to be pursued. This includes additional grants and fundraising as well as sponsorships. The Division should identify 3-5 grants a year to pursue for funding specific aspects of recreation programming and/or facility development. This will need to be coordinated at the manager or supervisor level. Grants should focus on energy savings, wellness, teen services and senior activities.
- It is critical that there is a policy that encourages an adjustment of fees at least every two years to keep from falling behind on increases in expenditures or increases in fees from other providers. There should also be a definite fee increase if there is a significant renovation or expansion to the center.
- The center should utilize electronic funds transfer (EFT) as a payment option for annual and other passes at the center.

## Center Amenities

**The following is a brief assessment of the amenities in the center and its overall physical condition.**

- The center in general is too institutional looking and needs to be updated to a more modern and inviting facility. Ultimately, this impacts utilization and revenues.
- As has been noted, the center has a significant number of deferred maintenance issues.
- Controlling access to the center is an issue with multiple points of entry and egress. There should only be two public access points to the facility. All other exterior doors should be alarmed.
- There is a definite lack of storage in all areas of the center.
- The first priority for any improvements should be to renovate and improve existing spaces and areas within the center. This will PRESERVE existing revenues. Life/safety and security issues should be the top priority followed by building systems updates.
- The City should not consider the possible development of another community center building at the same site or another location. Expansion of the existing center will be more cost effective from an operational standpoint.

## Recommendations

**Maintenance**

- Staff needs to develop an overall maintenance plan for the center that identifies on-going custodial and maintenance tasks, their frequency, standards, and responsible parties. This plan should also deal with preventative maintenance as well.
- Lifecycle cost estimates for all furniture, fixtures and equipment in the center should be developed. This should be utilized to develop long range capital funding needs.
- The center should have a well-defined emergency action plan in place.

**Entrance**

- Reconfigure the access road and parking to bring users to the front of the building first.
- User access to the center should be limited to the main entrance to the entire center and the "back" entrance from the existing parking area to the east of the building.
- The primary entrance needs to have an entry lobby with soft seating and visuals to other areas of the center. This should be the community's living room.
- The main control desk should be located in the lobby area with clear visuals to the front door as well as down the hall to the back entrance. This desk must also control access to the pay portion of the center (aquatics center and other possible amenities).

**Key Spaces to Renovate**

- Replace the slide in the pool as soon as possible. This is a top priority.
- Add storage to any and all areas of the building when possible.
- Upgrade and improve the locker rooms including the addition of individual showers. Develop 4-6 "family change rooms" with each having a shower, toilet, sink and changing area. There must be oversized lockers located just outside of these rooms. There also needs to be direct access to the pool from these change rooms.
- Improve the lay-out of the existing office area or move the space to accommodate other uses.
- Renovate the aquatic guard and staff offices and add a first-aid room.
- Add shade to the outdoor pool deck.
- Improve the lighting, look and feel of the existing meeting rooms.

## New Spaces to Possibly Add to the Center

The addition of the high and medium priority spaces will INCREASE center use and revenues. The addition of more than the high priority spaces is likely to require phasing of the project.

**High Priorities**

- Party Rooms – Add two party rooms that are located in close proximity to the pool but can be accessed from the dry side of the center as well. This space would be utilized for pool based birthday parties but could also serve as a small meeting room as well.
- Community Room – A divisible room of approximately 3,000 SF that opens to a covered outdoor patio area. This space would be used for a variety of recreation programs and classes as well as other community functions and rentals. Alcohol will be permitted in these rooms.
- Catering Kitchen – This kitchen area would be attached to the community room. There would be no actual food preparation from this kitchen.

**Medium Priorities**

- Health/Wellness Area – A space (4,000 to 5,000 SF) that can support group exercise classes as well as a limited amount of fitness equipment. This space will generate more net revenue than any other possible space in the building and will receive high use (even from seniors).
- Gymnasium/Track – A gym of approximately 10,000 SF that can be divided into two smaller court areas. This gym should consider the addition of a raised walk/jog track around the perimeter. The primary use of this space should be for active recreation purposes. Properly programmed and utilized for drop-in basketball/ volleyball, etc., this element should be able to come close to covering its operational expenses.

**Low Priorities**

- Outdoor 8 lane by 25 yard Competition Pool – This would serve as the competitive pool for the community and school district with covered seating and ample deck space. This would allow the existing indoor pool to be utilized for recreation and water fitness purposes. This amenity will not be able to cover its cost of operation.
- Climbing Wall – This should include high ropes climbing (32 feet minimum) as well as a significant bouldering wall. This amenity will not likely be able to cover its operating cost.

# Architectural Systems Study

## Lake Havasu City – Aquatics and Community Center Building

Aquatics and Community Center, 100 Park Ave, Lake Havasu City, AZ 86403

**Date of Opening:**
1993 (23 years old)

**Use of the Building:**
Aquatic center (indoor lap, wave and recreation pool, indoor therapy pools, party zones, water slide (indoor/outdoor), locker rooms (men, women, family), equipment rooms, first aid/lifeguard room, reception, lobby, administration offices)

Community Center (Multi-purpose room with high school style stage, catering + kitchen, classrooms, storage rooms, restrooms (male (with storage) and female with lockers and showers), semi-exterior storage room added onto the northwest elevation of the building at a later date)

Site (parking and driveways surround the building, the exterior portion of the water slide, splash pad and outdoor grass play areas outside the southeast elevation of the building)

**Size of Building:**
One story – 59,388 sf - No elevator
Community Center 17,888sf; Pool Building 41,500sf

## Building Description

**Occupancy Type:**
A-2.1 Occupancy (1988 Uniform Building Code)

**Construction Type**
Type II-1-hour construction (According to 1988 IBC)

**Sprinklers:**
All Areas are sprinklered except for the Pool Areas (Rooms 101, 102, 103, 130, 201, 301) Under an oversized building agreement by the Owner?

**Estimated Occupant Load:**
Pool – 755pp (600 bathers, 155 Spectators); Community Center 800pp - Total 1,555pp

**Setting Description**
The single story building is sited on a graded flat portion of the site which is below the adjacent State Highway 95. It has parking at approximately the same site elevation southeast and northeast of the building. The northeast parking lot has six sets of photovoltaic panel canopies over most of its available parking spaces.

There is an additional parking lot southwest of the building which is only accessed via a single driveway that passes through the southeast and northeast parking lots. The southwest parking lot is closest to the main public entry. This lot is a few feet lower in elevation than the building and access to the building is achieved through a series of stairs and ramps. Separate Community Center and Aquatic Center entries are provided from the southwest parking lot.

There is large hardscaped entry plaza adjacent to the apparent Aquatic Center entry surrounded by some relatively mature trees. There is a hardscaped party plaza and grass play yard outside the party room areas serving the indoor pools around the southwest and southeast corner of the building. There is a splash pad and the outdoor component of the water slide outside the Southeast corner of the building. These outdoor play areas are enclosed with 6' and under high CMU, Wrought Iron or a combination of both site fencing.

There is an emergency generator, transformer and electric service entrance equipment located adjacent to the center of the north east face of the building. The trash enclosure is in the north corner of the site.

Rotary Park is adjacent to and southwest of the Aquatic/Community Center site. It has ball fields, a skate park, parking lots, restroom buildings, general recreation fields and a lakeside beach. Rotary park is several feet lower than the Aquatic/Community Center site. An engineered drainage channel bifurcates the park and is adjacent to the Aquatic/Community Center site.

It is worth noting that there are tremendous views of the lake and distant mountains directly to the south from this building.

**Existing Condition Street Approach:**
The Building sits down below the primary street (Highway 95) and aside from the faded blue waterslide has no attention grabbing features on the primary street elevation. It has the appearance of an average building in an older industrial park. The building is now further obscured by the photovoltaic panel canopies. The paint on the building is a dull white with faded blue accents and has a dated appearance. The monument sign on Highway 95 is unattractive and easily missed. However, it is understood that a new sign (LED Reader Board) will be installed very soon.

**Site Conditions:**
The majority of the site is in good to very good condition with some exceptions. It is obvious the maintenance staff take great pride in the building and keep it in very good condition. The paving on site is in average to good condition; there are signs that the paving is being well maintained and follows a maintenance regimen.

The landscape is in good condition. The trees look healthy, grass in good condition and ground covers being well maintained. However, the trees do obscure one of the inherent assets of the site, the great views to the south.

The hardscape is showing its age in many locations with cracking and spalling.

The site vehicular circulation is confusing at best. Visitors must navigate through the major parking lots and traverse almost ¼ mile to get to the front door after arriving on site.

From anywhere on and off the site, the building does not provide any clues as to where the entry might be and (aside from the waterslide) what the function might be. It is very important that a facility like this which shares reception between a community and aquatic center have a single entry by all visitors.

The site wall enclosing the splash pad and party areas is in poor condition and do not comply with the Arizona Administrative Code (AAC) one of the building codes governing this use. A person can scale this wall by stepping up on the masonry base portions and jumping the wrought iron portion. According to the AAC,

**R18-5-240. Barriers**

**A.** *A public swimming pool or spa and deck shall be entirely enclosed by a fence, wall, or barrier that is at least 6 feet high. A semipublic swimming pool or spa and deck shall be entirely enclosed by a fence, wall, or barrier that is at least 5 feet high. The height of the fence, wall, or barrier shall be measured on the side of the barrier which faces away from the swimming pool or spa.*

**B.** *Fences or walls shall:*

1. *Be constructed to afford no external handholds or footholds;*
2. *Be of materials that are impenetrable to small children; Have no openings or spacings of a size that a spherical object 4 inches in diameter can pass through; and*

3. *Be equipped with a gate that opens outward from the swimming pool or spa. The gate shall be equipped with a self-closing and self-latching closure mechanism or a locking closure located at or near the top of the gate, on the pool side of the gate, and at least 54 inches above the floor.*

*G. If a barrier is composed of a combination concrete masonry unit and wrought-iron, the wrought iron portion shall be installed flush with the outside vertical surface of the concrete masonry unit. The space between the wrought iron and the concrete masonry unit shall be 1/2 inch or less. The vertical members of the wrought iron shall be spaced 4 inches on center.*

*The distance between the horizontal components of a fence shall not be less than 45 inches apart. The horizontal members shall be located on the interior side of the fence. Spacing or openings between vertical members shall be of a size that a spherical object 4 inches in diameter cannot pass through.*

**Recommendations:**

**Revised Entry:**
The customer entry sequence should be revised and enhanced. The City has taken the first step of building a new monument sign out on Highway 95 and wisely decided to incorporate LED Reader Board technology. This will be the first step in the customer experience.

A new driveway should be built to the southwest parking lot directly from the second driveway curb cut off of Park Avenue. The driveway should pass over where the existing shade ramada stands and where the carousel was. It should pass below the existing Aquatic Center entry plaza and connect to the southwest parking lot. This will necessitate revisions to the entry plaza, perimeter site fencing, and access from the parking to the building entry. New perimeter site fencing and a new building entry are required (see below) so it makes sense to create a new entry experience with these required changes combined with a new entry drive.

To support the new access to the southwest parking lot, a new monument sign should be built just south of the second Park Avenue curb cut so it is highly visible to the incoming traffic on Park Avenue.

The existing small shade structure can be relocated to the grass yard outside the party zone providing additional shade for the patrons. The existing flag poles should be relocated or replaced by the new entry.

A new building entry is being recommended below and with that the entry plaza, which sees little use, should be redesigned to provide a more welcoming experience and one that takes advantage of the tremendous views to the south.

**Splash Pad Enclosure:**
The splash pad enclosure walls must be rebuilt. They are in poor condition, they do not meet code requirements, and they present an opportunity for people to enter the splash pad zone unobserved. This is a great opportunity to combine this work with a new entry, driveway, and plaza to enhance the appeal of the Aquatic Center.

**Storage Building:**
There is a significant storage shortage at this facility. The many programs that use this facility, the everyday general building operations and the City's special events require more storage space than this facility currently has available. There are several large crates on the roof storing decorations other seasonal paraphernalia. A storage building could be added adjacent to the existing building in the northeast parking lot.

**Maintenance:**
The parking lot and driveways will need to be resealed or chip-sealed and the parking spaces restriped within the new five years.

*Shade gazebo should be moved adjacent to splash pad.*

*New entry monument sign should be located here.*

*Holiday display storage crates should be removed from the roof.*


*Excellent location for a new storage building.*

# Building Envelope

## Building Wall Construction

**Description:**
The building has concrete masonry unit (CMU) exterior wall construction throughout.

A portion of the building (higher pool enclosure) clads the CMU walls with stucco on expanded metal lath on 2" metal girts (2' on center horizontally with 2" rigid insulation between girts) on a troweled on vapor barrier.

A portion of the building (lower pool enclosure) clads the CMU walls with 1-1/2" deep pre-finished corrugated profile metal panels on 2" metal girts (2' on center horizontally with 2" rigid insulation between girts) on a troweled on vapor barrier.

**Existing Condition:**
Generally the exposed exterior CMU walls are in good condition. There are no apparent or concerning cracks. The paint on the building appears to be in mid-life condition. Most likely will need to be repainted within the next four to five years.

There is concern regarding the stucco coated wall at and around Grid Intersection H-2 (external corner of the Viewing Area south of the pool). There appears to have been significant leaks at the hose bib there resulting in significant stucco degradation. The area has been patched but it appears the cause of the leak still exists.

The construct of the furring on the building is not optimal. The horizontally applied girts rely upon rigid Styrofoam insulation as its brace against the gravity load applied by the metal lath and stucco finish. The horizontal girt configuration applies the load to the girts at their weakest axis.

There is evidence (stressed waterproofing membrane on the inside surface of the parapet above) that the leak may have corroded the girts in this area resulting in the entire furred surface sagging and placing stress on the parapet assembly. There is evidence (stressed waterproofing membrane on the inside surface of the parapet above) that this condition may be occurring at the grid intersection A-2 (external corner adjacent to the water slide trough) as well.

**Recommendation:**
In the two areas identified above, the stucco materials should be stripped off and the underlying conditions should be repaired. (Fix the leaks, replace the girts if damaged, replace the rigid insulation and replace the stucco; paint). Repair the waterproof membrane on the inside surface of the parapet walls once the repairs are made to the wall furring and the source of the stress removed.

The building will need to be painted within the next four to five years.

## Exterior Windows

**Description:**
Pre-finished Kawneer 450 Aluminum Windows and Storefront Systems with 1" insulating glass.

**Existing Condition:**
Good condition throughout, good quality windows and storefront, these should last many more years.

**Recommendation:**
Keep up the good maintenance regimen and keep the sealants around the frames in good condition through routine inspection and repairs.

## Interior Windows

**Description:**
Pre-finished Kawneer 450 Aluminum Windows and Storefront Systems with 1/4" clear tempered glass. (All interior windows and storefront systems except door/window Q)

Door/window "Q" (common corridor to lobby/reception) combination is constructed with hollow metal frames and 1-hr fire rated glass (Firelite)

**Existing Condition:**
Good condition throughout, good quality windows and storefront, these should last many more years.

**Recommendation:**
Keep up the good maintenance regimen and keep the sealants around the frames in good condition through routine inspection and repairs.

## Exterior Doors

**Description:**
Hollow Doors in Hollow Metal Frames

Roll-up Metal Insulated Service Doors

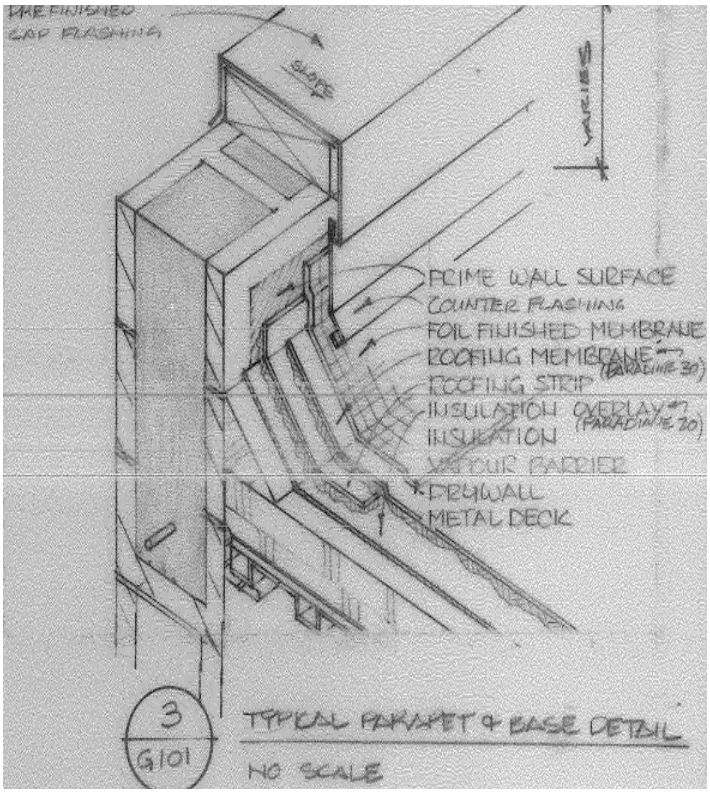
Aluminum Storefront Doors (see aluminum windows and storefront section)

**Existing Condition:**
All doors (swinging and roll-up) were in good condition and operating as intended. It was evident that the staff has consistent maintenance on these doors.

**Recommendation:**
Keep up the good maintenance regimen and keep the sealants around the frames in good condition through routine inspection and repairs. This is a harsh environment for this type door and frame material.

## Roof Type

**Description: Low Pitch Roof**
Low Pitch Roof: 2-ply roofing membrane (Paradiene 20 & 30) over 3" rigid insulation over 3 ply felt vapor barrier over ½" Type X gypsum board glued to metal roof deck. Foil faced waterproofing membrane coats the inside face of the parapets.



**Description: High Pitched Roof**
Pre-finished metal Roofing over bituthane waterproof membrane over ½" exterior grade gypsum board on 6" (20ga.) metal studs at 16"oc.

**Existing Condition: Low Pitched Roof**
The original roof is a good product that can serve the building well into the future with proper maintenance and scheduled regular re-coating of the top surface with durable elastomeric, desert rated, top coat paint. At the time of our inspection April 7, 2016, it was reported to us and it was evident that the center portion of the low pitch roof had been re-coated with an elastomeric coating by the City staff. It was reported that the staff applied (sprayed on March 7-18, 2016) three coats of E-las-tek 129 PolyTek Pro elastomeric coating formulated for harsh desert weather conditions. www.elastek.com This product has acrylic polymers which perform well in this climate. It is also designed for application of the Aquatic Center's low pitch roofing.

Some issues found on the low pitch roof include:

- The north and south blocks of the complex with low pith roofs and the solar water heater system have not been recoated and are next in line. This work should not be put off. The last application of the elastomeric coating was applied when the solar water heaters were installed. (+/- 5 years ago) The application did not fully cover the roof features such as the inside parapet walls.
- In the areas where the parapet sheathing was not coated there is some damage to the sheathing material.
- There are several components of the solar water heating system that are questionable such as solar deteriorated PVC piping, rusting 55 gallon drums, and leaking fittings. May need an overhaul.
- As mentions in the building wall section, the parapet waterproofing membrane is stressed in two locations. The source needs to be identified and repaired. Then the waterproofing membrane reinstalled.
- There are several storage crates on the roof that are not sitting on sleepers and are blockading water flow. These need to be removed from the roof or at least raised on sleepers that allow full transmission of water past them.
- There are areas of deteriorated sealant along the termination bar that need to be re-caulked.
- There are points of water infiltration at lap of mineral cap sheets where elastomeric coating did not seal the joint and needs to be reapplied
- There is a movement crack in the masonry wall following the masonry mortar joints running vertically that needs to be sealed
- Break metal needs to be added to the joint between the parapet flashing and the termination bar – photo 3

- Splicing plates at corner joints were not visually apparent. A parapet corner cap is a point a water infiltration and needs to be encapsulated with a new prefabricated corner set in a bed of sealant
- The elastomeric top recoat should encapsulate vent pipe penetration and a bug/varmint cap should be provided
- Tree overgrowth could damage parapet flashing and needs to be trimmed back
- Some elastomeric coating at parapet cap is not sealed and needs to be repaired
- Some stucco is cracked and a point a water infiltration. Remove loose stucco, trowel on new brown coat and paint to match
- The vertical joints between masonry wall and stucco wall needs to be caulked
- No emergency drain or scupper is present at first roof drain

- "J" boxes are installed horizontal with face plate facing up and needs to be reinstalled vertically with the face plate facing to the side
- The point loads at the exterior duct supports appear to have created a depression where water will accumulate on the roof. Possible solution would be to support the duct off the adjacent wall
- Mineral cap sheet and elastomeric coating has bubbled up and needs to cut, patched and recoated
- PVC pipes/conduit needs to be secured to the wall at top and bottom
- Some cap flashing appears to have been damaged and needs to be replaced
- The ozone vent piping should be removed completely.
- There is a shut off valve of unknown purpose on the roof that is a residential valve and not rated for exterior use. Need to replace with a commercial valve and one rated for exterior use
- There is a large diameter PVC vent pipe on the roof that is deteriorating in the sun. It needs to be replaced with an exterior rated assembly.
- A PVC pipe of unknown purpose is running through the roof hatch and hanging loose. This pipe if needed should be relocated around the roof hatch and out of the way of people using the roof hatch.
- Roof hatch needs to have a pop up safety post to OSHA requirements
- Roof top outlets need to be a GFI outlet
- Up and over roof ladders need to have cages to meet OSHA requirements.

**Existing Condition: High Pitched Roof**

The high pitched roofs appear to be the original roofing with no sign of any repair or replacement. It appears ventilation fans were added to the high pitched roof over the water slide.

Some issues with the Metal high pitched roof:

Mostly these roofs are in good condition. However, there is evidence of roof leaking in the pitched roof over the water slide. It appears some ventilation ports were installed after the building was opened and there may be a leak coming from that installation. This leak should be investigated and repaired. The drywall ceiling in that area will need to be repaired as well. There is evidence that mold is growing there.

**Recommendation:**

The center low-pitch roof was re-coated. The other areas of low-pitch roofing require recoating. Indeed, the city staff stated that they were going to apply the same material to the other areas over the next few months.

Many of the issues listed above can be completed by routine maintenance and city staff over time. The roof is sound and can serve the facility for many more years with proper and constant routine maintenance and recoating at durations recommended by the coating manufacturer.

# Building Interiors

## Room Name: Viewing Area

**Existing Condition:**
The Viewing area presents a special condition that in its current configuration is in violation to the AAC. The public can enter the viewing area through two sets of double doors from the exterior of the building without going through a control point (lobby-receptionist). Because of this configuration, that space cannot be considered a part of the pool deck. It must be separated from the pools by a compliant "Barrier" (see excerpt from the AAC in the Site Section above.

It appears there was an attempt to create that required barrier with a three-foot-high guardrail partially mounted on a one-foot-high concrete and tiled curb with self-closing gates. This is a non-compliance barrier.

**Recommendation:**
Prevent any public from entering this viewing area from the exterior and only allow the public to enter it after passing the control point and only when there are the proper number of lifeguards on duty.

Rebuild the barrier between the Viewing area and the Pool area with a compliant barrier.

## Room Name: Locker Rooms

**Description:**
It should be noted that access to the locker rooms is made by the receptionist buzzing open the door for access by approved public users. It is important to note that this process is essential to the safety of the public as this allows the staff to control entry to the pool to only times when lifeguards are on duty.

It should also be noted that it was reported that the public sometimes are allowed in and out of the pool area through the two roll-up doors to the parking lot northeast of the building. If that is the case this practice should be stopped and access by the public should only be allowed through the controlled access locker rooms.

**Existing Condition:**
The locker rooms (showers, lockers, restrooms) are in fair condition but are very dated. Locker room shave evolved significantly since this facility opened. Some of the evolution has occurred due to the Americans with Disabilities Act and others based upon the public's privacy expectations in these types of environments.

Placement of the lavatory pedestals do not allow the 15" clear from the center of the fixture to an adjacent obstacle (this case the pedestal) that is required by Americans with disability act. Also the trap guard wraps are missing – photo 68

The ADA shower doesn't not have a hand sprayer and transfer bench that is required for a standard roll-in-type shower compartment – photo 69

Mirrors from a locker room into a pool area need to polished stainless steel or non-breakable. The mirrors do not comply

ADA turning radius is not provided in water closet and urinal alcove

Gang showers do not provide any level of privacy for users.

AAC R18-5-241B - Public Swimming Pools; Bathhouses and Dressing Rooms - All entrances to and exits from the dressing rooms shall be effectively screened to interrupt the line of sight of persons outside the dressing rooms. The Family Locker Room showers are directly visible from the pool area.


AAC - R18-5-241F - Public Swimming Pools; Bathhouses and Dressing Rooms - An adequate number of hose bibs shall be provided for washing down the dressing room or bathhouse interior. No hose bibs were visible in the locker rooms.

**Recommendation:**
If any major work is done on the building all locker rooms and restrooms will be required to be brought up to current ADA codes.

These Locker rooms should be completely redesigned and renovated to enhance the viability of this aquatic center. The locker rooms are the main entry point to the pool by the public. The experience of the patrons is shaped by the quality of the locker rooms. At the very least the locker rooms should be brought up to ADA design standards.

## Room Name: Staff/First Aid/Pool Manager/Storage Areas

**Existing Condition:**
It may be that there is such little space dedicated to storage at this facility that the Staff/First Aid Room has become a catch all for a variety of functions. But one of the primary functions must be First Aid. The Staff/First Aid Room does not have enough space dedicated to allow for a person in need of first aid to be treated.

It has really become an aquatic staff touch down space which is essential especially with the window out to the pool providing good visual perspective of the pool area.

The pool manager's office is a good size and in a perfect location.

Storage is in short supply at this facility, the numerous pieces of equipment, wheelchairs, life vests, water toys, and supplies have overwhelmed the available storage space. This includes storage on the pool deck. Staff keeps these areas clear for view to the pool but this is not optimal. This has resulted in every nook and cranny of the facility being used for storage.

**Recommendation:**
The facility could use a large area dedicated to organized storage to free up much of the clutter that exists especially in these areas.

A dedicated first aid station/room should be developed in any changes or modifications to the Aquatic Center.

## Room Name: Pool Room

**Description:**
The Aquatic Center has as its main feature a large indoor wave pool with a beach entry. There are water play features at one end and the wave wall at the other. A floating bulkhead allows for competition swimming at the deeper end.

There is a whirlpool and soaking pool adjacent to the main pool also indoors. There is a good sized waterslide in this space that has and indoor/outdoor travel.

The pools are the main attraction of the center. The wave making ability, indoor/outdoor water slide and floating bulkhead are unique features that lend to the attraction of the facility. These features should be maintained at the highest level.

The center has seen good success in their "party zone" program where they host for a fee, parties centered around the aquatic facilities. We believe the City is only scratching the surface of the center's potential.

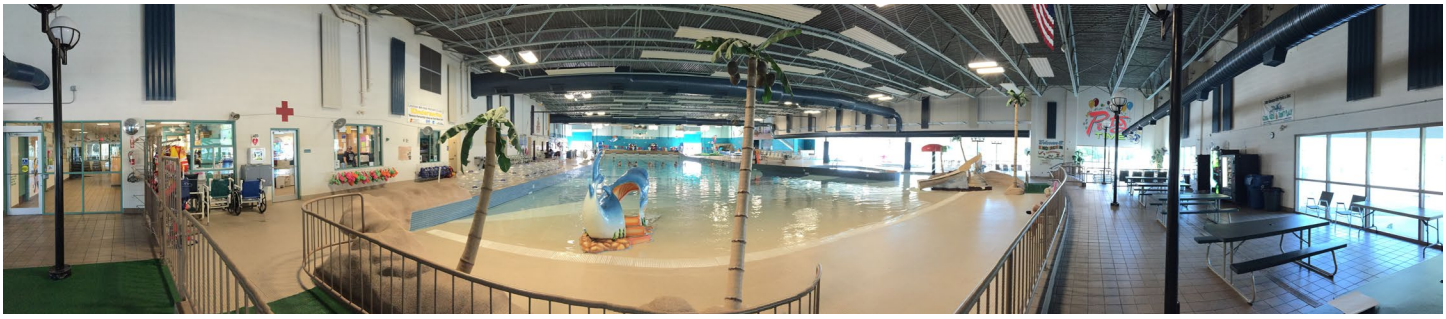
The current party set-ups are merely flagged off areas with tables and chairs where patrons center their party activities. There is potential is to create party rooms with the support facilities (counter, sinks, refrigerators, Audio/Visual Systems, lighting, etc) that open up to the aquatic features.

**Existing Condition:**
See the Aquatic Facility section of this report for the pool conditions and recommendations.

The pool deck is completely covered in ceramic, mosaic tiles. This was a major investment from the start and was meant to last a long time. These are original and the staff has been keeping up with maintenance, repair and replacement on a routine basis. They are doing a great job as there is little evidence of broken, damaged or cracked tiles throughout. As long as that tile is available, the deck should last many more years.

**Issues:**

- The elevated deck over the wave making equipment at the deep end of the pool is two feet higher than the remainder of the pool deck. It is only accessed via stairs on either end.
- AAC R18-5-217B Decks and Deck Equipment - The minimum **continuous unobstructed deck width**, including the coping, shall be 10 feet for a public swimming pool. The portion of the deck behind the starting blocks is a raised non ADA accessible platform. Aside from building a ramp on both sides of the raised platform there is not much more that can be done.
- AAC R18-5-217H - Decks and Deck Equipment - Hose bibs shall be provided along the perimeter of the deck so that all parts of the deck may be washed down. At a minimum, each hose bib shall be protected against back siphonage with an atmospheric vacuum breaker. The Department may approve quick disconnect style hose bibs. There are no visible hose bibs around the perimeter of the pool.



- E-stops need to be visible and easily accessible to shut down. E-stops were difficult to find and not accessible to shut down
- E-stops need to be easily accessible to shut down at the top and bottom of the water slide. E-stops were higher than 48" A.F.F. and not the easily accessible to shut down push button type.
- Stair landing leading to the water slide is higher than 12'-0" A.F.F.; No action, existing condition.
- Area under the water slide should be fenced off to prevent people from getting under it.
- Stair landings and the top and bottom of the stairs both to the waterslide and the equipment room need to have 2" texture and color contrast.
- Stairs to the waterslide are concrete and allow water to accumulate making them a slip hazard.
- There needs to be a lifeguard at the top and bottom of the waterslide
- There is a non-weather tight breaker box directly under a wet pipe in the equipment room.
- Railing in the equipment room does not meet current ADA and code standards for height and run at the top and bottom of the stairs
- Outlet covers and uni-strut clamps are rusting in the Acid room
- Eyewash station in the Acid room should be moved outside the room. Also the door closer should be on the exterior side of the door. Ceiling to wall should be caulked to prevent acid fumes from deteriorating the structure above
- Pool equipment room has no exhaust
- Doors from the pool deck (both interior and exterior) did not have panic hardware. Also exit signs directing people to the exits were not visible.

## Room Name: Administration Offices

**Description:**
It appears this area has been slightly modified from the original purpose. The Storage Room has become a server room as well. The original multi-purpose room has been converted to an office for up to three staff members and a small conference area. Access to that room occurs by the conversion of an office into a corridor.

**Existing Conditions:**
The Administrative offices take prime real estate in the Aquatic Center. It is central to the entry and both facilities, and creates a visual blockade at the critical entry. People entering the facility are presented with an awkward and visually unappealing assemblage of building components.

**Recommendations:**
A new fresh design for this portion of the Aquatic Center back to and including the Multi-Purpose Room #128 and around to the splash pads is **highly encouraged**. This will give the opportunity to create new and vastly improved:

- A new grander and more identifiable entry
- Locker Rooms
- Control Point entry
- First Aid Station
- Lifeguard Touchdown Space/Pool Manager
- Multi-purpose Rooms w/catering kitchen
- Viewing Area
- Party Rooms (adjacent to catering kitchen)
- Administration Offices

## Building Name: Community Center

**Description:**
The community center portion of the facility contains the large multi-purpose room with a small stage, classrooms, storage, a catering kitchen, restrooms and a women's locker room with showers.

**Issues:**
Except as noted below in the Catering Kitchen and the restrooms, this portion of the facility is simple construction and is in good condition. The building is being well maintained and has quality construction. The multi-purpose room is the workhorse for the community and fortunately is in very good condition.

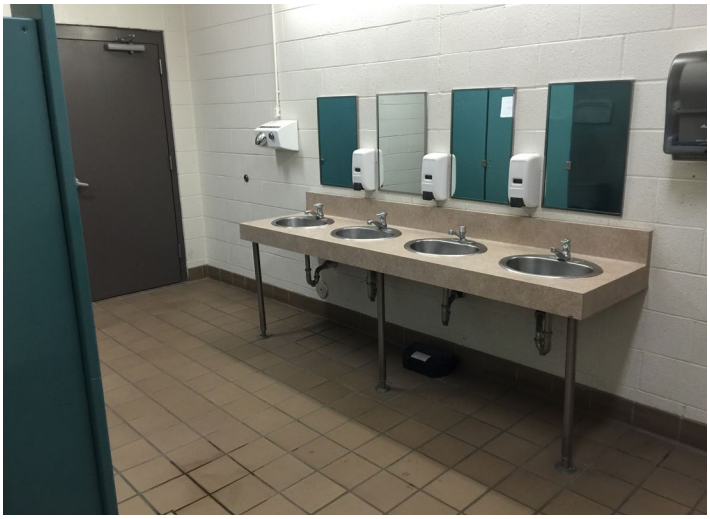
There is an unconditioned storage room that was added to the building outside the northwest wall of the multi-purpose room. That room is not tightly sealed from the exterior environment and there is evidence of insect infestation. It appears the room was built directly over the driveway paving but appears to be serving its purpose for the city well.

## Room Name: Community Center Restrooms (Men's Room only observed; Women's assumed)

**Description:**
The men's restroom for the Community Center has been modified from its original construction. Waterless urinals have replaced the originals. And the locker room has been converted to storage space. It was reported that the Women's restroom has not been modified and still retains its lockers and showers.

**Issues:**
Both restroom would need to be brought up to current ADA Compliant design standards.

It may be an inconvenience for those who need to shower or use the lockers after a basketball game in the Multi-Purpose Room to have to go into the Aquatic Center to use the locker rooms there. Additionally, a person who needs to use the showers/lockers in the Aquatic Center can only do so if there is the proper number of lifeguards on duty. Meaning if there is a basketball game in the multi-purpose room when the pool is closed/no lifeguards present the Aquatic Center Lockers cannot be used.



## Room Name: Catering Kitchen

**Description:**
It appears this room has been modified from the original construction. The original Mini-Serving Area and two storage rooms were converted to a Catering Kitchen and storage room.

The kitchen contains a commercial grade double gas range and a commercial rated hood, rolling commercial grade refrigerators and freezers, stainless steel (SS) vegetable sink, hand sink and three compartment sink (w/ drainboards), reverse osmosis water system, 7 SS preparation tables, 3 microwave ovens, and a floor mounted grease trap. There is a counter height roll-up door above a SS counter for food service into the multi-purpose room. That door has a fusible link activator due to the wall rating between rooms.

The wall surfaces are FRP panels in good condition. The ceiling is a washable acoustic tile also in good condition. The floor has been stripped of any floor tile and there is evidence the floor was partially removed and replaced presumably to install underground plumbing. After the floor was replaced the concrete surface was sealed with Eagle Rustic Acid Stain, Glaze and Seal Penetrating Sealer, Poly Seal 650VOC Hi-Gloss and then Glaze and Seal Floor Polish. It was reported that this application and use in this room type was approved by the Mohave Health Department. It was also reported that this floor is waxed and buffed once a month.

The storage room contains a walk in beer cooler with taps installed through the wall to the multi-purpose room.

**Issues:**
All of the kitchen equipment appeared to be relatively new and in good condition.

- The floor mounted grease trap is not plumbed properly and is causing sewer gas to escape into the kitchen. This assembly needs to be reviewed by a qualified plumbing contractor and revised for proper installation.
- Regardless of the approval by the Mohave County Health Department in our professional opinion, all floor coverings in food preparation, food storage, utensil-washing areas and walk-in refrigeration units must be smooth, non-absorbent, easily cleanable and durable. Continuous sealed concrete is an acceptable finish material; however, existing concrete slab is not continuous and has many saw cut joints that were not sealed correctly and do not meet the Arizona Administrative code requirements. Also the floor has a tackiness to it which makes it difficult to keep clean. The constant waxing may be leaving a residue build-up.
- Additionally, there must be coving at base junctures that is compatible with both wall and floor coverings. The coving should provide at least 1/4-inch radius and 4" in height. We recommend an epoxy flooring be installed on the floor and base.
- Food preparation area floors should be sloped to a floor drain at least 1/8" per foot in areas where pressure spray methods for cleaning equipment are used. Existing slab is flat. This will be difficult to achieve.
- All walk-in refrigeration units should be installed in accordance with the manufacturers' installation requirements. The walk-in unit has many holes and alterations that expose the construct of the walk-in unit walls and do not meet the manufacturer requirements. Additionally, all walk-in refrigeration units are required to have easily cleanable surfaces
- The hand wash sink does not provide the 15" clear from the center of the fixture to an adjacent obstacle (this case the wall) as required by Americans with Disability Act. Additionally, its ADA trap guard wrap is missing

# Mechanical Systems

## Descriptions of Existing Mechanical Systems

### Temperature Controls

1. The facility uses a direct digital controls (DDC) system which operates on the Delta Controls platform. The controls vendor is Arizona Controls Specialists Inc. This system manages the following building systems:
   A. Space temperature controls,
   B. HVAC Systems (i.e. Rooftop air conditioning and heat pump units, exhaust fans, 100% outside air heating and ventilating units, etc.),
   C. The heating hot water (boiler) system,
   D. And the solar thermal system.
2. This DDC system allows the controlled systems to be managed through a central building automation system. When controlled well, DDC systems can improve building efficiency, assist in trouble shooting problems, and identify systems which have failed or are about to fail. Based on observations and conversations with the facility personnel, the DDC system is not controlling some systems correctly. Those items are listed in the subsequent mechanical system descriptions.

### Natatorium (Pool) HVAC

1. Pool Air Handling Units – Two air handling units serve the pool area. The units are intended to circulate air in the pool area, introduce outside air for ventilation, and provide space heating. These units do not provide cooling or dehumidification of the pool room air.
   A. The unit which serves the west half of the pool area is comprised of two separate sections: a return fan section and a supply fan section. Each is manufactured by Engineered Air and manufactured in September of 2012. These sections are connected with large ductwork that appears to be original to the facility.


*Supply section of West Pool AHU.*

I. The supply fan section is sized for 31,000 cfm of supply air. This section also contains filters upstream of the fan, and a natural gas heater downstream of the fan. The heater provides up to 1,230,000 BTU/hr of heating. The supply fan speed may vary speed and flow with a variable frequency drive (VFD) based on space ventilating and heating demands. This section appears to be in good working condition.

II. The return fan section is sized for 24,800 cfm. This section also acts as a return and outside air mixing section which varies the amount of outside air that is introduced from this unit. The return fan is also controlled by VFD. HEI observed a few problems for this section:
   a. The return fan was not operating at the time of the observation, and the fan wheel was spinning in the opposite direction. In this type of air handling unit configuration, the return fan should operate while the supply fan operates. The return fan was likely spinning in reverse because the supply fan is drawing air through it. If the return fan is spinning in reverse when it is sent a start command, this could create unwanted stress on the return fan motor, or it could cause the return fan to operate in the reverse direction. In either case, this must be corrected.

b. There were small amounts of corrosion collecting on the fan and surfaces. Rust should be removed, then the surfaces should be repainted or treated to prevent further corrosion.

c. The control cabinet contains a fan and a small inlet damper to maintain the cabinet temperature. The fan was operating, but the damper was not operating. Two potential issues may come from this. First, the fan motor may burnout because there is not a means to introduce air into the cabinet. Second, if the cabinet is not sufficiently ventilated, the temperature could become hot enough for digital controllers and the VFD to fail.

I. The supply fan section is a modular Trane Climate Changer Air Handling Unit. Performance information was not listed, and design plans were not available from the city. In addition to the supply fan, the unit also has a filters, a hot water coil which is connected to the solar thermal system, and a supply discharge box with exhaust and supply isolation dampers. HEI observed a few problems with this unit:

a. The seams and seals where the AHU modular sections mate are deteriorating and creating small gaps in the unit. This causes unwanted air leakage and it allows precipitation to enter the equipment. Evidence of water entry was visible on the unit floor. HEI recommends replacing the seals.

*Return section of west Pool AHU*

*Damaged Trane AHU seals.*

B. The unit which serves the east half of the pool area is comprised of two separate sections: a return section and a supply fan section. The return section is manufactured by Engineered Air and it appears to be original to the facility. The supply fan section manufacture date is not listed, but it is presumed to be installed at the same time as the solar thermal system (between 2010 and 2012). These sections are connected with large ductwork that appears to be original to the facility.

b. The angle brackets which support the fan at its base are excessively rusted and should be replaced with a metal which is resistant to the corrosion caused by chlorine and moisture. Most of the unit interior is in good condition with exception to these supports.

*Fan angle bracket with significant corrosion.*

c. The supply fan discharges into a section which contains supply and exhaust isolation dampers. It is atypical to use an exhaust discharge at the supply of an air handling unit. According to the facility personnel and Ameresco, this feature is intended to reject heat from the solar thermal system when its water temperature becomes too high. However, when this sequence commences, the supply fan does not start, then the solar thermal system overheats.

II. The return fan section is in poor shape.
   a. Corrosion is abundant in the unit.
   b. The outside air and return air dampers are damaged and rusted in place, as a result this unit cannot introduce outside air to the pool room. The damper actuator is original to the unit and is not functional. The dampers and actuator must be completely replaced.

*Supply section of East AHU with supply (right) and exhaust (center) discharge dampers.*

*Damaged outside air and return air dampers.*

c. The return fan has been removed. Further review, and possibly testing, is required to determine if this is truly a problem. If the supply fan is adequately sized to meet the return and supply air pressures, then the return fan is not needed.

*Empty space in AHU where the return fan is missing.*

III. The supply and return sections are connected with large ductwork. This ductwork appears to be original to the facility. The ductwork has lined insulation that is severely degraded. There also appears to be an unknown growth (i.e. mold, bacteria, etc.) on the duct liner. This ductwork should be replaced with aluminum ducts approved for use in natatorium applications. Rather than duct liner, exterior insulation with a weather-proof wrap or cladding should be installed.

*Damaged liner in ducts connecting the return and supply sections of the East Pool AHU.*

2. Wall Propeller Fans and Intakes

A. The upper portions of the east and west walls are lined with (5) operable outside air intakes and (5) wall-mounted propeller exhaust fans, respectively. These fans operate via individual manual control. When a fan is started, a corresponding outside air intake opens. The building operators start fans as they deem necessary to maintain space temperature and humidity levels. The fans do not appear to be monitored or controlled by the DDC system.

*(2) Wall propeller fans within the natatorium.*

3. Additional Pool HVAC Notes

A. The intended controls for the pool air handling units is not clear.

I. In heating mode, it appears that equipment stages to maintain the space temperature. The east unit appears that it can only provide hot air when there is sufficient hot water available from the solar thermal system.

II. There does not appear to be an automatic control method to reduce space humidity.

III. During the summer, the air handlers likely should provide 100% outside air to maintain space temperature and humidity levels. However, this cannot occur because of the damage to the east air handling unit's outside air and return air dampers.

B. There is not an automatically controlled means for building relief when the air handling units provide 100% outside air. If the wall propeller fans are on and the outside air intakes are open, then the relief air occurs through these devices. If the large natatorium doors are open, then the relief will also occur through these openings. Otherwise, the natatorium does not have a means for relief air.

*Solar thermal heating system above the natatorium.*

*Relief tank (left) with PVC piping installed in tank, and relief valve (right) which was recently replaced.*

**Solar Thermal Heating Hot Water**

1. The facility uses several arrays of solar thermal collectors to heat a water-glycol solution. This solution can heat the natatorium air, pool systems, and a heating hot water system. (The heating hot water system provides heat to the domestic hot water system and other pool heat exchangers.) This system is controlled by the DDC system. Two pumps circulate water through the solar arrays, then through the air, pool, and heating hot water systems. For the east pool air handling unit, the solar thermal loop is piped directly through the unit's coil. For the pool and domestic heating hot water systems, heat is transferred from the solar loop with plate-and-frame heat exchangers. The solar thermal equipment appears to be in good shape with some exceptions.
2. Due to the overheating of the solar thermal system, as listed in the Pool HVAC Systems descriptions, relief valves regularly discharge and must be replaced. Also, the frequency of the overheating drove the facility personnel to install PVC piping to direct the water overflow (due to volumetric expansion) down to tanks in the main mechanical room. (The water-glycol solution must be reclaimed due to the glycol content.)
3. The solar thermal system controls sequences do not allow simultaneous heating of the air and water systems.
4. The solar thermal system is piped in parallel with the boiler(s) of the heating hot water system. This prevents the solar thermal system from heating the hot water loop at the same time as the boiler. This arrangement limits the utilization of the solar thermal system.
5. The solar thermal system does not have a thermal storage tank. This significantly reduces the amount of energy that may be harnessed from the thermal solar heating system. Much of the facility heating demand occur during the morning, prior to morning swim sessions. Unfortunately, the sun does not provide much solar thermal heating in its morning position. A thermal storage tank would allow heat to be stored during the middle of the day when the building heating demand is much less but the solar heating is higher. The stored heat may be used the next morning when the heating demand is much higher.

*Heating hot water boiler.*

*Empty space for additional boiler.*

**Heating Hot Water (Boiler) System**

1. A heating hot water system provides heating to the main pool, soaker pool, whirl pool, and the domestic hot water system. The system is located in the main mechanical room. There is one boiler, but room for a second boiler. Two parallel pumps operate at constant speed and circulate water through the boilers, (3) plate-and-frame heat exchangers for the pools, and a heating element in a domestic hot water storage tank. Each heat exchanger and heating element uses an automatic 3-way control valve. This system is controlled by the DDC system.
2. The existing boiler is a Laars Mighty Therm Model HH with an output capacity of 2,009,000 BTU/hr. The manufacture date is unknown, but the boiler appears to be very aged. The mean service life for this type of boiler is 24 years.
3. There is a location for a second boiler. The previous boiler was a high-efficiency condensing boiler. This equipment experienced a major failure and needed to be removed. It is HEI's understanding that this boiler pulled its combustion air directly from the mechanical room. The mechanical room was also being used as a storage for pool chemicals. The chemicals in the air were introduced into the boiler. This scenario created an environment for rapid corrosion which caused the condensing boiler failure.

*Parallel heating hot water pumps.*

4. The two parallel pumps provide N+1 redundancy: one pump operates, while the other pump sets in standby in case of a lead pump failure. While these pumps are aged, they appear to be in reasonably good working order.

### Locker Room HVAC

1. The locker rooms are served by an Engineered Air air handling unit that was manufactured in 2012. The unit delivers 4600 cfm of constant 100% outside air and up to 160,000 BTU/hr of natural gas heat output, but it does not have cooling. The unit is in good condition.

*Locker Room AHU.*

2. The air distribution (i.e. ducts and grilles) are exposed in the locker rooms. The ducts and grilles are painted, but corrosion is present on significant portions of the ducts. The ducts and grilles are likely constructed from galvanized steel and plain steel, which are not recommended for natatoriums.

*Rust of locker room duct and grille.*

### Gym HVAC Units

1. Two packaged rooftop air conditioning units (RTU's), CFS-1 and CFS-2, provide heating, cooling, and ventilation the Community Center Gym and surrounding areas. Each RTU is a Trane Voyager unit with 50-tons of nominal cooling capacity and natural gas heaters with 324,000 BTUH/hr of output. Each unit serves half of the gym, and a portion of surrounding areas like storage rooms and the stage.

*West Gym RTU.*

2. According to the city personnel, the manufacturer's controls were removed and replaced with Delta Controls. This is not recommended, and it often voids the warranty of the equipment. Packaged RTU's are generally best controlled by the manufacturer's control packages. This is especially the case for large RTU's with multiple stages of compression like these units. Inefficient operation and equipment failure can occur when the equipment is not controlled exactly as the manufacturer intends. When integrating RTU's with a DDC building automation system (BAS), it is best to maintain the manufacturer's controls in place. HEI recommends that the DDC system should have limited control of the equipment: the enabling and disabling of equipment modes (i.e. heating and cooling modes), the modification of control setpoints (i.e. space air temperatures), and the monitoring of equipment operational status and alarms.
3. Also according to the city personnel, this equipment has experienced numerous failures. These failures are not correctly reported back to the DDC system: the equipment stops functioning while the DDC system indicates that the equipment is functioning as intended.

**General HVAC Units**

1. A 20-ton Trane heat pump RTU, FS-2, provides HVAC to the front offices and lobby of the aquatic center. This unit was manufactured in 2010 and is in good condition.
   A. The cooling coil in the unit is damaged. The fins should be combed.
   B. As HEI understands it from Aquatic Center personnel, this unit's controls were replaced with the Delta Controls system.
   C. A portion of the supply air duct from this unit extends into the natatorium. This duct was originally intended to supply 1500 cfm (approximately 19% of the total supply airflow), but this branch's manual damper has been closed. While it may not be necessary to supply air to the natatorium with this unit, this is a significant portion of airflow and the system should be rebalanced in the remaining areas to ensure the unit maintains its design airflow.
2. A 4-ton Trane heat pump RTU, FS-3, provides HVAC to the Multi-Purpose Room on the Aquatic Center side of the facility. This unit was manufactured in 2010 and is in good condition. As HEI understands it from Aquatic Center personnel, this unit's controls were replaced with the Delta Controls system.
3. A 5-ton Trane heat pump RTU, CFS-3, provides HVAC to the Multi-Purpose Room at the west corner of the Community Center side of the facility. This unit was manufactured in 2010 and is in good condition. As HEI understands it from facility personnel, this unit's controls were replaced with the Delta Controls system.
4. A 10-ton Trane heat pump RTU, CFS-4, provides HVAC to the Community Center Rooms along the main facility corridor. This unit was manufactured in 2010 and is in good condition. As HEI understands it from facility personnel, this unit's controls were replaced with the Delta Controls system.
5. An evaporative cooler was recently added to serve the main mechanical room. The equipment was manufactured in 2015. It cools the mechanical room with 100% outside air which is cooled by evaporated water directly to the airstream.
   A. The water line that feeds this unit has a poor roof penetration. It is likely that water will infiltrate this roof penetration.
   B. The unit is installed too close to an exhaust fan. The evaporative cooler air intake must be 10 feet from all exhaust systems.

*Damaged fins in 20-ton RTU.*

*4-ton RTU.*

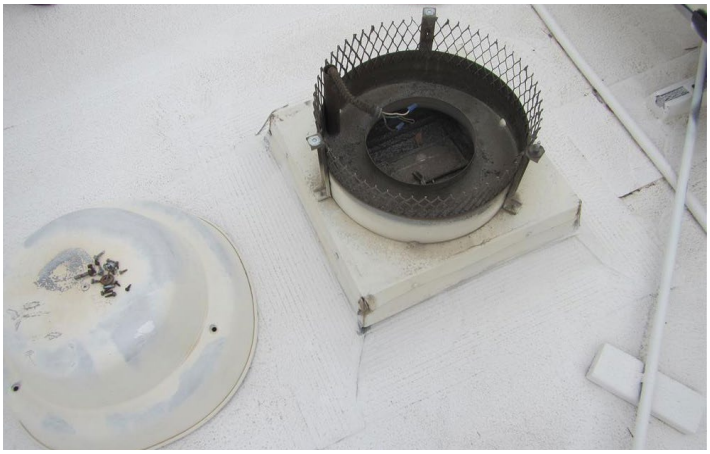
**Kitchen HVAC**

1. The kitchen exhaust fan, grease exhaust duct, makeup air unit, and kitchen hood have been recently replaced. The year is unknown, but it is suspected that the replacement occurred in 2010 with the replacement of RTU's. The grease exhaust ductwork is well supported, but the grease fan is not. The grease fan base is not fixed to the roof, but is weighted-down with two large steel plates.

2. The Walk-In Cooler Condensing unit is very weathered and aged. While the equipment is still operational, budgeting for its replacement should be planned. Also, the refrigerant piping insulation is very weathered and should be replaced.

**General Exhaust Systems**

1. The facility uses several fans for the general exhausting of various areas. Except where noted below, the fans are in good working order.
   A. The fan wheel and motor assembly of the exhaust fan which serves the pool mechanical room have been removed from the fan. According to facility personnel, there is a plan to replace this fan.



*Exhaust fan with missing impeller and motor.*

   B. The exhaust which serves the Chemical Storage Room, used for storing pool chemicals, pulls air from the top of the room, and makeup air enters near the top of the room. Exhaust for this room should occur at the floor and the top of the room to ensure that all chemicals in the air are captured.

*Slide water piping with support system.*

**Other Observed Mechanical Conditions**

1. A Community Center storage room does not have ventilation. This room is located next to the east exterior entrance of the main facility corridor. The odors from the stored materials are obtrusive.
2. At the top slide platform, a wall exhaust fan appears to have been removed. This fan should be replaced.
3. At the top slide platform, a residential ceiling fan was mounted to the ornate light fixture. According to the facility personnel, this area becomes very hot. This fan could be replaced with a larger commercial propeller fan that would increase the comfort of the top slide platform. If a commercial propeller fan is used, it is not recommended to support the fan from the light fixture.
4. The support for the large slide piping in the southeast pool equipment room is very questionable. It is recommended that a structural engineer review the support system and make change recommendations.

## Mechanical System Recommendations

**Retro-commission the Mechanical Systems. It is clear that numerous systems are not operating as intended, and it is likely that there are many other unobserved items not functioning correctly. The retro-commissioning process will vet all mechanical systems, troubleshoot problems, and assign plans for corrective action.**

1. The commissioning agent (CxA) should be hired by Lake Havasu City.
2. The CxA must collect and review all controls sequences for the systems controlled by the Delta Controls DDC BAS.
3. The CxA should make recommendations to improve the controls sequences.
4. Controls sequence improvements must be approved and implemented.
5. The CxA must create a Functional Performance Testing plan to test the controls sequences.
6. As problems are identified, the CxA will address items as they can, and assign actions to responsible contractors and vendors

**The manufacturer's controls for the Trane RTU's should be reinstalled. The Delta DDC system should be updated such that it has limited controls and monitoring of the RTU's.**

**Provide upgrades to the solar thermal system:**

1. Install a thermal storage tank for the solar thermal system.
2. Revise pumping and piping layout to allow the solar thermal system to simultaneously heat the pool air, pool water, and domestic hot water systems.
3. Adjust piping of the solar thermal loop to the heating hot water loop such that it is not piped parallel to the boiler.

**Rust should be removed from HVAC equipment surfaces, then the surfaces should be repainted or treated to prevent further corrosion.**

**Pool Room HVAC**

1. The existing ducts and insulation serving the pool room air handling units should be replaced.
2. The outside air and return dampers of the east unit must be replaced and brought under the control of the DDC.
3. The gaskets of the Trane AHU should be repaired and replaced.
4. The fan brackets should be replaced with corrosion resistant material.
5. The controls logic of the AHU's should be reviewed for outside air control, as it relates to space humidity levels, solar thermal system heating purge, and the return fan operation.
6. The wall-mounted intakes and exhaust fans should be connected to the DDC, and these fans should be controlled based on space conditions and pool room relief air. Manual start switches should be provided so the facility has some direct control over these fans.

**A new boiler should be installed to replace the failed boiler. If this boiler is a condensing type, then the combustion air must be directly piped to the boiler from the outside.**

**The chemicals in the mechanical room should be moved to a chemical storage room.**

**All chemical storage rooms must exhaust near the floor and ceilings of these spaces.**

**Rebalance the FS-2 RTU supply air system.**

**Replace the exhaust fan which serves the pool mechanical room.**

**Replace the locker room ductwork with aluminum ducts and air devices.**

**Add ventilation to the Community Center Storage Room which does not have HVAC.**

**Reinsulate walk-in cooler refrigerant piping.**

# Plumbing Systems

## Description of Existing Plumbing Systems

### Sanitary and Storm

1. Existing sanitary system is all below ground. There have not been reported complaints regarding sanitary backup in the system, however, sewer smell has been a concern in random areas within the facility. Piping within chemical areas are excessively corroded and a few cracks in vent piping was also observed in some areas.
2. Storm piping is all cast iron, installed at the time of the initial construction of the facility. There have been no complaints from the facility staff about storm overflows within the facility, which indicates that the system was sized appropriately and can withstand the existing weather conditions.

*Domestic hot water storage tank*

### Domestic Water Distribution System.

1. Cold Water:
   A. A single 2" meter serves the existing facility. The water meter was recently replaced by the utility provider and it's in great working condition. The existing service entry is within the building mechanical room, there have been no water pressure issues, and hence a booster pump is not on site.
   B. There are no water softeners on the cold water system. Throughout the facility calcification was noticed on the equipment as well as the plumbing fixtures.
2. Hot Water:
   A. A 500 gallon storage tank is located in the existing mechanical room. The tank has a coil which is connected to the heating hot water system for producing the facility domestic hot water. Existing recirculation pump is out of commission and it seems like at one time there were water softeners installed on the domestic hot water system, these are not functioning at the time.

*Domestic water meter and backflow device out on site*

### Natural Gas System

1. Existing natural gas service is adequately sized for the boilers and roof top units and pool heaters. Piping in the mechanical room is corroded due to chemical stored in those areas but there are no signs of leaks.


*Natural gas utility meter and corroded natural gas piping*

### Plumbing Fixtures

1. Existing fixtures are from the original construction. Parts of the facility has updated the urinals to water less. Showers and faucets has sever calcification due to lack of any water conditioning system available.

*Existing fixtures and calcification*

2. Public lavatories are provided with tempered water with a remote located thermostatic mixing valve, valve does not comply with ASSE 1070 certifications per code.

*Lavatory with no TMV and master TMV with no ASSE1070 certification*

**Kitchen**

1. Existing kitchen has only one point of use grease trap serving the three comp sink. Per code all floor sinks in any cooking area need to go to grease waste. Either another point of use grease trap (below slab) is to be installed or an on site grease interceptor shall be installed to correct this code deficiency.

*Floor sink to be routed to grease interceptor, Point of use grease trap*

## Plumbing System Recommendations

**A water softener or a water conditioning system is highly recommended for both domestic hot and cold water systems.**

**Controls for the solar thermal system need to be updated and a solar thermal storage tank is highly recommended to utilize the system to its maximum.**

**Repairs are to be made in piping systems, domestic, gas and sanitary and vent piping, for cracks and corrosion.**

**Kitchen grease waste system needs to be brought up to code with a point of use or an on site grease interceptor.**

**All thermostatic mixing valves to be ASSE 1070 certified per code.**

# Electrical Systems

## General Power Distribution

**Citizen Utility Pad Mount Transformer feeds a 1,600 A. air circuit breaker which feeds the 1,600 A, 480Y/277 V, 3-phase, 4-wire Main Service Entrance Section "M". The transformer seemed to be in a good working condition.**

*Citizen Utility Pad Mount Transformer*

**The 1,600 A, 480Y/277 V, 3-phase, 4-wire Main Service Entrance Section "M" (SES-M) is located outdoors at the North West corner of the pool building. SES-M seemed to be in a good working condition.**

**Main Service Entrance Section "M" feeds Motor Control Center -1 (MCC-1), Motor Control Center -2 (MCC-2), Motor Control Center – Wave Equipment (MCC- Wave Equipment) and (1) 112.5 kVA transformer.**

1. Motor Control Center -1 (MCC-1) is fed with 150A, 480V, 3-phase, 3-wire feeder and is located in the Pool Filtration Room. MCC-1 seemed to be in a good working condition.
2. Motor Control Center -2 (MCC-2) is fed with 150A, 480V, 3-phase, 3-wire feeder and is located in the Pool Equipment Room adjacent to the Soaking Pool. MCC-2 seemed to be in a good working condition.
3. Motor Control Center - Wave Equipment (MCC- Wave Equipment) is fed with 200A, 480V, 3-phase, 3-wire feeder and is located in the Pool Filtration Room. MCC-Wave Equipment seemed to be in a good working condition.
4. The 112.5 kVA stepdown transformer serves a 400 A, 480Y/277 V, 3-phase, 4-wire Distribution Panelboard "PD1"; both are located in the electrical room. Stepdown transformer and Panelboard-PD1 seemed to be in a good working condition.

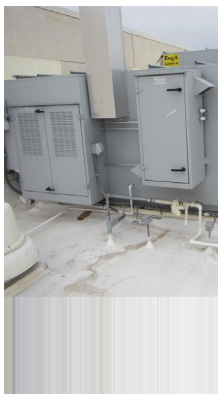
*Main Service Entrance Section "M"*


*Utility meter at main Service Entrance Section "M"*



*Sections at main Service Entrance Section "M"*





*Sections at main Service Entrance Section "M"*

## Stand-by Emergency Distribution

**The Stand-by Emergency Generator manufacturer is "GENERAC" and has the following specifications: 810 kW/1013 kVA, 1,218 A, 480Y/277 V, 3-phase, 4-wire with (1) 800 A circuit breaker. It is located outdoors next to Service Entrance Section "M". The Generator seemed to be in a good working condition.**

**The stand-by generator is connected to the Automatic Transfer Switch (ATS) which is rated for 800Amps, 480 V. It could not be determined in the field what load the ATS was serving or how it was connected to the general power. ATS seemed to be in a good working condition.**


*Automatic Transfer Switch*



*Stand-By Generator*



*Stand-By Generator name Plate and Circuit Breaker*

## Lighting

Spaces throughout the building seemed to be lit well. All light fixtures were upgraded to fluorescent light fixtures by "AMERSCO" between 2010-2012 and they seemed to be in a good working condition.

General lighting level at the pool surface seemed low. A light level reading needs to be done at the water level and at the bottom of the pool to assure proper light levels.

## Receptacles

Receptacles generally seemed to be in a good working condition.

## Electrical Equipment

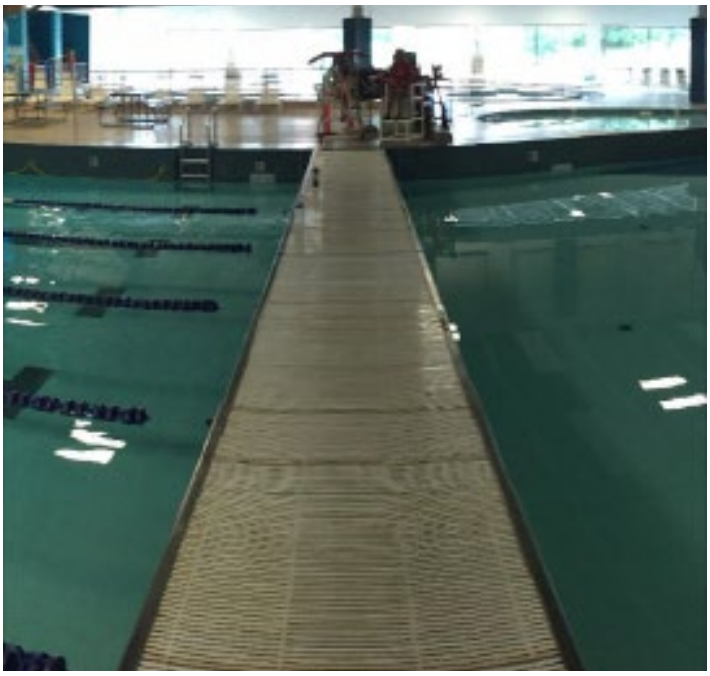
Electrical equipment generally seemed to be in a good working condition.

## Recommendations

General lighting level at the pool surface seemed low. A light level reading needs to be done at the water level and at the bottom of the pool to assure proper light levels.

The Stand-by Emergency Generator was installed on the site after the original building was completed and no records of it was available on site. The power distribution by the Stand-by Emergency Generator needs to be verified and all the components be identified.

# Aquatics Systems Study



*Bulkhead.*

## Bulkhead

**System Description:**

This stainless steel bulkhead is floated out of the floor and pinned into the "up" position when the pool is configured for use as a lap pool. The bulkhead is lowered into the floor when configured for use as a wave pool. The ballast system to raise the bulkhead uses a tank style air compressor. The air is forced into the ballast tank to raise the bulkhead to the "up" position. When raised, the bulkhead is locked into position with four pins (two on each side). This bulkhead is the original equipment from the construction of the pool in the early 90's. This was supplied by Aquatic Development Group in Cohoes, NY (www.aquaticgroup.com).

**System Condition:**

The PVC grate that makes up the top platform has been replaced and repaired as needed over the years.

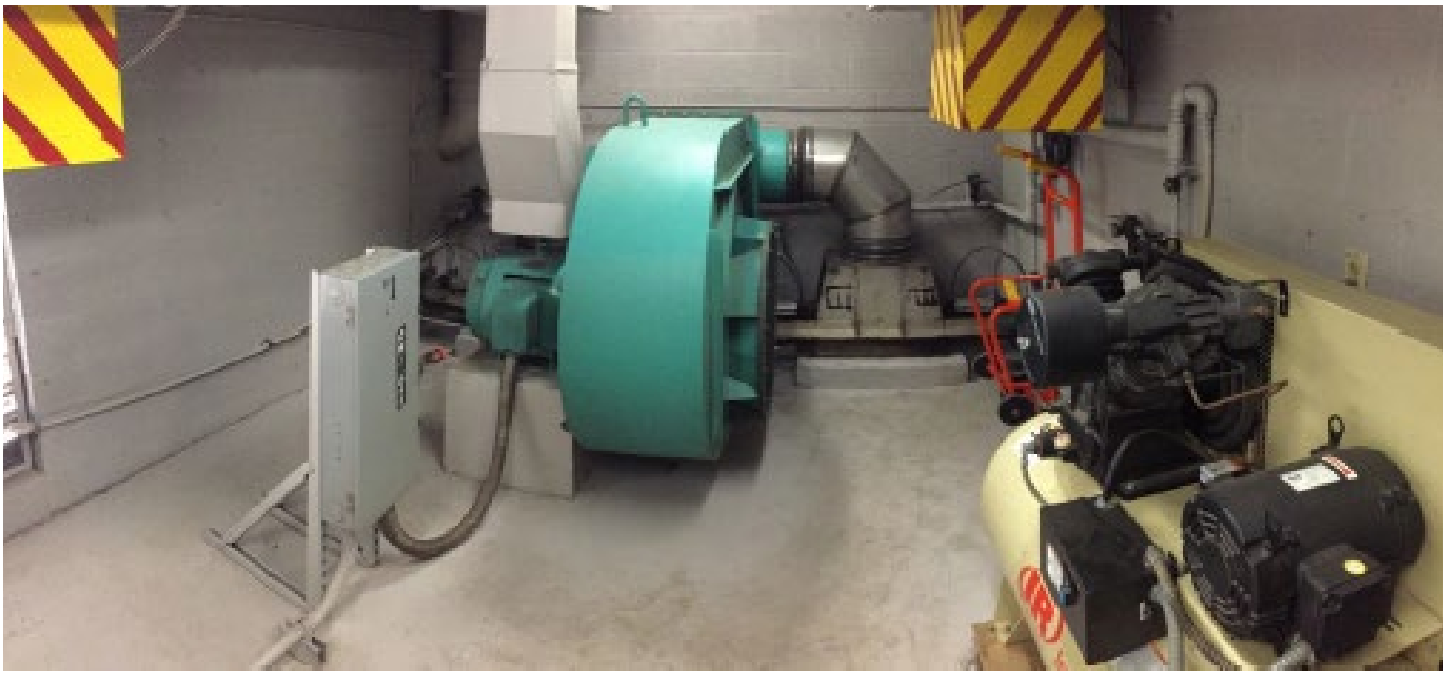
Two of the four pins, on the beach entry side, are not functioning. The bulkhead is being held in place with two pins instead of four pins. The sides of the bulkhead are in good condition. The air compressor that is used to raise and lower the bulkhead is in good condition. The bulkhead is being maintained properly.

**System Recommendation:**

The bulkhead works as intended. We would recommend a service call from the representative of the manufacturer, Aquatic Development Group. The City should budget for a complete change out of the grate/platform on the top of the bulkhead. The cost of this will be in the range of XXXXXXXXXXX for the top grate/platform to be replaced. This will allow the City to start a new life cycle for the bulkhead.

**Long term:**

The bulkhead grate would need to be replaced again in the 10-15 year range.



*Air system for wave machine.*

## Wave Machine

**System Description:**

The wave machine is a two air chamber, single blower wave generating machine. This device creates the wave action in the pool. This wave machine was replaced in XXXXXXXXXXXXXX.

**System condition:**

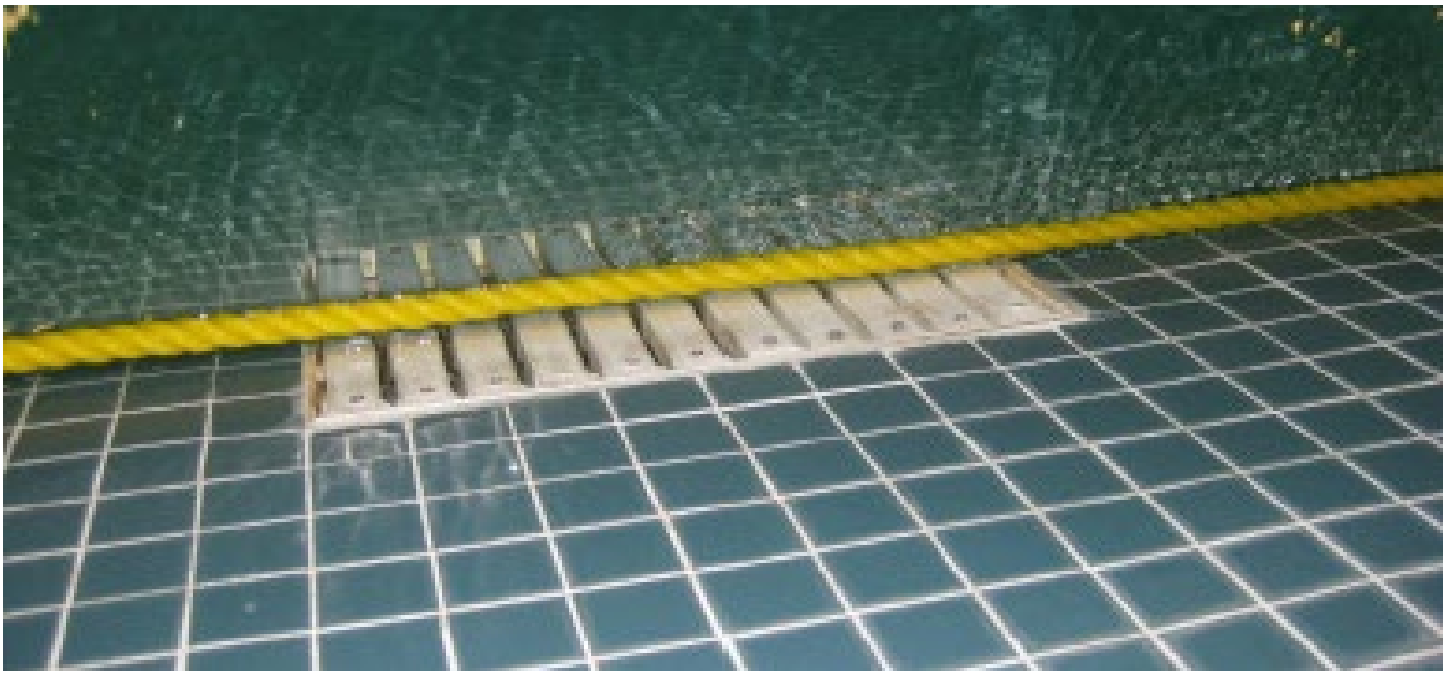
The wave generating device consists of an air blower and it is in above average condition and is working properly. This is installed correctly. This is being maintained properly.

**System recommendation:**

Our recommendation is to follow the maintenance procedures as described by the wave machine manufacturer, Aquatic Development Group. We have no recommended replacement or enhancement for this system.

**Long term:**

Keep the wave machine serviced per the manufacturer's directions. This falls into normal maintenance.



*Air system for wave machine.*

## Interior Coating

**System Description:**

The pool interior is a coating that is placed over the concrete shell of the pool. The function of the coating is both aesthetic and to water proof the shell of the pool. The pool interior is all tiled. This was a good decision for interior coatings.

**System condition:**

The tile has held up well after 25+ years of service. It is evident that the proper maintenance is being done on a continuing basis.

**System recommendation:**

Continue to make minor repairs should some tiles become chipped.

**Long Term:**

The tile should provide many more years of service without major expense.

*Image from 2015 of Ship Wreck Feature (Now Removed).*

## Ship Wreck Feature

**System description:**

The ship wreck feature was originally designed to provide interest to young kids. The original construction included a ship wreck play feature. This was removed and abandoned recently. See image of the area that the ship wreck had been installed. The feature was removed and the water supply line has been buried under the tile deck.

**System recommendation:**

We recommend a new kiddie slide be installed. The slide will need to be properly sized and selected to work with the flowrate available from the water supply line that has been buried below the deck surface. This will need to be properly sized and selected with the attachment details worked out and planned for by a professional aquatic design person. This replacement is not a DIY project.

**Long term:**

Should the City decide to provide a new kiddie slide we can recommend several different vendors that manufacture a variety of similar slide packages. The price range in these selections can cover a wide range from $30,000 to over $100,000.

*Splash Pad in Operation.*

## Splash Pad

**System description:**

The splash pad was added sometime after the original pool construction. The splash pad uses water taken directly from the main pool recirculation system inside the building. The water is then sent outside to the play toy features on the pad. Then the water collects on the surface and runs through a drain to a surge tank, also outdoors, next to the splash pad. Then the water is sent to the main pool surge tank by means of a sump pump.

**System condition:**

The splash pad, when in operation, has standing water that can be up to 4”-6” deep. This is indicative of an underperforming drain system. The drains in the pad should immediately evacuate all the water on the pad.

**System recommendation:**

The trend of all approving agencies is to completely separate the splash pad operation from any other pool system. In the current time we could not permit a project without having a segregated equipment set for the splash pad. The City should consider modifying the splash pad at some point in time to include a separate filtration and chemical treatment system that is not tied in any way to the indoor pool. This equipment set could be placed outside next to the splash pad with a screen wall around it. A properly sized surge tank and drain line would need to be added for this to function properly. Health Department jurisdictions are also mandating a secondary sanitizer be added to splash pad such as ozone or UV sterilizers.

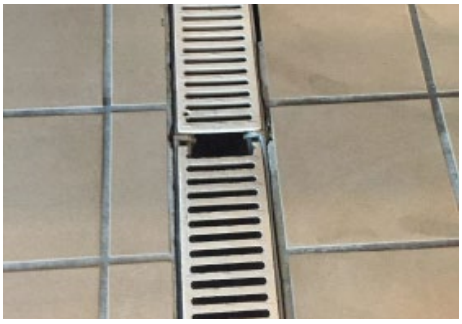
**Long term:**

Consider the re-design for separate equipment and fix the drain and gravity pipe issue at that time to keep water from building up on the pad. The cost for this improvement would range from $20,000 to $30,000. Add to that the addition of ozone or UV for an additional $10,000 to $13,000.

*Discoloration on Tiled Deck.*

*Cork Surface on Artificial Rocks.*

*Rusting Anchor in Floor.*



*Warped Drain Channel Cover.*

## Deck

**System Description:**

The deck is all tiled. This was also a good decision for deck materials. We are including comments on the hand rails and the cork surface coating the artificial rock at the palm trees.

**System condition:**

Some staining is visible in some areas of the deck. A few areas have visible rust. Certain areas have been retiled using a slightly different color grout. Some of the hand rails are mounted in the deck with corrosion evident at the base connection from the rail to the deck anchor. The cover for the existing channel drains are warping and this creates a tripping hazard. The cork surface is in fair shape and areas are delaminating.

**System recommendation:**

We would recommend a professional tile cleaning company be hired to come in and thoroughly clean the entire surface. This should be budgeted for and completed once a year. This would typically cost between .50-.80 cents per sf of deck. This would make it easier for the staff to do the day to day maintenance of the tile surface.

Regarding the ramp rails (see photo) we would recommend the escutcheon plates be replaced, the tile immediately surrounding the rail be removed and a small raised platform be added. This raised platform would be approx. 6" in diameter, raised approx. 1". This would raise the connection point for the anchor/rail above the water that collects on the deck surface. The cover for the existing channel drains should be replaced. The cork should be removed and re-coated with a material call Aquaflex made by Surface America.

**Long term:**

The City should budget a thorough cleaning by a professional floor maintenance company every two years. By raising up the anchor/rail connection will mitigate the buildup of rust on the anchors and escutcheon plates. The City should invite an installer to inspect the cork surface area in order to establish a budget for this work and then you can predict the long term expense of maintaining that new surface.

*Rusted Components of Water Slide Support*

## Slide

**System description:**

The large water slide is configured as an indoor slide with a path that takes the rider outside and back inside to the pool. This Whitewater West Industries water slide was installed with the original construction in the early 90's.

**System condition:**

The slide leaks at a majority of the connection points of the individual flume sections. This leakage is causing deterioration of the support system for the slide, specifically at the yokes and arms that hold the slide together.

The slide has been weathered from the sun and shows considerable wear and deterioration. Temporary repairs have been made over the last several years.

**System recommendation:**

See last year's report from Aqua Design International with specific recommendations for a complete description of the structural issues with the slide. The recommendations have not changed. There is no middle ground in this recommendation. This is a life safety issue. The slide repair must be approached as a total replacement of the fiberglass slide, the yokes and the arm supports per the report. The slide is currently unsafe for use. This could represent liability for the City. No more temporary repairs should be attempted. The slide should be closed until such time that the City provides the level of repair necessary to make this safe.

**Long term:**

The slide will need to be replaced. A new slide will offer a new 20-year duty cycle. The cost of the new slide, with supporting structure is approx. $230,000.

*View of Filter System*


*Main Pool Pump Systems*

## Recirculation System

**System Description:**

The pool has two circulation pumps, with one in use and one as a redundant pump. Each pump is 25hp with a flow rate of approx. 875gpm. The staff runs one pump for a week and then runs the next pump for the next week. The filter system is comprised of two Neptune Benson steel tanks, each featuring 33.2 sf of surface area.

The water passes through the filter and exits to a pipe system that runs to the heat exchanger by-pass and ozone by-pass. The therapy pool and spa each have 10hp pumps and 11.8 sf Neptune sand filters.

**System Condition:**

The pipe system appears to have been replaced along with the pumps at some time, after the original construction. The filters are in good condition. The pumps are in good condition.

**System Recommendations:**

The piping system has water drawn into the head of the pump(s) by two lines, one from the surge tank and one from the main drains. These pipes are joined together with tees, with no control valve between. On the discharge of the pump(s) the water is combined into one line that runs to the filter manifold. The flowmeter forthe main pool is installed in an awkward place. In order for the flow meter to register correctly you would need

4x the pipe diameter downstream and 10x the pipe diameter upstream of the meter. Continue to provide cleaning of the pipe systems, filters. The spa jet pump does not have a 15-minute timer to allow the patron to activate the jets. A 15-minute timer should be added to the spa jet pump.

**Long term:**

Installing a control valve would cost approx. $1,500. For the next 5-10 years the City should budget another $5,000 for ongoing repairs to the pumps and motors.

*Chemical Storage of Chlorine Next to Acid*

## Chemical Treatment Chlorine and pH Control

**System Description:**

The system consists of a liquid chlorine used as the base disinfectant and muriatic acid used for pH control. The chemicals are introduced into the recirculation system by the use of peristaltic chemical pumps. The chemical pumps are controlled by a chemistry controller. The chemical storage tanks are brought in by the bulk supplier. We found a chlorine tank stored, and in use, inside the acid room. This is an extremely dangerous situation. When you mix chlorine and acid it will liberate the chlorine gas. Chlorine gas, if inhaled, will form hypochlorous acid. Hypochlorous acid is a very severe irritant to eyes and nasal passages and lungs, even in small amounts.

**System condition:**

The chemical pumps are in good shape. The chemistry controller is fairly new and is in good shape.

**System recommendation:**

Some crystallization was found on the probes that are part of the chemistry controller. The probes should be inspected and cleaned with a diluted acid once a week. The fire code does not allow for the chlorine tank to be stored next to the acid tank. The fire code calls for a fireproof separation wall that finishes 18" above the top of the tank.

**Long term:**

To build a fireproof separation wall would cost approx. $2,000. In the next five years the probes on the chemistry controller should be replace at a cost of approx. $400.

*Ozone System*

## Ozone

**System description:**

The ozone generator is made by Triogen in Scotland. The ozone generator you own was installed somewhere around 1993. This is currently not in use.

**System condition:**

This system is not in use.

**System recommendation:**

Ozone is an oxidizing gas that is made in your pool equipment room via the ozone generator. Ozone is hundreds of times more powerful and complete than chlorine in oxidizing urea (ammonia) which is responsible for the buildup of chloramines. Chloramines are the source of the odors associated with indoor pools. Ozone gas in water kills all bacteria and viruses and is effective against chlorine resistant microorganisms. Ozone will significantly improve water quality and the air quality for natatoriums.

Ozone is used with chlorine in commercial pools. Chlorine will leave a residual in the pool that can be measured. The chlorine is the insurance policy for the next swimmer that enters the pool. Ozone has a very short life span in solution so you can't rely on the ozone to provide this residual insurance. The work that the chlorine is normally used for is now taken to a much easier level since the ozone has oxidized most of the organics out of the pool. It now takes you far less chlorine to do the job and the chlorine stays in the pool as free available chlorine, which is the active disinfectant that you want.

The City should purchase a new ozone generator, properly sized and designed for this application. We are recommending a unit manufactured by Clearwater Tech in California so you will have access to service and replacement parts.

A UV Sterilizer is effective in inactivating bacteria and viruses. It works by passing the "contaminated" pool water past a lamp that is housed in a stainless steel tube, plumbed into the pool's filter system loop. UV will inactivate pathogenic microorganisms, not outright kill them. The UV will damage the DNA of the bacteria which disrupts the organism's ability to replicate.

UV systems are considered to be bacteriostatic in that it will stop the bacteria from reproducing, but not necessarily killing them. Ozone and chlorine are bactericidal. You can rely on Ozone and Chlorine to kill the bacteria and viruses. On your list of what to consider to offer LHC the biggest "bang for your buck" would be Ozone on the top of the list.

**Long term:**

The City should budget for a replacement ozone generator. This would include a unit for the main pool, the therapy pool and the spa. The unit for the main pool will cost approx. $45,000 to $50,000. The therapy pool unit will cost approx. $18,000 and the spa unit will cost approx. $15,000. This replacement will again enhance the air quality and reduce the amount of chemical expense. The typical breakeven point is approx. 5-6 years.