TOWN OF KILL DEVIL HILLS

Land Where Flight Began

MEMORANDUM August 11, 2014

TO: Mayor and Board of Commissioners

FROM: Shawn R. Murphy, Assistant Town Manager

REF: New Business

1. Eric Davis – Surface 678 – Baum Tract Recreational Development Market Study and Operational Planning (Attached NB-1)

Surface 678 has completed Phase I of the Baum Tract Recreational Development project and it includes site analysis, plan graphics, perspectives, cost estimates, and the marketing report which was provided by ConsultEcon, a partnering firm for this project. Eric Davis, Vice President – Principal, and Robert Pratt – Landscape Architect, both with Surface 678, and Robert Brais of ConsultEcon will make a joint presentation outlining the attached market study and operational planning. They will also explain the details of three possible options for future development. All options include maintaining the existing Kill Devil Hills mulching operations site.

Preliminary cost summaries are also attached for each of the three identified development options.

A PowerPoint presentation will be shown.

Baum Tract Recreational Development

MARKET STUDY AND OPERATIONAL PLANNING

Prepared by:
ConsultEcon, Inc.

Prepared for:
Surface 678
The Town of Kill Devil Hills

July 2014

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Section I
INTRODUCTION AND ASSUMPTIONS

The purpose of this report is to evaluate the market and operational potential for a number of possible land uses on the Baum Tract site in Kill Devil Hills, North Carolina. The property, owned by the Town of Kill Devil Hills, is a 44-acre tract that is accessed via Veterans Drive and is bordered by Buzzard Bay and Collington Creek, the First Flight School Complex, the Bermuda Bay housing development, and Run Hill, a part of Jockey's Ridge State Park. The site has 18.20 acres of wetland and 26.19 acres of uplands.

This report serves to summarize the research, analysis, and findings that contribute to the alternative land use options prepared for the Town by Surface 678. Also included in Section V is the final site planning matrix of potential land use options and planning criteria that informed the site layout options as proposed by the planning team.

The following lists the potential uses for the Baum Tract Site. The uses are broken down into five categories; active recreational uses, which involve significant modification of the site relating to the development of recreational facilities; nature-based uses, which focus on the natural elements of the site; accessory uses, which target a particular audience group in their accompaniment of other site uses; supportive uses, which are necessary and included in all site uses options; and, public works uses, which support the operations of the town's public works department. Several other uses were introduced at the beginning of the planning process, but based on feedback from the Town of Kill Devil Hills during the course of the evaluation and planning process, they were not ultimately included in the site plans.

Active Recreational Uses

- Town Gathering Park / Pavilion / Amphitheater
- Disc Golf Course
- Multi-purpose Sports Field

Nature-based Site Uses

- Boardwalk and Nature Preservation
- Kayak / Canoe Launch

Accessory Uses

- Fenced Dog Park
- Children's Playground
- Camping Facilities for Organized Groups

Supportive Uses

- Restrooms
- Parking
- Snack Bar / Concession Stand

Public Works Uses

- Mulching Operation Facility

Other Uses

- Municipally Owned and Operated Pool
- Vehicle Impound Facility
- Waste Water Treatment Facility and Spray Irrigation Field

Evaluation Criteria

The following lists the factors that are being considered in determining the suitability of the site for the potential uses listed.

- Acreage required / allocated for use
- Infrastructure requirements
- Required adjacencies / compatible uses
- Potential for shared use of space allotted
- Leverages adjacent uses
- Suitability of areas of the site for a particular land use
- Location within the site / potential for phasing
- Target audiences (residents, tourists, events)
- Serves multiple user types and/or seasonality of use

- Presence of regional competitor
- Economic / tourism impacts
- Quality of life / resident impacts
- Difficulty or Ease of permitting particular use
- Potential funding sources
- Volume and timing of vehicular trips
- Parking requirements and shared parking potential
- Earned revenue potential
- Capital costs (order of magnitude)
- Maintenance / Operating Costs (order of magnitude)
- Personnel requirements
- Capital renewal requirements

Assumptions

In preparing this report, the following assumptions were made. This study is qualified in its entirety by these assumptions.

1. The size and design of the recreational facilities on the Baum Tract site in Kill Devil Hills will serve to create a high quality, stimulating facility for both the community and visitors to the Town. The entrances to the site will be highly visible and well signed. Additional land on the site will be used in a manner advantageous to the success of the project.
2. The facility will be competently and effectively managed. Use patterns of the facility will likely be consistent with the recreational and educational value offered. As it is a public park, use of the facilities will likely be free of charge.
3. There will be no physical constraints to impede visitors to the Baum Tract site, such as major construction activity. Changes in economic conditions such as a major recession or major environmental problems that would negatively affect operations and visitation will not occur in the near future.
4. Every reasonable effort has been made in order that the data contained in this study reflect the most accurate and timely information possible and it is believed to be reliable. This study is based on estimates, assumptions and other information developed by ConsultEcon, Inc. its independent research efforts, general knowledge of the industry, and consultations with the client. No responsibility is assumed for inaccuracies in reporting by the client, its agents and representatives, or any other data source used in the preparation of this study. No warranty or representation is made that any of the projected values or results contained in this study will actually be achieved. There will usually be differences between forecasted or projected results and actual results because events and circumstances usually do not occur as expected. Other factors not considered in the study may influence actual results.

5. This report may not be used for any purpose other than that for which it was prepared, to assist the Town of Kill Devil Hills in determining future site use. This report will be presented to third parties in its entirety and no abstracting of the report will be made without first obtaining permission of ConsultEcon, Inc., which consent will not be unreasonably withheld.
6. Neither all nor any part of the contents of this study shall be disseminated to the public through advertising media, news media or any other public means of communication without the prior consent of ConsultEcon, Inc. Such consent will not be unreasonably withheld

Section II
MARKET RESEARCH

This section summarizes the resident market context around the Baum Tract site and the tourist market to Kill Devil Hills and the Outer Banks in general. This section also includes an evaluation of the potential land uses as they relate to local and regional attractions.

RESIDENT MARKET CHARACTERISTICS

The following section reviews the characteristics of the Resident Market for the Kill Devil Hills Baum Tract. The site is being surveyed for use by the town of Kill Devil Hills for potential uses by both residents and tourists to the area. Understanding the demographic profile of the resident market will help determine the most effective uses of the Baum Tract site.

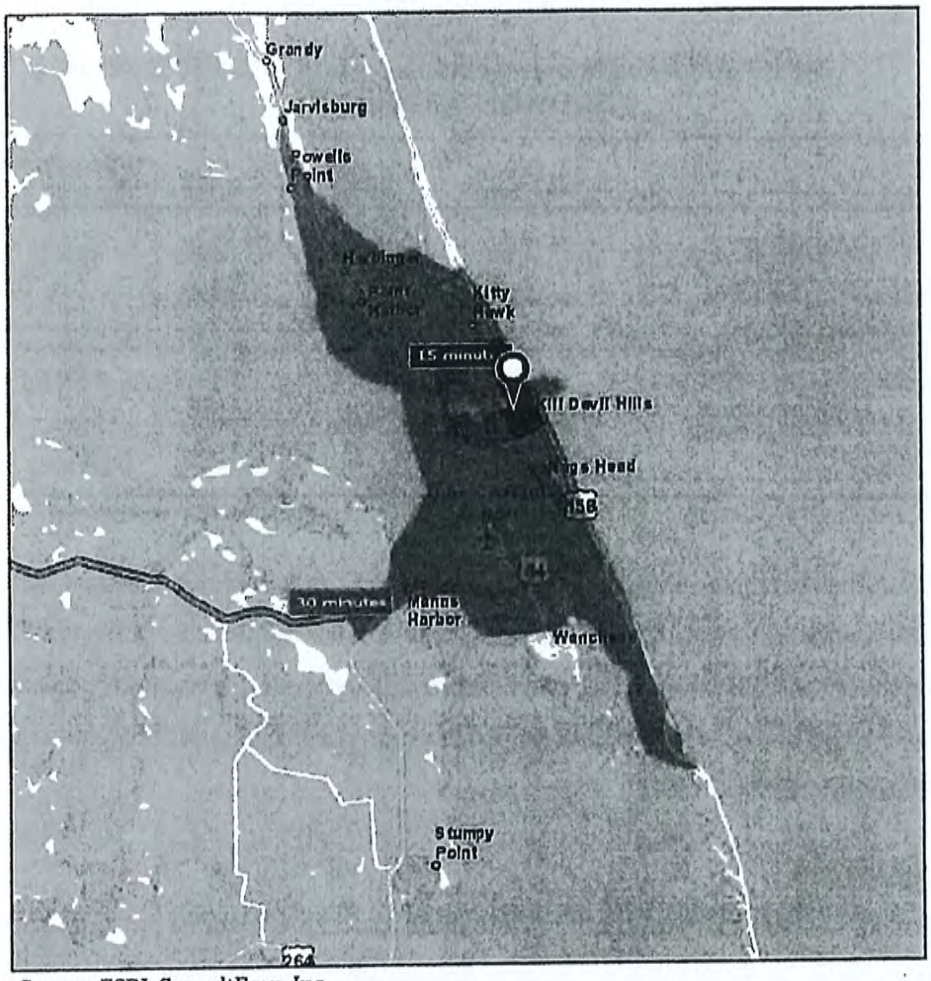
The resident market for any facility that might be developed at the Baum Tract site is defined as the geographic area whose residents would visit and utilize the site or benefit from its operations the most. Resident markets are analyzed within a "gravity model" context; that is, the closer residents live to the site, the more likely they are to utilize it. On its periphery, the resident market changes over to the visitor (or tourist) market. The resident market area is separated into Primary, Secondary, and Tertiary Market Areas. The propensity to visit is highest in the Primary Market Area, and lower in the Secondary and Tertiary Market Areas. Depending on the use of the site, resident market areas can vary in size from less than one mile, to more than 100 miles. Factors that affect the market definition include distance from the site, transportation networks and travel patterns, project type, size and location, natural barriers (topography, rivers, etc.), and location of competitive facilities.

Resident Market Definition

For this analysis, the overall Resident Market Area is defined as the area within a 30-minute drive from the Baum Tract site, which, for calculation and mapping purposes, is located at 198 Veterans Drive in Kill Devil Hills. Within this area, residents would have the greatest proximity to the site, and by extension the greatest knowledge or benefit from facilities developed on the site. The total Resident Market Area is divided into three Market Areas; the

Primary Market Area, which includes the Town of Kill Devil Hills; the Secondary Market Area, which extends from the boundaries of the Town to the 15-minute drive-time from the Baum Tract Site; and the Tertiary Market Area, defined as the area within a 15- to 30-minute drive time from the Baum Tract Site. Data in **Figure II-1** show a map of the Resident Market Area for the Baum Tract Site.

Figure II-1
Map of Resident Market Area
Kill Devil Hills Baum Tract



Source: ESRI, ConsultEcon, Inc.

	Primary Market Area	Town of Kill Devil Hills
	Secondary Market Area	Town Line to 15-minute Drive Time
	Tertiary Market Area	15- to 30-minute Drive Time

Population

Data in **Table II-1** show the estimated population levels and projected growth for the Resident Market Area for the Baum Tract site. The 2013 population, estimated based on the 2010 Census data for the area, is 6,804 residents for the Primary Market Area, while the Secondary Market Area has 9,848 residents, and the Tertiary Market Area has 12,376. In all, the total Resident Market Area has a population of 29,028, and that number is projected to grow by 4.2 percent, to 30,251, by the year 2018.

Table II-1
Resident Market Area Population Trend, 2010, 2013, 2018
Kill Devil Hills Baum Tract

	2010	2013	2018	Percent Change, 2013 to 2018
Primary Market Area	6,683	6,804	7,048	3.6%
Secondary Market Area	9,580	9,848	10,310	4.7%
Tertiary Market Area	12,095	12,376	12,893	4.2%
Total Resident Market Area	**28,358**	**29,028**	**30,251**	**4.2%**
State of North Carolina	***9,535,483***	***9,827,435***	***10,357,934***	***5.4%***
United States	***308,745,538***	***314,467,933***	***325,843,774***	***3.6%***

Source: U.S. Census Bureau, Census 2010 Data; ESRI forecasts for 2013 and 2018; and ConsultEcon, Inc.

The population is projected to grow at a faster rate than the United States as a whole, where the population is projected to grow 3.6 percent, yet slower than the rest of the state of North Carolina, where the population is projected to grow 5.4 percent. The rate of growth is projected to be greatest in the secondary market area, with the population growing 4.7 percent between 2013 and 2018.

Age Profile

The success of possible facility uses for the Baum Tract Site will depend on different characteristics of the Resident Market Area. One of these characteristics is the age profile for the Resident Market Area, as different facilities attract and benefit different age groups. Data in **Table II-2** provide a profile of the age characteristics of the Resident Market Population, as well as the age profile for the State of North Carolina and the United States for comparative purposes.

Table II-2
Resident Market Area Age Profile, 2013
Kill Devil Hills Baum Tract

	Median Age	0 to 17	18 to 24	25 to 34	35 to 54	55 +
Primary Market Area	39.0	19.8%	8.3%	16.1%	31.3%	24.5%
Secondary Market Area	45.6	19.0%	5.7%	10.7%	30.6%	34.0%
Tertiary Market Area	45.3	20.5%	6.3%	10.8%	27.6%	34.8%
Total Resident Market Area	**43.2**	**19.8%**	**6.5%**	**12.0%**	**29.5%**	**32.1%**
State of North Carolina	***37.9***	***23.4%***	***9.8%***	***13.1%***	***27.3%***	***26.4%***
United States	***37.6***	***23.4%***	***9.9%***	***13.5%***	***26.7%***	***26.5%***

Source: ESRI and ConsultEcon, Inc.

The data show that the average median age of the Resident Market Area is significantly higher at 43.2 than in the rest of the State of North Carolina and the United States as a whole, where the median ages are 37.9 and 37.6, respectively. The older age of the resident population is also reflected in the age distribution across the resident market areas. The percentage of residents in the 0-17 age cohort is 19.8 percent in the resident market area, significantly lower than the 23.5 percent in the rest of the state and the country. Correspondingly, 32.1 percent of the Resident Market Area population is in the 55 and older age cohort, which is higher than the 26.4 percent in the State of North Carolina and the 26.5 percent in the United States as a whole.

School Age Children

Considering the proximity of the Baum Tract site to the local schools, it is a distinct possibility that the site will occupy an important place in the market for school age children, or children ages 5 to 17. The number of school children in the Resident Market Area, therefore, will impact the use of the facilities on the site by children and families with children. Data in **Table II-3** show the estimated number of school age children in 2013 and the projected number for 2018 in the Resident Market Area, as well as the estimates for North Carolina and the United States for comparative purposes.

Table II-3
Estimated and Projected Number of School Age Children, 2013, 2018
Kill Devil Hills Baum Tract

	2013 Estimated School-Age Children	2018 Estimated School-Age Children	Percent Change, 2013-2018
Primary Market Area	973	1,002	3.0%
Secondary Market Area	1,392	1,459	4.8%
Tertiary Market Area	1,854	1,974	6.5%
Total Resident Market Area	**4,219**	**4,436**	**5.1%**
State of North Carolina	***1,669,139***	***1,722,121***	***3.2%***
United States	***53,588,838***	***54,172,592***	***1.1%***

Source: ESRI and ConsultEcon, Inc.

The data show that the number of school age children is growing in the Resident Market Area. Between 2013 and 2018, the population of school age children is projected to increase 5.1 percent. This rate of growth is faster than the State of North Carolina, where the population of children is projected to grow 3.2 percent, and the United States as a whole, where the population of children is projected to grow 1.1 percent. In the resident market area, the growth is expected to be greatest in the Tertiary Market Area.

Households

Just as the population of school age children may affect the utilization of the Baum Tract site, so, too, does the number of households in the Resident Market Area. Data in **Table II-4** show the household profile of the Resident Market Area, including the number of households, the number of family households, and the average number of people per household.

Table II-4
Profile of Resident Market Area Households, 2013
Kill Devil Hills Baum Tract

	Estimated Number of Households	Estimated Number of Family Households	Percent of Families to Total Households	Average Household Size
Primary Market Area	2,859	1,620	56.7%	2.38
Secondary Market Area	4,188	2,740	65.4%	2.36
Tertiary Market Area	5,069	3,505	69.1%	2.43
Total Resident Market Area	**12,116**	**7,865**	**64.9%**	**2.37**
State of North Carolina	***3,864,321***	***2,559,819***	***66.2%***	***2.48***
United States	***118,979,182***	***78,699,566***	***66.1%***	***2.58***

Source: ESRI and ConsultEcon, Inc.

The average household size in the Resident Market Area is approximately 2.37 people per household. This is a lower number than in the state of North Carolina, where the average household size is 2.48, and in the United States, where the average household size is 2.58. This suggests that there are smaller or fewer families in the Resident Market Area. This is supported also by the census data, which estimates that approximately 64.9 percent of households are family households, compared to 66.2 percent in the rest of the State and 66.1 percent in the United States as whole.

Income

Higher incomes are frequently associated with higher educational achievement as well as larger amounts of leisure time. As such, the possibility of developing the Baum Tract site for leisure purposes may be affected by the income profile of the Resident Market area. Data in **Table II-5** show the income characteristics of households in the Resident Market Area.

Table II-5
Profile of Resident Market Income, 2013
Kill Devil Hills Baum Tract

	Median Household Income	Less than $25,000	$25,000-$49,999	$50,000-$74,999	$75,000-$99,999	$100,000+
Primary Market Area	$52,033	17.7%	28.0%	31.0%	9.7%	13.6%
Secondary Market Area	$55,217	16.8%	25.2%	24.8%	13.1%	20.1%
Tertiary Market Area	$55,353	17.0%	25.8%	23.8%	12.2%	21.3%
Total Resident Market Area	**$53,473**	**17.1%**	**26.1%**	**25.8%**	**11.9%**	**19.1%**
State of North Carolina	***$53,036***	***27.9%***	***26.6%***	***19.2%***	***10.9%***	***15.3%***
United States	***$51,314***	***24.0%***	***24.6%***	***18.4%***	***11.8%***	***21.2%***

Source: ESRI and ConsultEcon, Inc.

The median household income in the Resident Market Area is estimated at $53,473, which is comparable to the State of North Carolina, where the median household income is approximately $400 less, at $53,036. Both of these values are higher than the United States as a whole, where the median income is estimated at $51,314. Approximately 26.1 percent of the Resident population earns between $25,000 and $49,000 per year, making this the largest income cohort. This is also true of the United States as a whole, where 24.6 percent of the population falls into that segment. The data reflect a fairly wealthy population in the Resident Market Area.

Resident Market Summary

The Resident Market Area is defined as the area within a 30-minute drive from the Baum Tract site in Kill Devil Hills. The Resident Market Area had an estimated population of 29,028 in 2013 and is projected to grow 4.2 percent to 30,251 by 2018. This rate of growth is lower than the State of North Carolina as a whole, but higher than the United States. Demographic characteristics of the Resident Market Area reflect that the population has an older population, a higher percentage of school aged children, a smaller average household size and a higher median income than the State of North Carolina and the United States as a whole.

TOURIST MARKET CHARACTERISTICS

This section discusses the tourism trends in Kill Devil Hills and the Outer Banks of North Carolina. Leisure travelers make up a vast majority of visitors to the Outer Banks and provide a strong market opportunity for proposed visitor-oriented recreational uses proposed for the site in Kill Devil Hills. Within the Outer Banks and Kill Devil Hills, tourist market segments include:

- Overnight visitors staying in private homes and rental accommodations, including:
  - Primarily, those staying nearby in Kill Devil Hills, and
  - Secondarily, those staying in adjacent Towns of Nags Head and Kitty Hawk;
- Day visitors to Kill Devil Hills, including those staying overnight elsewhere on Outer Banks or from inland North Carolina; and,
- Kill Devil Hills pass through visitors.

Information presented in this section is based on data available from the State of North Carolina Division of Tourism, Film & Sports Development and the Outer Banks Visitors Bureau.

State and Coastal Region Travel

Of the 45.5 million person trips to North Carolina in 2012, about 21 percent or 9.5 million occurred in the Coastal Tourism region.[1] Of Coastal Region travelers, the majority – 91.4 percent or 8.7 million trips were for leisure purposes with the remaining 8.6 percent visiting for business purposes. On the whole, visitors to the Coastal Region had longer stays than visitors to the state, spending an average of 3.2 nights in the region compared to 3.0 nights for the State of North Carolina as a whole. Of the Coastal Region travelers on overnight trips, about 39 percent stayed in private homes, 36 percent stayed in hotels or motels, and the remaining 25 percent stayed in other lodgings, such as bed and breakfasts, timeshares, and camping facilities. About 10 percent of visitors stayed in rental homes, compared to about 3 percent in the rest of the state.

[1] The North Carolina Division of Tourism, Film & Sports Development divides the State into three tourism regions: the Coastal, Mountain, and Piedmont regions. The Coastal Region comprises North Carolina's 28 eastern-most counties, including Dare County, in which Kill Devil Hills is located.

Outer Banks Tourism Impact

The Outer Banks (Dare County) is an important driver of tourism impact in Coastal North Carolina. In 2012, there were an estimated $926.3 million in visitor expenditures in Dare County that supported 11,590 employees with $184.2 million in wages and $41.4 million in local tax receipts. Dare County ranked number 4 in visitor expenditures statewide and first among coastal counties.

Outer Banks Visitor Volume

While there are no recent or available scientific estimates of visitor volume to Dare County, Outer Banks Visitor Bureau reports there are an estimated 5 million visitors annually in Dare County, including a mix of day and overnight travelers.

Overnight Accommodations in Dare County

Overnight travelers are primarily staying in rental homes, which account for almost 90 percent of the available supply of overnight accommodations. There are a reported 8,200 rental homes in Dare County that range in size from 2 to 20 bedrooms or more. Travel parties are typically on summer vacation and stay for a week, thus most rental properties are leased by the week. While the exact count of bedrooms and beds in rental homes is unknown, the Outer Banks Visitor Bureau indicates that a reasonable average is 5 rooms per rental home, which would result in a total of 41,000 rooms in rental homes throughout Dare County. There are an additional 3,200 hotel and motel rooms, 1,900 campsites, 200 B&B rooms and 145 Cottage rooms for a total estimated total of 46,445 rooms and campsites, of which approximately 88 percent are located in rental homes.

Overnight Accommodations in Kill Devil Hills and Adjacent Towns

Approximately 70 percent of the rental homes in the county are located in the towns on the Northern Beaches, which encompasses Kill Devil Hills and adjacent towns Nags Head and Kitty Hawk. According to the Outer Banks Visitor Bureau, these three communities contain approximately 3,500 rental homes, including approximately 1,800 in Nags Head, 900 in Kill Devil Hills and 700 in Kitty Hawk.

Over 70 percent of the hotel and motel rooms located in Dare County are located in Kill Devil Hills (1,200 rooms), Nags Head (700 rooms), and Kitty Hawk (300 rooms), based on information available in the Outer Banks Visitor Guide.

Daily Overnight Tourist Population in Kill Devil Hills and Adjacent Towns

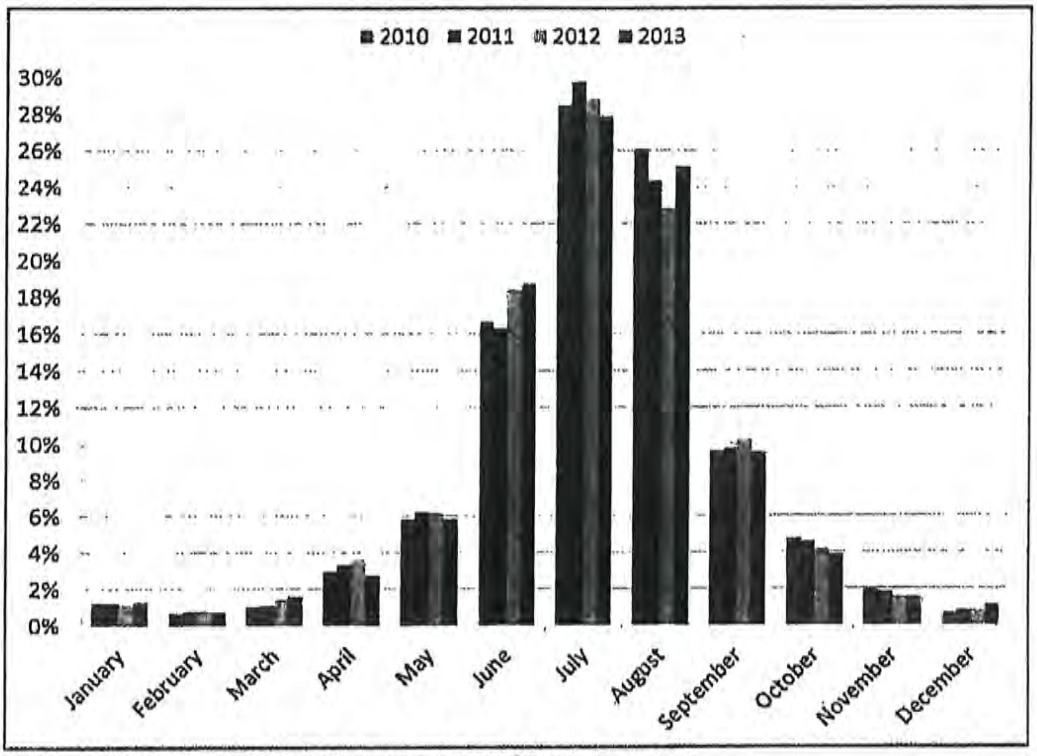
During July and August, the tourist population in Kill Devil Hills far exceeds the local resident population. Based on the inventory of rental homes and hotel and motel units and assuming an average of 2 persons per bedroom/unit, the maximum daily tourist capacity is approximately 11,400 people staying in rental homes and hotels/motels in Kill Devil Hills. Using the same factors, the maximum tourist daily tourist capacity is 19,400 in Nags Head and 7,600 in Kitty Hawk. Full or near full occupancy would be achieved during peak summer weekends and holidays. Given the weeklong stays in the area, weekdays in July and August likely have very high occupancy rates on the order of 90 percent or above.

Occupancy and Meals Tax Trends

Because of the high number of seasonal renters and vacationers, the lodging industry and specifically the available supply of rental homes has long been a major contributor to the Dare County economy and local revenues. Between 2010 and 2013, the occupancy tax increased 11.2 percent from $356.8 million to $396.7 million. In 2013, rental homes accounted for over 81 percent of the occupancy tax collected in the county, followed by hotels and motels at 15 percent, and other accommodations at 3 percent. Between 2010 and 2013, the meal tax, another important source of local revenues, increased 13.9 percent, from $187.7 million in 2010 to $213.8 million in 2013.

The trend in monthly occupancy tax revenue, as shown by data in **Figure II-2**, reflects a highly peaked seasonal pattern of visitation in Dare County during core summer travel and family vacation season when school is not in session. In 2013, approximately 53 percent of occupancy tax revenues were generated in July and August, with June adding 19 percent and September adding 10 percent. Compared to the monthly visitation patterns posted by Dare County regional attractions, as presented in more detail following, the seasonal trend in occupancy tax revenue is more peaked during July and August due to the increase in visitation, the increase in average occupancy rates and the increase in average room rates.

Figure II-2
Monthly Trend in Occupancy Tax Revenue
Dare County



Source: Outer Banks Visitor Bureau and ConsultEcon, Inc.

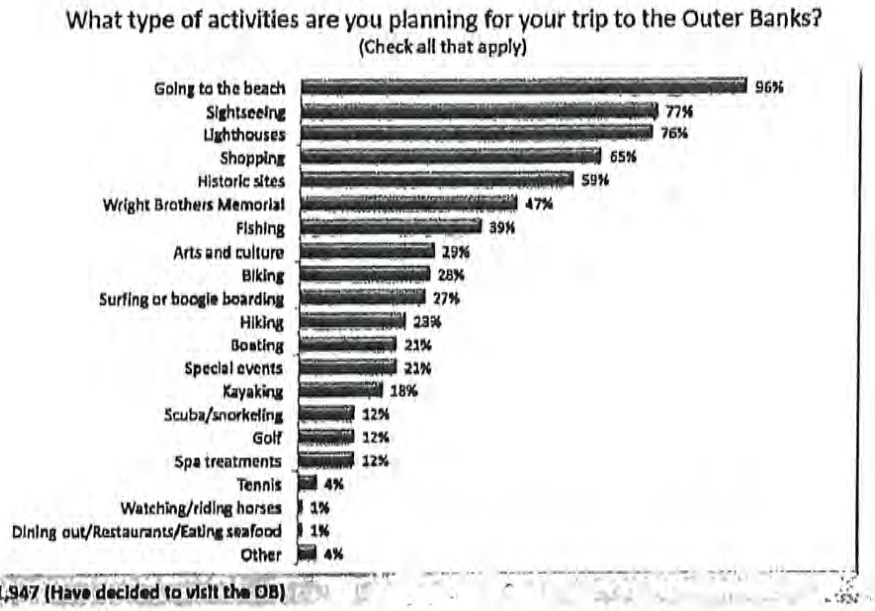
Outer Banks Visitor Profile

The latest available data on Outer Banks visitor and trip characteristics is from 2010. Because the Outer Banks is a mature destination with stable long-term visitation patterns, the visitor profile has likely not changed significantly since 2010.[2] Findings of this study relevant to the site development and propose recreational uses at the site in Kill Devil Hills include:

- **There is a wide diversity of visitor origins from throughout the United States,** including many that require long distance travel. Most visitors are from the Northeast (33%), Southeast (24%), Mid-Atlantic (20%), and Midwest (17%).
- **Visitors likely have high familiarity with the Outer Banks, its offerings, activities and attractions due to the high frequency of visitation to the destination as a whole.** Half of visitors had visited the Outer Banks four or more times, and another 25 percent had visited one to three times prior. A quarter were first time visitors to the Outer Banks.
- **Rental homes were the most popular type of accommodations because most visitors are traveling with immediate and extended families and friends.** Most visitors stayed in single family homes (55%) or multi-family homes (15%) for a total of 70 percent of visitors in rental homes. Approximately 70 percent traveled with one or more children.
- **Visitors and travel parties stay a long time the area.** Three quarters stayed one or more weeks. Only 11 percent stayed for less than three days.
- **While going to the beach is the most popular activity, people are looking to sightsee and see historic sites.** Most popular activities include going to the beach (96%), sightseeing (77%), visiting lighthouses (76%), shopping (65%) and visiting historic sites (59%), as shown by data in **Figure II-3**. A reported 49 percent of actual and potential visitors to the Outer Banks were planning to include a visit to the Wright Brothers National Memorial, the only specific single site attraction on the list, during their trip.

[2] 2010 Visitor Profiling and Re-Contact Study, ROI Research. Study sample focused on travel inquirers from OBX website, including 59% that either took or booked a vacation to OBX during summer.

Figure II-3
Type of Activities Planned in Outer Banks, 2010



Source: ROI Research.

Regional Attractions

The primary attraction on the Outer Banks is the beach. On Hatteras Island covering the distance of the coastline from Bodie Island to Hatteras, the Outer Banks National Seashore attracted an estimated 2.2 million visitors to its beaches, camping areas, and ticketed lighthouses in 2013. Lighthouses cost $8 to climb and camping costs $20 to $23 per site or $4 per person for group camping per night. Primary activities include going to the beach, visiting sand dunes, hiking, and water sports.

Data in **Table II-6** show a list of selected other attractions in and near Kill Devil Hills, their ticket prices and attendance trends from 2010 through 2013.

Table II-6
Selected Regional Attractions in and near Kill Devil Hills

Facility / Attraction	Location	Admission Price 1/	2010	2011	2012	2013	Change, 2010-2013	Percent Change, 2010-2013	4-Year Average
Jockey's Ridge State Park	Nags Head	No Charge	1,478,034	1,323,354	934,686	1,185,745	-292,289	-20%	1,230,455
Wright Brothers National Memorial	***Kill Devil Hills***	***No Charge***	***478,396***	***447,645***	***469,007***	***449,987***	***-28,409***	***-6%***	***461,259***
Jennette's Pier	Nags Head	$2.00 2/		275,800	305,167	306,786	NA	NA	295,918
Outer Banks Welcome Center	Roanoke Island	No Charge	276,073	287,719	294,393	279,295	3,222	1%	284,370
Aycock Brown Welcome Center	Kitty Hawk	No Charge	278,115	211,633	270,070	272,305	-5,810	-2%	258,031
NC Aquarium at Roanoke Island	Roanoke Island	$10.95	287,927	256,706	279,578	269,419	-18,508	-6%	273,408
Fort Raleigh National Historic Site	Roanoke Island	No Charge	318,129	283,478	283,177	264,830	-53,299	-17%	287,404
Roanoke Island Festival Park	Manteo	$10.00 3/	140,556	132,714	146,243	89,176	-51,380	-37%	127,172
Whalebone Welcome Center	Nags Head	No Charge	65,843	45,815	52,117	50,446	-15,397	-23%	53,555
The Lost Colony (Summer Only)	Manteo	$30.00	47,674	45,258	42,474	41,715	-5,959	-12%	44,280
U.S. Weather Bureau Station / Hatteras Welcome Center	Cape Hatteras	No Charge	7,782	3,369	5,488	5,182	-2,600	-33%	5,455

1/ General admission for adults only. Other fees charged for use of campsites, picnic areas/shelters, and other facilities.
2/ Requested donation for walking on pier.
3/ Good for two consecutive days.
Source: Outer Banks Visitor Bureau and ConsultEcon, Inc.

Most attractions profiled are free because they are either public natural attractions or welcome centers. Except for performances and events, attractions that do charge admission charge between $10 and $11 for an adult ticket, and coupons are often available.

Dare County's second most popular attraction, Wright Brothers National Memorial (NM) with a four year average attendance of 461,000, is located in Kill Devil Hills. In addition to the NM in Kill Devil Hills, the first and third most popular attractions, Jockey's Ridge State Park with 1.2 million visits (beach, hiking, boardwalks, sand dunes, kites, sand boarding, and water sports) and Jennette's Pier at almost 300,000 visits (fishing pier and special events) and Whalebone Welcome Center are located in Nags Head and combined draw 1.6 million visits annually. The Aycock Brown Welcome Center in Kitty Hawk has 258,000 visits annually, compared to those visitors center to the south, including 53,000 visits at Whalebone Welcome Center in Nags Head and 284,000 at Outer Banks Welcome Center at Roanoke Island. Manteo, the town on Roanoke Island draws approximately 1 million visits annually.

Most attractions lost attendance between 2010 and 2013, with the exception of the Outer Banks Welcome Center on Roanoke Island, which posted a modest 1 percent increase over

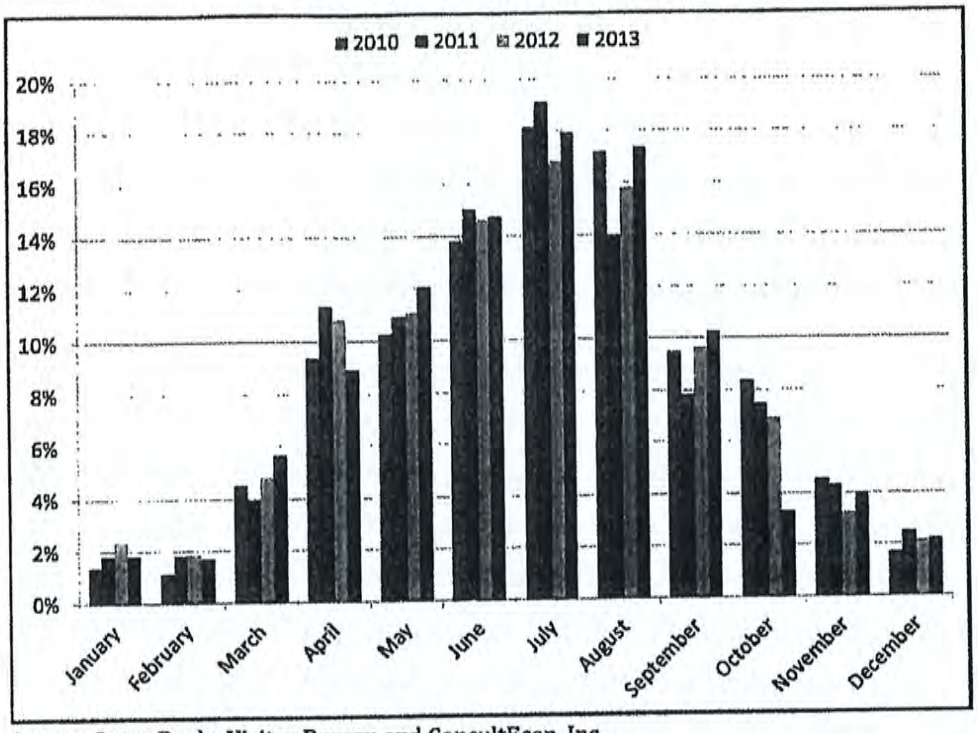
the period compared to an average decrease of 14 percent for the attractions as a whole (not including Jennette's Pier which has no data available from 2010).

Wright Brothers National Memorial

The Wright Brothers National Memorial is across the street from the proposed site, adjacent to a municipal complex and fronting a major tourist thoroughfare. Activities at the National Memorial include a visitor center, exhibits, public programs, climbing memorial with a scenic outlook, and a 3,000 foot live runway celebrating the history of flight. Due to the site's adjacency and potential visibility, tourists at Wright Brothers NM are a potential market segment for proposed recreation uses at the site. Making visitors aware of visitor oriented offerings at the memorial will enhance the market opportunity, especially since many visitors to the memorial are first time visitors.

As noted prior, the Wright Brothers NM attracts approximately 461,000 visitors annually. Its seasonal visitation trend is reflected by monthly data shown in **Figure II-4.** Between 2010 and 2013, July and August averaged 78,000 visitors per month, which means that there are approximately 2,500 people onsite on an average day during the peak season.

Figure II-4
Percent Monthly to Total Annual Attendance, 2010 through 2013
Wright Brothers National Memorial



Source: Outer Banks Visitor Bureau and ConsultEcon, Inc.

A National Park Service visitor study conducted in 2002 offers insight into the Wright Brothers NM visitors. Since the completion of the study the memorial has not changed substantially. Relevant findings from the 2002 survey of July visitors include:

- Most visitors to the Wright Brothers NM are first time visitors (70%) from outside of North Carolina (86%).
- For over half of the visitors to the Wright Brothers NM, the most important reason for visiting the memorial is its historical significance.
- Most trips to the Wright Brothers NM were short trips. Two thirds of visitors stayed one or two hours.
- Visitors were visiting with large, family groups. Approximately two out of five visitors were in groups of five or more and another third were in groups of three or four. Almost three quarters of visitors were in family groups.

Tourist Market Summary

The Outer Banks is a popular tourist summertime beach destination attracting a reported 5 million visitors annually. The tourism season is highly peaked, centered on summer months of July and August. Most Outer Banks visitors travel with families and extended families and stay for a week-long summer vacation in one of the region's many rental homes. For example, attractions in Dare County that are open year round draw most visits between May and September, typically 65 to 70 percent of total annual visitation, with July and August attendance typically ranging between 30 and 35 percent of the year's total.

Tourists are a large market opportunity, depending on the drawing power, positioning and repeatability of uses and activities proposed for the site in Kill Devil Hills. The volume of tourists to the Outer Banks indicates a strong potential for tourist visitation, particularly from the large number of tourists staying overnight in Kill Devil Hills hotels, motels and rental homes and those visiting the Wright Brothers NM. During a typical summer day in July and August, there are likely 10,000 overnight visitors in Kill Devil Hills and 2,400 visitors to the Wright Brothers NM (there is likely some overlap between these visitor segments). Visitors to Kill Devil Hills and the Outer Banks as a whole are looking for family-oriented activities to occupy their time. While the beach is certainly an important activity and the primary reason for their trip to the area, other outdoor recreational and educational activities are popular in the area and would be a natural fit for the Baum Tract site.

MARKET EVALUATION OF POTENTIAL LAND USES

The following section evaluates particular land uses based on market criteria that may affect its suitability for the Baum Tract site.

Developed Site Use

Developed site uses are those that would involve a reimagining of the existing space and the development of particular amenities on the site. Possible developed site uses include a Town Gathering Park and Pavilion, a Municipally Owned and Operated Pool, a Disc Golf Course, an Amphitheater, a Sports Complex, and a Fenced-in Dog Park.

Town Gathering Park / Pavilion

Data in **Figure II-5** show the locations of existing town gathering parks and pavilions which can be rented for events. The existence of such facilities in the area indicates that to some extent they would be used by the community. One site in particular, the Windmill Point site in Nags Head, is currently in development as an event ground. The development of a similar site may indicate that there is a necessity for more such sites.

Figure II-5
Map of Existing Parks and Pavilions
Kill Devil Hills Baum Tract

Source: GoogleMaps; ConsultEcon, Inc.

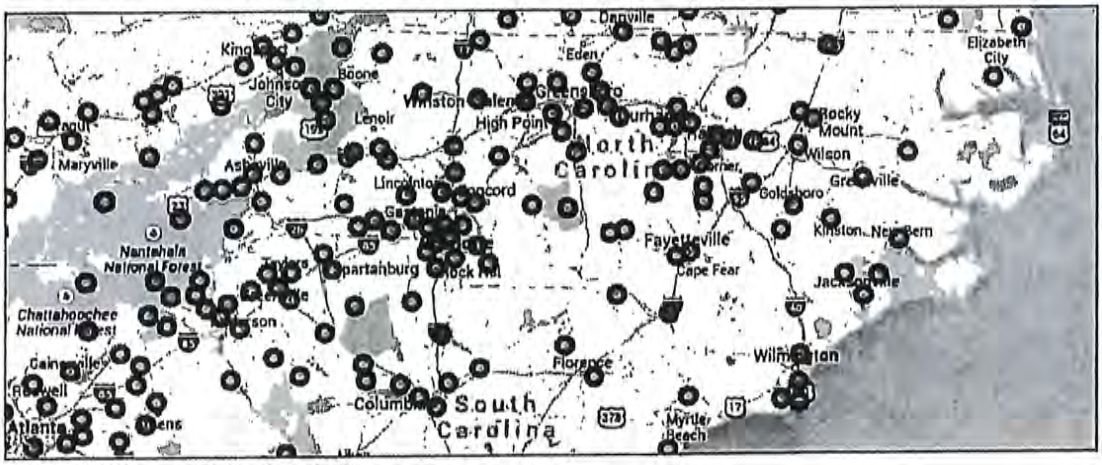
Municipally Owned and Operated Pool

Currently, the only public pool on the Outer Banks is the YMCA in Nags Head. The facility offers some guest passes, but is largely reserved for residents. The local First Flight school system splits its swim team practice time between the YMCA in Nags Head and the YMCA in Elizabeth City.

Disc Golf Course

Disc golf is a precision and accuracy sport in which the object is to traverse a course from beginning to end in the fewest number of throws of the disc. Currently, the closest disc golf course facilities are located in Virginia Beach (83 miles away) and Elizabeth City (52 miles away). The market for professional-standard, 18-hole disc golf courses is growing in the North Carolina area, with several courses having opened in the Raleigh area in recent years. As a tourist destination, the existing market context would be supportive of a new disc golf course, as it would attract professional players in the spring and fall (the main seasons for the sport) and more leisurely players during the summer months. Data in **Figure II-6** show the locations of existing disc golf courses in North Carolina and neighboring states.

Figure II-6
Map of Existing Disc Golf Courses
Kill Devil Hills Baum Tract



Source: PDGA.com; ConsultEcon, Inc.

Amphitheater

Data in **Figure II-7** show the locations of existing amphitheaters in the area around Kill Devil Hills. The only existing amphitheater is located in the town park of the town of Duck; however, the plans for the Windmill Point development site in Nags Head include an amphitheater.

Figure II-7
Map of Existing Amphitheaters
Kill Devil Hills Baum Tract

Source: GoogleMaps; ConsultEcon, Inc.

Not shown in Figure II-7 is the location of the Waterside Amphitheater on Roanoke Island. This amphitheater is used exclusively by the Roanoke Island Historical Association and their annual production of the outdoor drama "The Lost Colony." In recent years, the organization has begun producing a concert series to supplement the drama's season, thus making the amphitheater a more flexible venue.

Sports Field Complex

Data in **Figure II-8** show the locations of existing sports field complexes operated by the Dare County Parks and Recreation Service. Four of these are located in the Northern Beach Division of Dare County, including two in Kill Devil Hills, one in Kitty Hawk, and one in Nags Head. Another consideration is the number of schools in the area that have sports facilities, and how they are being used in the area; however, these are not included in Figure II-8.

Figure II-8
Map of Existing Parks and Recreation Sites in Dare County
Kill Devil Hills Baum Tract

Source: GoogleMaps; ConsultEcon, Inc.

Fenced Dog Park

There is one existing fenced-in dog park in the area around Kill Devil Hills, located at Kitty Hawk Park in the Town of Kitty Hawk. This county-operated park is frequently used because it is located conveniently en route between the residential neighborhoods of Kitty Hawk and the main thoroughfare of the Outer Banks; however, use of the park is limited to those dogs and their owners who have applied for membership and understand the personal risks associated with unleashing dogs. Each town and beach has different rules in effect regarding dogs on the beach. The looser of these laws allow dogs to run unleashed on the beach, while the stricter laws require that dogs be restrained on 6-foot leashes or ban dogs from the beach between the hours of 9:00 AM and 6:00 PM. A fenced-in dog park may benefit the population in the Resident Market Area, as well as some tourists.

Natural Site Use

Natural Site uses would develop the Baum Tract to a lesser extent, emphasizing instead the natural environment of the sound-side of the Outer Banks. Potential uses include Camping Facilities for Organized Groups, a Natural Preservation Boardwalk, and a launch ramp for Kayaks and Canoes.

Camping Facilities for Organized Groups

Most of the camp grounds in existence are further south in the Outer Banks. There are only three campgrounds between the town of Kill Devil Hills and its neighboring towns. Between these three campgrounds there are a total of 78 camp sites, 48 of which are reserved for RVs. Though there are a number of camping facilities in the Outer Banks, few emphasize a propensity to cater to organized groups. Data in **Figure II-9** show the sites of existing campgrounds in the Outer Banks.

Figure II-9
Map of Existing Campgrounds
Kill Devil Hills Baum Tract

Source: outerbanks.org; GoogleMaps; ConsultEcon, Inc.

The proposed camp site for the Baum Tract site is not a commercial one. Instead, the site would be a campground for organized groups, such as Boy Scout troops and church groups. In this way, it would not be competing with the existing campgrounds shown in Figure II-9.

Boardwalk and Nature Preservation

The wetlands on the sound-side of the Outer Banks are a good environment for boardwalks to be used for the observation of natural wildlife in the area. There are several such boardwalks already in the area, mostly associated with existing parks or nature preserves. Of particular note is the State Park located adjacent to the Baum Tract site. Working with this park's operations could support the development of new boardwalks and trailheads that could be incorporated into the park's existing infrastructure. Data in **Figure II-10** show the locations of other existing boardwalks in the area.

Figure II-10
Map of Nature Preservations and Boardwalks
Kill Devil Hills Baum Tract

Source: outerbanks.org; GoogleMaps; ConsultEcon, Inc.

Kayak / Canoe Launch

The sound-side of the Outer Banks is already a destination for canoeing and kayaking, with a number of boat launches located in the area. There are at least 25 public boat launches on the sound between the Outer Banks and the mainland, and a number of boat rental companies to provide equipment. Data in **Figure II-11** is a map showing the locations of existing boat launches and rental shops in the area. Although there are many boat launches already in existence, a boat launch at the Baum Tract site could support visitors to the new facilities who arrive by kayak and canoe from other launch sites.

Figure II-11
Locations of Boat Rental Companies and Boat Launches
Kill Devil Hills Baum Tract

Source: obxpaddlers.org; outerbanks.org; GoogleMaps; ConsultEcon, Inc.

Public Service Use

Using the Baum Tract site for public service would have a low impact on the resident and tourist markets because the site would be used mostly by town or county entities. Potential uses in this category include the mulching operation, a vehicle impoundment lot, and waste water treatment facilities. The resident and tourist markets would experience an indirect impact from such land uses, based on improved quality of environment and life.

Accessory Uses

Restrooms, parking, and a snack bar are some of the uses that would be accessories to any other land use on the Baum Tract site. For that reason, as the planning process moves forward, it is important to keep in mind the amount of space that these will necessitate in order to accommodate the expected number of users.

Section III

EVALUATION OF SITE USES BY TARGET AUDIENCE

This section discusses the proposed uses for development of the Baum Tract site in Kill Devil Hills, North Carolina as evaluated by target audience groups. The Town of Kill Devil Hills seeks to develop the site in a way that would best benefit the residents of and visitors to the town. Four audience groups whom these site options would serve have been identified:

- Those interested in passive recreation.
- Those interested in active recreation and organized sports.
- Those interested in a recreational disc golf experience.
- Those interested in preserving and experiencing the natural world unique to the Outer Banks.

All of the audience groups include area residents, as well as tourists. The following explores the four audience groups in depth, and the site uses that they would be most interested in.

Passive Recreation

The audience for passive recreation would be interested in a park that focuses on community gathering and nature trails. Such a park would include amenities such as a town gathering lawn, a pavilion for shade, concessions, and restrooms, as well as a stage performance space.

The audience group most likely interested in these facilities is residents of and visitors to the Town. Among Town residents, active parties include families of all types, of which there are approximately 1,600. Depending on the programming available at the site, additional users may come from neighboring towns. Visitors to the Outer Banks may also utilize the park's passive recreation facilities. Since many visitors to the Town come for beach vacations, the park's passive recreation facilities provide a unique contrast to the beach setting. They may also be interested in participating in programming provided by the town at the site.

Not designating all of the site as a sports-specific facility allows for additional flexibility of the space. The gathering lawn may be used for performances oriented towards the stage, but could also be used for picnics, fairs, and more casual sports and games, such as ultimate Frisbee, making it a very versatile option.

Active Recreation and Organized Sports

The audience for Active Recreation and Organized Sports would be most interested in a facility that has a number of sports fields to accommodate field usage by young athletes. Different site layouts could accommodate a number of sports fields, which vary in size depending on the age group using it. For instance, a single U-12 soccer field or lacrosse field occupies the same amount of space as four U-6/U-8 soccer fields and two U-10 soccer fields. A synthetic turf field of this size could be used for all these age groups with various field delineations.

The audience group most likely interested in facilities supporting these uses are the Town's residents. Among Town residents, active parties would be school-aged children, of which there are approximately 1,000, as these are the residents for which the Dare County Parks and Recreation organizes leagues, and their families, who will likely accompany their children to games. The proximity of the site to the First Flight School Complex would support use by other local children who do not reside in Town. Using the site in this way would satisfy the need for more sports fields, as the existing fields are frequently occupied and over-used, according to local youth.

A small number of visitors may also be part of the audience for this option. Considering the high concentration of sports fields around the First Flight School Complex and in the nearby Kill Devil Hills Family Recreation Park, this area could be a destination for organized sports tournaments. Depending on the size of the tournament, Kill Devil Hills could become a regional destination for athletic groups from neighboring counties. Outside of this context, however, it is unlikely that seasonal visitors or tourists will utilize the facilities. It is also unlikely that these recreational fields will be utilized when the fields are not in use for an official game.

Recreational Disc Golf

The audience for disc golf is comprised of both local proponents and visitors from other parts of the region and State. There are currently no disc golf courses in the Outer Banks. The addition of a new disc golf course, especially if designed and installed at tournament-level quality, could benefit a wide audience and could be used in tandem with a variety of site uses, especially if the disc golf course extends beyond the limits of the Baum Tract, onto the adjacent properties.

The audience for a disc golf course would be residents of the Town, as well as visitors from the region and the rest of the State, as it would be the only disc golf course on the Outer Banks. The idea of the disc golf course was supported by many of the Town's residents, who believe that a disc golf course would be a fun way for the community to engage in an active, yet casual recreational activity. Disc golf facilities may also be attractive to the casual tourist community, as an alternate activity for non-beach days. The tournament circuit may also find the course attractive, but only if it is up to tournament standards.

The fact that there are no tournament-level disc golf courses in the area (the closest one is 52 miles away in Elizabeth City) is supportive of a disc golf course. However in a tournament-level disc golf course, each hole requires approximately one acre of land. Therefore, for a full 18-hole course to be developed on the Baum Tract site, the town would need to allocate most of the space for that purpose. However, this would leave little room for other site uses and limit the amount the town's residents would benefit from the site's development. One alternative is to extend the disc golf course beyond the limits of the site and incorporate some of the holes on the adjacent properties.

Preserving and Experiencing the Natural World

Approximately one third of the Baum Tract site is made up of the wetlands on the west end of the site. As this ecosystem is fragile and important to the Outer Banks, it would be appropriate to preserve the area for natural uses. A network of boardwalks and nature trails, including a kayak and canoe launch, are considered to be a feasible option for all site plan options. Installing a network of nature trails and boardwalks would preserve much of the natural landscape, while also allowing visitors to enjoy the space.

The audience for a natural site use such as a boardwalk includes most of the residents of the Town as well as some visitors to the area, who would also be interested in the other amenities the park has to offer. Though there are many boardwalk systems on the sound side of the Outer Banks, they are an asset to all communities who utilize them, and the addition of a boardwalk would be a great benefit to the community in Kill Devil Hills. Additionally, linking the boardwalk and trail system into the existing greenways network on adjacent sites would make the Baum Tract accessible without vehicular travel. Similarly, though there are a number of kayak and canoe launches on the sound side of the Outer Banks, an additional launch will allow boaters to both launch from the site, and arrive to the site.

In addition to the boardwalk and boat launch infrastructure, an off-the-grid nature porch in the southwest of the site provides a venue for outdoor education and meetings, as well as restroom amenities and some electricity, generated by solar power. This porch would be an educational resource for the neighboring First Flight Schools, as well as other community members. Partnerships with local environmental group would also provide opportunities for interpretation of the significant ecosystem in that section of the site, where the wetlands, sand dunes, and coastal forests meet.

Accessory Uses

Regardless of what other land uses are implemented on the Baum Tract, some accessory uses will be necessary. These include:

- **Parking:** A parking area should be located in the east end of the site, where it is closest to the road and, therefore, most accessible. From that point, the rest of the park should be designated as a pedestrian area. On-site parking would accommodate approximately 100 vehicles. Approximately one-half mile from the entrance to the Baum Tract is the First Flight School Complex, which has a parking capacity of over 800 spaces. In the event a high-volume of parking become necessary, this may be available for use.
- **Restrooms:** A necessity for any place where people are gathered, restrooms would be located in a pavilion structure that would serve as a node for all utilities. For accessibility purposes, this pavilion would be located close to the entrance to the site and the parking area. Additional restrooms may be available at the off-the-grid nature porch.
- **Concessions / Snack Bar:** The concessions area would not be an official retail outlet; rather, it would be a stage for catering or snack bar operations that may vary

depending on the programming taking place. This would also be located in the pavilion, along with the restrooms, as the facility would require electricity and plumbing.

- **Mulching Operation Facility:** The town's mulching facility has been on the Baum Tract site for the past several years. While this use does not directly impact visitors to the site, it does benefit the Town as a whole, since the town provides this service to the residents. The mulching facility is likely to remain in its current location on the site, in the southeast corner, where it will share a road access, but otherwise be separated from the other uses on the site. The Town should consider moving the mulching operation to another site in Town, in the event that another site becomes available.

Limited Accessory Uses:

Several other accessory uses were discussed and identified as appropriate to supplement some of the other site uses, but not others.

Children's Playground

A children's play area is being considered, as it would be a convenient amenity for families who utilize the park, offering place for children to play and occupy themselves while parents are involved in other activities, such as concerts or sports matches. The location would likely be adjacent to the other central uses of the park.

Fenced Dog Park

The audience for a fenced dog park would be a number of dog owners who reside in Kill Devil Hills, along with some visitors to the town. A fenced dog park would give these owners a place for their dogs to run without a leash and without causing damage or harm to property or other people.

Dog parks take up a small amount of space (as few as 7,500 square feet); however, the odor and noise make the amenity more suitable to accompany active recreational facilities. It is recommended that the dog park be implemented adjacent to sports fields.

Other dog parks in the area are frequented by dog owners because they are conveniently en route between residential neighborhoods and major commercial areas. Given the relative isolation of the Baum Tract site, a dog park located here would be a destination for dog owners who want to let their dogs run free, but are unable to elsewhere. The size and the

location of a possible dog park will depend upon the layout of other amenities on the site, and can be determined as the Town sees fit at a later stage of the process. For this reason, it was not included in the concept diagrams.

Camping Facilities for Organized Groups

In the context of camping facilities for organized groups, the audience is made up of organized groups such as Boy and Girl Scout Troops and Church Groups. This concept arose out of a request from the local Boy Scout Troop, considering the fact that the closest official Boy Scout camping facility is located well over one hour away from Kill Devil Hills.

Such a camping facility is not meant to be large, nor is it meant to compete with other commercial campgrounds on the Outer Banks. This facility would be partitioned from the public space of the park, likely as an offshoot from the boardwalk and nature trail area, and available for use by permit only for a small fee to interested local groups. It would be patrolled by local authorities to prevent vagrancy and other issues.

This camping facility would be most appropriate in the event that more passive recreational and nature-oriented uses are implemented. Proposed locations would be set in the wooded areas in the middle of the site, but away from the wetlands, where users would be isolated from other activities on the event lawn. The site would be accessible by a short walk on the nature trails or boardwalks, allowing local youth to experience a camping trip without traveling several hours by car first.

Summary of Evaluation by Audience Type

Recreational development of the Baum Tract targets both residents of and visitors to Kill Devil Hills. The land uses proposed for its development cater to different sub-groups within these larger audiences. Land uses are proposed that would serve both residents and visitors who are interested in active recreation, passive recreation, community events, and experiencing the natural world. Further, several land uses under consideration target specific segments within these audiences, including families with young children, organized groups interested in camping excursions, dogs and their owners, families for youth sports, organized youth groups, and disc golf enthusiasts. The land use options under consideration are being evaluated based on how the site would serve these varied audience segments.

Evaluation criteria for the proposed uses include whether the site would be used by broad general audiences or niche segments of the overall population; the density of the on-site population within the area of a proposed land use; and, the pattern of use regarding the seasonality and user demographics. Other criteria for evaluation are included in the site planning matrix in Section V of this report.

Section IV
PRELIMINARY ESTIMATE OF BAUM TRACT SITE MAINTENANCE COSTS FOR POTENTIAL LAND USE OPTIONS

The following is a summary of preliminary estimates of potential maintenance costs for alternative land uses proposed for the Baum Tract site in Kill Devil Hills, North Carolina.

Maintenance costs for public uses on the Baum Tract site will be largely connected with the cleared or redeveloped areas that would have passive and active use. The potential on-site land uses include walking trails, boardwalks, restrooms, parking, a children's playground, camping facilities, a nature observation deck, waterfront access for kayaking and canoeing, and an open field designated as either a sports field or as an event lawn. The "actively programmed" areas of the site are estimated to be on the order of 10 to 12 acres out of the 44 acres of the Baum Tract. The remainder is undisturbed wetlands and undeveloped uplands that remain in their current woodlands character. The areas will require varying amounts of maintenance depending on the amount that they are used.

Evaluation of Individual Proposed Components

Following are preliminary estimates of potential operating costs for individual proposed uses on the Baum Tract, reflecting the site use concept options.

Town Gathering Park

A town gathering event lawn would occupy between one and two acres of property on the Baum Tract site. Maintenance for this area will be mostly related to landscaping and lawn mowing, which would be an expense related to public works labor hours. Using the national average per acre cost of approximately $7,000, the total cost might be $7,000 to $14,000 annually for the maintenance of the town gathering lawn and associated spaces on the Baum Tract Site.[3]

[3] Estimate based on information from the Town of Duck.

Pavilion

As noted in the concept designs, the pavilion structure, which would serve as a field house, restroom, concession area, and covered outdoor area for dining and gathering, would include approximately 750 square feet of enclosed space and 400 square feet of covered outdoor space. Based on typical maintenance costs of $2 to $3 per square foot per year for pavilion-like structures of this size, the estimated annual maintenance cost of a pavilion on the Baum Tract site would be approximately $2,300 to $3,600. Utilities at $1 to $2 per square foot might add an additional $1,100 to $2,300.[4] In all, the total maintenance estimate ranges between $3,400 and $5,900. (It should be noted that this does not include a capital replacement fund.)

Multi-Purpose Sports Field

Sports fields vary in maintenance costs depending on their construction materials and their location in relationship to other fields. Where a number of fields are concentrated in one area, the travel expenses of bringing in maintenance equipment is reduced and maintenance activities are more efficient.

Dare County maintains a number of grass soccer and other sports fields around the Outer Banks. Seeded with Bermuda grass and overused by the public, they require a lot of maintenance. Due to the speed at which Bermuda grass grows, they must be mowed at least twice each week. Further, during the grass's dormant season, from January to April, it is difficult to keep players off the fields, which prevents the grass from growing well during the summer and fall.

The county is interested in and has considered installing synthetic turf fields, which cost approximately $1 million to install, not including the purchase of property. This is considered by some to be a cost effective investment, because it would allow the fields to be used all-day every day for the entire year, unlike Bermuda grass, which should only be used nine months of the year with some limitations regarding the number of hours per day.

[4] Estimate based on information from the Town of Duck.

One report from the Sports Turf Mangers Association estimated the maintenance cost of a synthetic turf field at $6,000 for materials and as many as 375 labor hours annually. 375 labor hours can be estimated at approximately 10 person weeks or 1/5 of a parks and recreation employee. Based on those estimates, the total cost might reasonably be estimated at $12,000 to $15,000 annually.[5] (It should be noted that this does not include a capital replacement fund.)

The decision to include artificial turf fields may be affected by the role the Dare County Parks and Recreation system might play in its maintenance. It is through the Dare County recreational sports programs that the existing sports fields have come to be so heavily used, but also through this program that the County generates funding through participation fees to maintain the fields. The addition of a new sports field, either synthetic or real grass, would be welcomed by the community; however, the question of who will maintain the fields remains. It is uncommon that a field should be maintained by a town, but utilized mostly by a county organization. Additionally, considering the adjacent County school property and the volume of county residents that frequent the area because of the school complex, limiting use of the park to town residents would be virtually impossible. In an interview with the Parks and Recreation Manager for Dare County, he stated that additional hires would likely be necessary to maintain new fields regardless of who was carrying out the maintenance, the Town or the County.

Disc Golf Course

Most disc golf organizations have used volunteer approaches to achieve low installation and maintenance costs for disc golf courses. A course proposal template that has been widely shared among disc golf organizations outlines the following maintenance figures for disc golf courses:

Mowing: 15 hours/week
Trash removal: 5 hours/week
Seeding: $200/year
Tree Trimming/Miscellaneous: 5 hours/month

[5] http://stma.org/sites/stma/files/STMA_Synthetic_Guide_2nd_Edition.pdf

The Baum Tract course would likely have a lower lawn maintenance component, but would add costs related to seasonal mulching, pruning, and weed elimination in wooded areas. A reasonable estimate for Town maintenance costs would be in the $15,000 to $20,000 range. Depending on the governance and operating structure put into place, volunteers and fundraising campaigns may be able to cover some or a substantial portion of these costs.[6] In similar circumstances, disc golf clubs and organizations have proposed that their organization will donate volunteer time for the removal of trash on the disc golf course and provide labor and materials for maintenance of the course itself.

Boardwalk

There are a number of boardwalks in the Outer Banks to compare with the proposed boardwalk at the Baum Tract in Kill Devil Hills. Analysis based on the Town of Duck provides one estimate for annual maintenance costs. The boardwalk in the Duck Town Park cost $1.1 million to install, including associated benches, signage, and solar power infrastructure. The boardwalk is approximately 4,149 linear feet or .78 miles. According to the Town of Duck Budget for the 2013-2014 fiscal year, boardwalk repairs and maintenance cost approximately $8,000. Based on this data, Duck's boardwalk maintenance during the 2013-2014 fiscal year cost $1.93 per linear foot for an 8 foot wide boardwalk built on a piling system.[7] Considering the length of the boardwalk system proposed for the Baum Tract, the annual cost might be $4,000 to $6,000. (It should be noted that this does not include a capital replacement fund.)

Kayak / Canoe Launch

A simple addition to a boardwalk system would be a kayak or canoe launch. The aforementioned Duck Boardwalk included the area of the boat pier and other access points. The addition of a canoe or kayak launch would not likely add significant costs to the maintenance of the boardwalk.

[6] Source: fayncdiscgolf.info
[7] Estimate based on information from the Town of Duck.

Nature Trails

Dare County maintains only one combined nature trail / boardwalk, which was installed in 2012 and opened for use in 2013. The one-mile-long trail cost approximately $350,000 to install and is made of crushed granite, which compacts easily, and is ADA approved. As it is less than two years old, there have been no maintenance costs associated with its use yet. Due to the high quality of the materials, it is expected that maintenance costs will remain low. Periodic contracts over the years can be expected to level trail areas, fill eroded spots etc., but these would not be major expense items. An allowance of $3,000 to $5,000 for materials and labor might be expected

Camping Facility

Any camp site development that would be included in the master plan for the Baum Tract would be a project of the user groups, such as the local Boy Scout Troop, who proposed the project. Therefore, maintenance costs and labor will be the responsibility of that organization.

Children's Playground

Children's playgrounds vary greatly in size and content, and maintenance costs vary depending on the materials used. According to one source, the cost of maintenance and a capital replacement fund (for a target ten-year life cycle) for a playground would be proportional to the capital cost, at an estimated ratio of 10 to 15 percent.[8] Therefore an annual maintenance / contribution of $12,000 to $18,000 can be expected.

[8] The Universal Playground: A Planning Guide Province of British Columbia

Parking

Parking lot maintenance will also vary depending on the materials used. One source estimates parking lot maintenance costs at between $.09 and $.16 per square foot.[9] Based on a parking spot size of approximately 300 square feet, a reasonable estimate of annual maintenance costs for an individual spot is approximately $50. For a parking lot with approximately 100 spaces, the total parking lot maintenance cost can be estimated at $4,000 to $6,000 annually. (It should be noted that this does not include a capital replacement fund.)

Budget-Based Estimate for Park Facility Maintenance Cost

The Town of Duck budgets between $85,000 and $95,000 for the maintenance of its town park, located on an 11-acre sound-side site in the commercial downtown area of Duck. The park's amenities include a .5 acre town green which can fit approximately 2,000 people at full capacity, a 5,000 square foot, 350-seat amphitheater, a 4,149 linear foot boardwalk, a children's playground, a 1,200 square foot band-stand-style gazebo, a 1,200 square foot picnic shelter, and a restroom. The maintenance for the park includes weekly mowing of the ryegrass town green, the twice-annual planting and fertilizing of the lawn, the maintenance of the built infrastructure and trails, the planting of annuals, as well as the twice-daily cleaning of the public restrooms during the peak summer months. The budget includes $8,000 for the maintenance of the boardwalk; $5,000 to $10,000 for the maintenance of and minor repairs to the built infrastructure, the picnic shelter, gazebo, amphitheater, and playground; and $20,000 for restrooms maintenance, cleaning, and trash removal. As this is a good comparable for the proposed development projects on the Baum Tract site, these budget data confirm the general reasonableness of the presented maintenance cost estimates.

Additional estimates from a survey by the National Recreation and Park Association show that the median operating expenditures per acre of land for parks in 2013 was $7,357.[10] For 10 to 12 acres of the Baum Tract site that would be actively used and would require substantial

[9] http://nreionline.com/mag/keeping-parking-lots-solid-ground
[10] http://www.nrpa.org//uploadedFiles/PageBuilder_Proragis/Content/common_elelments/National-Database-Report.pdf

maintenance, this would translate to approximately $70,000 to $85,000 annually. This overall estimate is in line with the potential costs as evaluated by land use above.

Summary

Depending on any needs for new hires or purchase and depreciation of major equipment as well as the extent of use as would manifest in the cleanup of and trash removal from park facilities, a reasonable range of maintenance costs for the Baum Tract Site would be between $70,000 and $95,000 annually. Depending on the extent to which the park is used and maintained at a county level, the amount of annual investment from the Town of Kill Devil Hills may vary; however, the variations in cost between different land uses will ultimately be marginal.

Section V
SITE PLANNING MATRIX

This section contains the evaluation matrix that was used to compare the different land use options during the planning process based on a variety of criteria. The evaluation matrix lists the land use options in the first column of each page, and the subsequent columns show the 21 evaluation criteria for the site uses. The considerations have been organized here by land use option category. These categories include active recreational uses, which are shown in blue; nature-based uses, shown in green; accessory uses, shown in pink; supportive uses, shown in purple; and public works uses, shown in yellow.

Land Use Option	Acreage required / allocated for use	Infrastructure requirements	Required adjacencies / compatible uses
Town Gathering Park / Pavilion / Amphitheater	48,750 SF (Southern Village Park, Chapel Hill, NC); Seating Capacity (100) Small - 2,000 SF; Seating Capacity (450) Med - 8,000 SF. One acre has a capacity of approximately 1,000 people.	Pavilion or gazebo, stage space from which a person could speak or performance could take place, picnic tables, benches, electrical outlets.	Park, amphitheater, concession stand and restrooms should be together to centralize utility connections.
Disc Golf Course	18 Acres; assume one acre per hole.	Disc golf goals/holes/tee mats, signage and maps, collapsible rental and ticket booth.	Some shared trail space could connect holes, but care has to be taken in course layout given the heavy flying discs.
Multi-purpose Sports Field	Between 1 and 2 acres. Standard soccer fields are generally between 110-120 yards by 70-80 yards, or up to 1.98 acres.	Synthetic turf field or lines on field to mark boundary, benches, goals.	Adjacent to dog park, pavilion, park, playground.

Note: BT means Baum Tract.
Source: ConsultEcon, Inc.; Surface 678; Town of Kill Devil Hills; Town of Duck; NC Parks and Recreation; outerbanks.org; obxpaddlers.org

Land Use Option	Potential for shared use of space allotted	Leverages adjacent uses	Suitability of areas of the site for land use	Location on site/ potential for phasing
Town Gathering Park / Pavilion / Amphitheater	Space could be used for a number of activities, including casual sports matches, concerts, movies, games, and other public gatherings.	Centralized space includes park, amphitheater, concession stand, restrooms, fenced dog park, sports field, and playground.	Near east-end entrance, where there is easy access to the parking area.	On the east-end there is easy access to parking & infrastructure demands are fewer. Furthermore, orienting stage to face the east, the backdrop for evening performances could be the sunset.
Disc Golf Course	Possibility to incorporate holes in the Baum Tract and also on the adjacent tracts; course should be physically isolated for safety reasons.	Spreads throughout park and possibly into neighboring sites. Usage increased if start of course is near central gathering space.	Course tee-offs and goals should be on uplands, but fairways could incorporate some wetland areas. This would reduce the required upland acreage.	Should be created in one phase and at industry standard. Course developed below industry standard will not be an attraction.
Multi-purpose Sports Field	Synthetic turf should stand alone. Grass field could be part of park for shared space, but that may cause field damage for playing purposes.	Centralized space includes park, amphitheater, concession stand, restrooms, fenced dog park, sports field, and playground.	Non-wetland - 26.19 acres.	East side- further from water on flat ground. Near schools, as well, so it can be used as an overflow field.

Note: BT means Baum Tract.

Source: ConsultEcon, Inc.; Surface 678; Town of Kill Devil Hills; Town of Duck; NC Parks and Recreation; outerbanks.org; obxpaddlers.org

Land Use Option	Target audiences (residents, tourists, events)	Serves multiple user types /seasonality of use	Presence of regional competitor
Town Gathering Park / Pavilion / Amphitheater	Town and school community events, concerts, theater, festivals; open to visitors as well.	Mostly summer with some potential for colder months, as well. Flexible space can be used to target specific groups or the community as a whole.	Rental pavilions exist in a number of locations, associated with private facilities, hotels, and towns. Duck Town Park, Nags Head Event Site, Sandy Run Park (Kitty Hawk).
Disc Golf Course	Locals and visiting tourists, good activity for non-beach days. Note: This use has a relatively low density of users per acre compared to other active recreation uses. A reasonable estimate at peak use periods is about 8 participants per acre or about 150 for the entire 18-hole course.	Mostly shoulder seasons and summer. Focus will be on regional disc golf players; a small tournament circuit, and locals who become involved.	No local facilities. Closest locations are in VA beach and Elizabeth City.
Multi-purpose Sports Field	Overflow field for school sports activities and other community sporting groups.	School teams, community teams, tourists? Mostly summer and shoulder season.	Most fields are operated by Dare County Parks and Rec or the First Flight school system. Many soccer fields in the area, but they are overused.

Note: BT means Baum Tract.
Source: ConsultEcon, Inc.; Surface 678; Town of Kill Devil Hills; Town of Duck; NC Parks and Recreation; outerbanks.org; obxpaddlers.org

Land Use Option	Economic / tourism impacts	Quality of life / resident impacts	Difficulty or Ease of permitting particular use	Potential funding sources
Town Gathering Park / Pavilion / Amphitheater	Likely low. Depends on programming and size.	Increased community engagement through new shared spaces and community events.	Fairly easy, as several already exist.	County Parks and Recreation, County Tourism Organization, Local businesses and companies.
Disc Golf Course	If only course on OBX, good attraction for non-beach days and for shoulder season. Depends on quality of the course.	Improved local attractions keep community engaged with one another and with common space.	Permitting land use on the BT site may be challenging due to the wetlands. Further, getting permission to use parts of adjacent properties will also be necessary to achieve the full 18-hole course.	Funding for this use has already been pledged. Additional funding may be available from other sources, such as the County Parks and Recreation Department and the local Tourism Board.
Multi-purpose Sports Field	Low, some visitors may come, but target use would be school and community groups. If hosting tournaments, increased visitation.	Benefits schools and community; though sports fields exist, more and higher quality ones would likely be utilized.	Parks and Recreation manages and maintains most sports fields. Question of management for town-owned property.	County Parks and Recreation, County Tourism Organization, Local businesses and companies, local private sports teams.

Note: BT means Baum Tract.
Source: ConsultEcon, Inc.; Surface 678; Town of Kill Devil Hills; Town of Duck; NC Parks and Recreation; outerbanks.org; obxpaddlers.org

Land Use Option	Volume and timing of vehicular trips	Parking requirements and shared parking potential	Earned revenue potential
Town Gathering Park / Pavilion / Amphitheater	Formal programming on evenings and weekends may cause high traffic volumes, but would not likely conflict with school hours.	Assuming high volume of usage, high need for parking space. Possibility to share with adjacent school complex.	Depends on what events are hosted and by whom. Summer concert/festival programming could generate some revenue. Likely low or self-sustaining.
Disc Golf Course	Afternoon and weekend use would may cause mid level traffic volumes. Tournament traffic may be high volume. Would not conflict with school hours.	Tournament use would bring maximum parking need, but would still likely be small. Possibility to share with adjacent school complex.	Hosting disc golf tournaments or as concession. Likely low or self-sustaining.
Multi-purpose Sports Field	Use would not likely be during school hours and would lighten the traffic load for other sports fields and facilities.	Parking could be shared with adjacent school-owned sports facilities. High volume of parking may be necessary.	Hosting tournaments in tandem with the county could generate revenue, but limited. Likely self-sustaining.

Note: BT means Baum Tract.
Source: ConsultEcon, Inc.; Surface 678; Town of Kill Devil Hills; Town of Duck; NC Parks and Recreation; outerbanks.org; obxpaddlers.org

Land Use Option	Capital costs (order of magnitude)	Maintenance / Operating Costs (order of magnitude)	Personnel requirements	Capital renewal requirements
Town Gathering Park / Pavilion / Amphitheater	Estimated $545,700 (includes construction of pavilion, site furnishings, waterline exstension, sanitary sewer, electrical connection and sanitary disposal system).	Estimated $20,000 Annually (includes landscaping for park, building maintenance, and utility costs).	Town Public Works Department maintains facility or organizes facility maintenance with contractors.	Depends on amount of use and popularity with community.
Disc Golf Course	Estimated $60,000 (includes design fees, furnishings, and selective clearing)	Estimated $20,000 Annually (depends on level of interest for local Disc Golf proponents and level of use).	Town management involved in coordination, landscaping and maintenance contractors, or local disc golf "club" maintains.	Depends on amount of use and popularity with community. Likely low.
Multi-purpose Sports Field	Estimated $992,000 (Includes synthetic turf field land preparation, installation, and furnishings)	Estimated $15,000 Annually (Depends on whether field is synthetic turf or real grass).	Ten person-weeks annually of maintenance labor by either Town Public Works or County Parks and Recreation.	Depends on amount of use and popularity with community.

Note: BT means Baum Tract.
Source: ConsultEcon, Inc.; Surface 678; Town of Kill Devil Hills; Town of Duck; NC Parks and Recreation; outerbanks.org; obxpaddlers.org

Land Use Option	Acreage required / allocated for use	Infrastructure requirements	Required adjacencies / compatible uses
Boardwalk and Nature Preservation	6'-8' Width - Length Varies. Estimated 600 linear feet, plus outlook and launch areas.	Boardwalk structure (6'-8' wide), kayak launch, lighting (solar powered?), possible covered areas (not enclosed), benches and/or picnic areas, overlook structure and education gathering spot.	Waterfront, could include children's playground and kayak / canoe launch. Also, could lead to different areas of site, including camping facility and picnic areas. Nature interpretation along boardwalk could be included in school curriculum.
Kayak / Canoe Launch	Estimated 600 linear feet of boardwalk, plus outlook and launch areas.	Boat racks, docking area, tie-up posts or handles.	Waterfront, could be included as part of boardwalk.

Land Use Option	Potential for shared use of space allotted	Leverages adjacent uses	Suitability of areas of the site for land use	Location on site/ potential for phasing
Boardwalk and Nature Preservation	Includes kayak/canoe launch.	Spread throughout natural environments on site, offers access to different pieces, including camping facility, kayak launch, observation deck, and picnic area.	Boardwalk and trail could be combined and traverse both wetland and upland areas. Possible to connect with greenways at Bermuda Bay to north and extend into the dune area south of the site (owned by NC Division of Parks and Recreation).	Dispersed. Must consider wildlife corridor. Best use for wetlands area.
Kayak / Canoe Launch	Included as a part of the boardwalk.	Incorporated with boardwalk and nature preserve area, could be extended over wetland and open water in places.	Extension of boardwalk, close to open water access on west-end of site.	Waterfront. Best use for wetlands area if included with boardwalk.

Note: BT means Baum Tract.
Source: ConsultEcon, Inc.; Surface 678; Town of Kill Devil Hills; Town of Duck; NC Parks and Recreation; outerbanks.org; obxpaddlers.org

Land Use Option	Target audiences (residents, tourists, events)	Serves multiple user types /seasonality of use	Presence of regional competitor
Boardwalk and Nature Preservation	Both locals and tourists; more access to natural environments. Could be incorporated with school science and nature curriculum.	Year round, but likely to be used more in summer and shoulder season. Serves all.	Several nature boardwalk facilities exist in the Outer Banks area. Of note are Jockey's Ridge State Park, The Nature Conservancy, Cape Hatteras NSS, Duck Town Park, and Sandy Run Park.
Kayak / Canoe Launch	All; as kayaking and canoeing are popular activities in the area.	Summer and shoulder periods. Serves all.	Approximately 25 launches located on the sound side of the Outer Banks, two of which are in the KDH area. Additionally, many waterfront properties have private access points.

Land Use Option	Economic / tourism impacts	Quality of life / resident impacts	Difficulty or Ease of permitting particular use	Potential funding sources
Boardwalk and Nature Preservation	Would support the existing tourism infrastructure.	Good, encouraging engagement and preservation of the environment. Educational enhancement of adjacent school curriculum.	Preservation of wetlands should be conscientously considered, especially regarding potentially covered areas.	County Parks and Recreation, County Tourism Organization, Local businesses and companies.
Kayak / Canoe Launch	Adds to the variety of launches available in the Outer Banks and serves as a good docking point for incoming canoers and kayakers, coming to use BT facilities.	Good for encouraging environmental awareness and healthy lifestyle.	Access from parking lot may be difficult. As similar facilities exist, likely easy to include in plan.	County Parks and Recreation, County Tourism Organization, Local businesses and companies.

Note: BT means Baum Tract.
Source: ConsultEcon, Inc.; Surface 678; Town of Kill Devil Hills; Town of Duck; NC Parks and Recreation; outerbanks.org; obxpaddlers.org

Land Use Option	Volume and timing of vehicular trips	Parking requirements and shared parking potential	Earned revenue potential
Boardwalk and Nature Preservation	Boardwalk usage hours may vary, but unlikely that high volume usage would occur to conflict with school hours.	Low parking volume necessary.	None.
Kayak / Canoe Launch	Launch usage hours may vary, but unlikely that high volume usage would conflict with local traffic and school.	Low parking volume necessary, but parking for trailers may be necessary.	None.

Land Use Option	Capital costs (order of magnitude)	Maintenance / Operating Costs (order of magnitude)	Personnel requirements	Capital renewal requirements
Boardwalk and Nature Preservation	Estimated $500,000 (Includes site prep, installation, materials) Depends on length of boardwalk.	Esitimated $6,000 Annually.	Town management and public works involved in coordination, landscaping and maintenance contractors.	Depends on amount of use and popularity with community.
Kayak / Canoe Launch	Estimated $500,000 (Includes site prep, installation, materials) Depends on length of boardwalk.	Esitimated $6,000 Annually.	Dock maintenance included with boardwalk and trail maintenance by public works.	Depends on amount of use and popularity with community.

Note: BT means Baum Tract.
Source: ConsultEcon, Inc.; Surface 678; Town of Kill Devil Hills; Town of Duck; NC Parks and Recreation; outerbanks.org; obxpaddlers.org

Land Use Option	Acreage required / allocated for use	Infrastructure requirements	Required adjacencies / compatible uses
Fenced Dog Park	At least 7,500 Square Feet.	Fencing, trash cans, plastic bag dispenser.	Adjacent to sports field, park, pavilion, playground.
Children's Playground	Less than 1 acre.	Play structure, benches, fencing.	Adjacent to dog park, pavilion, park, sports field. Best close to other central attraction, where parents are close by during sporting event or concert.
Camping Facilities for Organized Groups	1.5 Acres - (7 - 10) Camping Sites w/Staging.	Restrooms, tent platforms, dry space for fire pit, and possibly running water.	Should be separate, possible access to plumbing. Could be used for a variety of group programming uses.

Note: BT means Baum Tract.
Source: ConsultEcon, Inc.; Surface 678; Town of Kill Devil Hills; Town of Duck; NC Parks and Recreation; outerbanks.org; obxpaddlers.org

Land Use Option	Potential for shared use of space allotted	Leverages adjacent uses	Suitability of areas of the site for land use	Location on site/ potential for phasing
Fenced Dog Park	No, should be fenced off from other uses. Using an organic shape, however, might help to fit it into an otherwise less-used corner of another use area.	Centralized space includes park, amphitheater, concession stand, restrooms, fenced dog park, sports field, and playground.	Non-wetland - 26.19 acres.	East side - further from water.
Children's Playground	Stand alone, but could be incorporated as part of boardwalk.	Centralized space includes park, amphitheater, concession stand, restrooms, fenced dog park, sports field, and playground.	Non-wetland - 26.19 acres.	Close to gathering lawn, park, or sports field spaces.
Camping Facilities for Organized Groups	No; should be separate from other land uses.	Possibly incorporated with Boardwalk and Nature preserve section.	Possibly northern edge adjacent to Bermuda Bay, between wetland areas. Isolated from other active areas.	Anywhere, not on the wetland.

Note: BT means Baum Tract.
Source: ConsultEcon, Inc.; Surface 678; Town of Kill Devil Hills; Town of Duck; NC Parks and Recreation; outerbanks.org; obxpaddlers.org

Land Use Option	Target audiences (residents, tourists, events)	Serves multiple user types /seasonality of use	Presence of regional competitor
Fenced Dog Park	All pet-owners, mostly locals but some tourists as well, if dog needs enclosed space. This would be a "destination" dog park and inconvenient for most users in KDH.	Year-round. User types are pet owners in the area and some visitors.	KDH: May 15 - September 15, 9A-6P, dogs are banned from beach. Kitty Hawk Dog Park is mostly used by locals because it is conveniently on the way to the grocery store and other amenities.
Children's Playground	Children, especially during community events that may not be of interest to younger audiences.	Mostly summer and shoulder season. Benefits children who play and their parents.	Playgrounds incorporated into school grounds and some Dare County and Town parks.
Camping Facilities for Organized Groups	Local scouting troops, church groups, existing organizations who want a camping experience.	Summer with some shoulder season. Open for local organized groups with a permit.	Many commercial campgrounds; none for use by school or scouting groups. Eastern Carolina BSA Council has a camp over two hours from KDH.

Land Use Option	Economic / tourism impacts	Quality of life / resident impacts	Difficulty or Ease of permitting particular use	Potential funding sources
Fenced Dog Park	Low, some visitors with pets may come.	Benefits pet owners for having enclosed space to walk dogs; perhaps fosters community of pet owners.	Fairly easy, as several already exist.	Local kennel or pet store contributions from local organizations, companies, tourism board, parks and recreation.
Children's Playground	Low; some tourist families may use the facility, but use will be mostly as an accessory to other events.	Benefits community through children's creative spirit and providing constructive, safe activity during other events.	Fairly easy, if created as adjacent use to other uses.	County Parks and Recreation, County Tourism Organization, Local businesses and companies.
Camping Facilities for Organized Groups	Low; campsite target audience would be local organizations and permit from town would be necessary for any users.	High; community groups (including, boy scouts) do not have to travel as far to access camping facilities.	Easy to permit, but possibly difficult to police for unauthorized use.	Organized groups, such as scouting troops, who wish to use the site are responsible for funding.

Note: BT means Baum Tract.
Source: ConsultEcon, Inc.; Surface 678; Town of Kill Devil Hills; Town of Duck; NC Parks and Recreation; outerbanks.org; obxpaddlers.org

Land Use Option	Volume and timing of vehicular trips	Parking requirements and shared parking potential	Earned revenue potential
Fenced Dog Park	Dog walk times vary, but unlikely that volume of dog walkers would cause major traffic during school hours.	Low parking volume necessary.	None.
Children's Playground	This is, to some degree, an accessory use that provides and amenity to children, and would likely not be a traffic-causing destination.	As an accessory use, the playground itself does not necessitate a high volume of parking.	None.
Camping Facilities for Organized Groups	Small volume of camp site space available would mean low traffic volumes. Assuming park open during daylight hours only, no traffic at nights.	Low parking volume necessary.	Likely none. Nominal use fee may be charged for some groups to cover maintenance. Not a commercial campground.

Land Use Option	Capital costs (order of magnitude)	Maintenance / Operating Costs (order of magnitude)	Personnel requirements	Capital renewal requirements
Fenced Dog Park	Low.	Low, some grass and fence maintenance.	Town management involved in coordination, landscaping and maintenance contractors.	Depends on amount of use and popularity with community.
Children's Playground	Estimated $119,100 (includes fencing, play surface, and play structure).	Estimated 10 to 15 percent of capital cost, approximately $15,000 annually.	Town management involved in coordination, landscaping and maintenance contractors.	Target 10-year captial renewal cycle.
Camping Facilities for Organized Groups	Estimated $63,500 (includes selective clearing, construction of tent platforms, furnishings and common area clearing).	Organized groups, such as scouting troops, who wish to use the site are responsible for maintenance.	Organized groups, such as scouting troops, who wish to use the site are responsible for maintenance.	Likely low. Depends on amount of use and popularity with community.

Note: BT means Baum Tract.
Source: ConsultEcon, Inc.; Surface 678; Town of Kill Devil Hills; Town of Duck; NC Parks and Recreation; outerbanks.org; obxpaddlers.org

Land Use Option	Acreage required / allocated for use	Infrastructure requirements	Required adjacencies / compatible uses
Restrooms	1,500 SF - (2) Restrooms.	Restrooms, plumbing, water fountains, toilets, electricity. Possibility of composting disposal system.	Park, concession stand and restrooms should be together to centralize use of electricity and plumbing and user convenience.
Parking	Depends on site development and expected site use.	Pavement, painted parking space lines, fire hydrants, lighting.	Park, concession stand and restrooms should be together to centralize use of utilities and user convenience.
Concession Stand	Building w/RR, Kitchen, Seating Area - 2,500 SF.	Small building, plumbing, electricity, trash cans, pantry, food prep and sales area.	Park, amphitheater, concessions and restrooms should be together to centralize use of utilities, and user convenience.

Land Use Option	Potential for shared use of space allotted	Leverages adjacent uses	Suitability of areas of the site for land use	Location on site/ potential for phasing
Restrooms	Accessory to all public use.	Centralized space includes park, amphitheater, concession stand, restrooms, fenced dog park, sports field, and playground.	East-side or central area.	Depends on location of pavilion and gathering space. Utilities should be concentrated in one place.
Parking	Accessory to all public use.	Centralized space includes park, amphitheater, concession stand, restrooms, fenced dog park, sports field, and playground.	Close to road/entrance on East side of site.	Close to road/ entrance.
Concession Stand	Accessory to all public use.	Centralized space includes park, amphitheater, concession stand, restrooms, fenced dog park, sports field, and playground.	Best on east-side, close to entrance. Can operate in cooperation with ticket/info booth.	Close to entrance or adjacent to activity centers.

Note: BT means Baum Tract.
Source: ConsultEcon, Inc.; Surface 678; Town of Kill Devil Hills; Town of Duck; NC Parks and Recreation; outerbanks.org; obxpaddlers.org

Land Use Option	Target audiences (residents, tourists, events)	Serves multiple user types /seasonality of use	Presence of regional competitor
[redacted]	All.	Year Round / All.	Yes.
[redacted]	All.	Year Round / All.	Yes.
[redacted]	All.	Venue for a concession vendor or a group/club to provide a service for a fundraiser. Opening hours depend on events taking place.	Most local parks do not feature concession stands, but are located close to restaurants or convenience stores. Featuring a snack bar may be good, considering the Baum Tract's distance from commercial areas.

Land Use Option	Economic / tourism impacts	Quality of life / resident impacts	Difficulty or Ease of permitting particular use	Potential funding sources
[redacted]	Infrastructure.	A supportive use.	Depends on location within the site.	Depends on principal use.
[redacted]	Infrastructure.	A supportive use.	Necessary as supportive use.	Depends on principal use.
[redacted]	Infrastructure.	Positive outlet for employment and/or fundraising window.	Depends on how the facility will be used and operated.	Depends on principal use.

Note: BT means Baum Tract.
Source: ConsultEcon, Inc.; Surface 678; Town of Kill Devil Hills; Town of Duck; NC Parks and Recreation; outerbanks.org; obxpaddlers.org

Land Use Option	Volume and timing of vehicular trips	Parking requirements and shared parking potential	Earned revenue potential
Restrooms	Depends on principal use.	Depends on principal use.	None.
Parking	Depends on principal use.	Depends on principal use.	None.
Concession [illegible]	Depends on principal use.	Depends on principal use.	Depends on operating hours and adjacent space use.

Land Use Option	Capital costs (order of magnitude)	Maintenance / Operating Costs (order of magnitude)	Personnel requirements	Capital renewal requirements
Restrooms	Estimated $100,000 (includes plumbing and water line extension.) Overlap with pavilion construction.	Cleaning as scheduled and periodic maintenance.	Cleaning and maintenance likely provided by Town Public Works.	Depends on amount of use and popularity with community.
Parking	Estimately $230,000 (includes curbs and paving of parking lot).	Estimated $6,000 annually for 100 parking spaces.	Limited, related to Town Public Works.	Depends on amount of use and popularity with community.
Concession [illegible]	Included in Pavilion capital costs.	Included in Pavilion maintenance.	Managers and part-time work for students.	Depends on amount of use and popularity with community.

Note: BT means Baum Tract.
Source: ConsultEcon, Inc.; Surface 678; Town of Kill Devil Hills; Town of Duck; NC Parks and Recreation; outerbanks.org; obxpaddlers.org

Land Use Option	Acreage required / allocated for use	Infrastructure requirements	Required adjacencies / compatible uses
Mulching Operation Facility	5 Acres (or less).	Pavement, storage for mulching, truck access.	Best to be separate from other facilities on site.

Land Use Option	Potential for shared use of space allotted	Leverages adjacent uses	Suitability of areas of the site for land use	Location on site/ potential for phasing
Mulching Operation Facility	No.	No; should be set off from center of site and not accessible to the public.	Non-wetland. Preferably on edge, removed from other activities. Likely to remain in place in southeast corner.	Truck accessible, closer to road. Likely southeast corner, shares access road with parking lot.

Land Use Option	Target audiences (residents, tourists, events)	Serves multiple user types /seasonality of use	Presence of regional competitor
Mulching Operation Facility	Local operations.	Collection site exists year-round, 2-week pick-up period takes place 2 times per year, mulch grinding, 1 time per year.	Each town coordinates its own mulching operation for its residents.

Land Use Option	Economic / tourism impacts	Quality of life / resident impacts	Difficulty or Ease of permitting particular use	Potential funding sources
Mulching Operation Facility	No direct benefits for visitors.	More convenient access to mulch, better for community.	Already in existence; will the neighboring properties be in favor of continued use (Bermuda Bay)?	Town Public Works.

Land Use Option	Volume and timing of vehicular trips	Parking requirements and shared parking potential	Earned revenue potential
Mulching Operation Facility	During 2-week pickup season, 40+ truck trips per day. High volume starts after school starts in the morning, may conflict with after school pick up.	Parking for trucks during the day.	N/A, this is a town public service.

Land Use Option	Capital costs (order of magnitude)	Maintenance / Operating Costs (order of magnitude)	Personnel requirements	Capital renewal requirements
Mulching Operation Facility	Estimated $49,000 (includes paving, perimeter fecing, and gate).	Low.	Existing public works operation.	N/A.

Note: BT means Baum Tract.

Source: ConsultEcon, Inc.; Surface 678; Town of Kill Devil Hills; Town of Duck; NC Parks and Recreation; outerbanks.org; obxpaddlers.org

APPENDIX A

Interviews Conducted

- Jay Pontier – Expert on Disc Golf and Disc Golf Course Designer
- Lewis Hoffman – Expert on Disc Golf
- Tim White – Dare County Parks and Recreation Director
- Christopher Layton – Town of Duck Town Manager
- Steve Albright – Town of Kill Devil Hills Public Services
- Greg Loy – Town of Kill Devil Hills Planning

Field Visits

- Third Street Boat Access, Kill Devil Hills
- Bermuda Bay Residential Development, Kill Devil Hills
- Bob Perry Road Boat Access at Kitty Hawk Recycling Center, Kitty Hawk
- Dare County Airport and Park, Manteo
- Duck Town Park, Duck
- First Flight School Complex, Kill Devil Hills
- Ginguite Creek Kayak Launch, Kitty Hawk
- Jennette's Pier, Nags Head
- Jockey's Ridge State Park, Nags Head
- Kill Devil Hills Family Recreation Park, Kill Devil Hills
- Kill Devil Hills Field, Kill Devil Hills
- Kitty Hawk Park, Kitty Hawk
- Nags Head Soccer Complex, Nags Head
- Nags Head Town Park, Nags Head
- Nature Conservancy Nags Head Wood Preserve, Kill Devil Hills
- Roanoke Island Festival Park, Manteo
- Sandy Run Park, Kitty Hawk
- Windmill Point Event Space, Nags Head
- Whalebone Park, Nags Head
- Wright Brothers National Memorial, Kill Devil Hills
- Nags Head YMCA, Nags Head

Kill Devil Hills - Baum Tract - Option A

Surface 678, PA

PRELIMINARY STATEMENT OF PROBABLE CONSTRUCTION COST

August 11, 2014

PRE-SCHEMATIC PHASE

ITEMS & ASSUMPTIONS	QTY.	UNIT	UNIT COST	TOTAL
SITEWORK				
PRECONSTRUCTION				
Site Preparation & Mobilization				
Includes the following: Temporary Utilities, Construction Office, Traffic Control, Staging, and Existing Conditions Verification		ALLOW		$100,000.00
Site Protection				
Includes the following: Construction fencing, gates, and temporary construction drive		ALLOW		$15,000.00
Erosion Control / Environmental Protection				
Tree Protection Fence - 3' ht.	4,000	lf	$4.00	$16,000.00
Silt Fence - 3' ht.	2,500	lf	$3.00	$7,500.00
Inlet Protection - maintained	25	ea	$250.00	$6,250.00
Demolition / Excavation / Removal				
Clearing and Grubbing	7	ac	$5,000.00	$35,000.00
Earthwork				
Grading		ALLOW		$100,000.00
Unsuitalbe Soil Replacement Allowance		ALLOW		$15,000.00
	PRECONSTRUCTION SITEWORK Subtotal			*$294,750.00*
Dumping Fees - 6%				*$17,685.00*
	PRECONSTRUCTION SITEWORK AND DUMPING FEES Subtotal			*$312,435.00*
SITE CONSTRUCTION				
Hardscapes				
Curbs				
Curb	800	lf	$20.00	$16,000.00
Paving/ Trails				
Asphalt Drive- heavy duty - stone base	4,050	sy	$34.00	$137,700.00
Asphalt Parking Stalls - Light Duty - stone base	2,530	sy	$30.00	$75,900.00
Asphalt Trail/ Greenway (10' wide; includes greenway & multi-modal trails)	3,200	lf	$30.00	$96,000.00
Concrete Sidewalk & Plaza	4,500	sf	$5.00	$22,500.00
Mulch Trail (6' wide and 3" thick)	0	cy	$30.00	$0.00
Boardwalks (includes Phase I boardwalks & overlooks only)				
Boardwalk Trails	700	lf	$120.00	$84,000.00
Decks/ Overlooks at Water's Edge (approx. 300 sf each)	2	ea	$20,000.00	$40,000.00
	Hardscape and Trails Subtotal			*$472,100.00*

Kill Devil Hills - Baum Tract - Option A

Surface 678, PA

PRELIMINARY STATEMENT OF PROBABLE CONSTRUCTION COST

August 11, 2014

PRE-SCHEMATIC PHASE

ITEMS & ASSUMPTIONS	QTY.	UNIT	UNIT COST	TOTAL
Planting/ Landscape				
Trees - Deciduous 16' (3.5" cal.)	40	ea	$600.00	$24,000.00
Trees - Flowering 12' (2" cal.)	40	ea	$300.00	$12,000.00
Trees Evergreen 12' (2" cal.)	70	ea	$350.00	$24,500.00
Shrubs - Evergreen 24" ht. - 30" o.c.	250	ea	$40.00	$10,000.00
Groundcovers 1 gal - 12" o.c.	1,500	ea	$10.00	$15,000.00
Ornamental Grasses/ Perennials 1 gal - 12" o.c.	1,000	ea	$12.00	$12,000.00
			Planting Subtotal	*$97,500.00*
Utilities				
Utilities - Electrical - unknown	1	ALLOW	$20,000.00	$20,000.00
Utilities - Sanitary sewer - (to Pavilion Structure)	1,275	lf	$12.00	$15,300.00
Utilities - Sanitary sewer - (to Nature Porch Structure)	1,000	lf	$12.00	$12,000.00
Utilities - Sleeves - (future unknowns)	1	ALLOW	$3,000.00	$3,000.00
Utilities - Storm Drainage - Unknown Piping & Ponds	1	ALLOW	$40,000.00	$40,000.00
Utilities - Waterline Extension - (to Pavilion Structure)	1,300	lf	$25.00	$32,500.00
Utilities - Waterline Extension - (to Nature Porch Structure)	1,000	lf	$25.00	$25,000.00
Pump Station Grinder (Pump from one location to another)	1	ALLOW	$25,000.00	$25,000.00
Sanitary Disposal System	1	ALLOW	$35,000.00	$35,000.00
			Utilities Subtotal	*$207,800.00*
Irrigation - all components				
Irrigation - sports fields (to cool down artificial turf field)	2	ALLOW	$15,000.00	$30,000.00
Irrigation - landscape beds	1	ALLOW	$15,000.00	$15,000.00
			Irrigation Subtotal	*$45,000.00*
Sports Fields				
Artificial Turf (sports fields; includes additional sf for town gathering)	1	ALLOW	$700,000.00	$700,000.00
Sub-drainage (sports fields)	1	ALLOW	$180,000.00	$180,000.00
Fencing w/ Netting (lining sports fields along wetlands)	1	ALLOW	$40,000.00	$40,000.00
Concrete Flush Curb (surrounding sports fields)	4,500	lf	$16.00	$72,000.00
			Sports Field Subtotal	*$992,000.00*
Playground / Children's Play Area				
Playground Structure	1	ALLOW	$50,000.00	$50,000.00
Play Surface	5,500	sf	$9.00	$49,500.00
Fencing	350	lf	$40.00	$14,000.00
Concrete Flush Curb (surrounding sports field)	350	lf	$16.00	$5,600.00
			Playground / Children's Play Subtotal	*$119,100.00*
Disc Golf Course				
Tee boxes and baskets, signage; installation	18	ea	$2,000.00	$36,000.00
** Selective Clearing & Grubbing (1/3 of holes to require min. clearing)	12	ea	$1,000.00	$12,000.00
Adjustment Settings for tee boxes	18	ea	$500.00	$9,000.00
Design Fees	1	ea	$3,000.00	$3,000.00
			Disc Golf Subtotal	*$60,000.00*

Kill Devil Hills - Baum Tract - Option A

Surface 678, PA

PRELIMINARY STATEMENT OF PROBABLE CONSTRUCTION COST

August 11, 2014

PRE-SCHEMATIC PHASE

ITEMS & ASSUMPTIONS	QTY.	UNIT	UNIT COST	TOTAL
Pavillion Structure				
450 sf of restrooms	450	sf	$250.00	$112,500.00
300 sf of storage space	300	sf	$200.00	$60,000.00
400 sf of covered outdoor porch area	400	sf	$50.00	$20,000.00
	Pavillion Structure Subtotal			*$192,500.00*
Outdoor Education Structure (Nature Porch)				
450 sf of unconditioned gathering space (occupancy for 50 people)	1,000	sf	$125.00	$125,000.00
300 sf of storage space	75	sf	$125.00	$9,375.00
128 sf of single occupant restroom	128	sf	$250.00	$32,000.00
1376 sf of outdoor deck area	1,376	sf	$35.00	$48,160.00
	Outdoor Education Structure Subtotal			*$214,535.00*
Mulching Operation				
Perimeter Fencing	800	lf	$30.00	$24,000.00
Access Gate	1	ea	$5,000.00	$5,000.00
Pavement (Gravel Drive Area)	1	ALLOW	$20,000.00	$20,000.00
	Mulching Operation Subtotal			*$49,000.00*
Site Lighting				
Sports Field Lights	1	ALLOW	$260,000.00	$260,000.00
Parking Lot Fixtures - LED	7	ea	$2,500.00	$17,500.00
Pedestrian Pole Fixtures - LED	20	ea	$2,500.00	$50,000.00
Parking & Pedestrian Light Installation	1	ALLOW	$35,000.00	$35,000.00
	Site Lighting Subtotal			*$362,500.00*
Site Furnishings				
Tables	10	ea	$1,340.00	$13,400.00
Seating - Benches	15	ea	$1,000.00	$15,000.00
Trash/Recycle Receptacles	10	ea	$600.00	$6,000.00
Bike Racks	10	ea	$600.00	$6,000.00
Bollards	10	ea	$1,000.00	$10,000.00
	Site Furniture / Amenities Subtotal			*$50,400.00*
ALL SITEWORK (Preconstruction / Construction / Additional Construction) Subtotal				*$3,174,870.00*

Kill Devil Hills - Baum Tract - Option A

Surface 678, PA

PRELIMINARY STATEMENT OF PROBABLE CONSTRUCTION COST

August 11, 2014

PRE-SCHEMATIC PHASE

ITEMS & ASSUMPTIONS	QTY.	UNIT	UNIT COST	TOTAL
CONSTRUCTION FEES				
ALL SITEWORK (Preconstruction / Construction / Additional - Construction Fees Basis) Total				*$3,174,870.00*
Contractor Overhead and Profit - 10%				$317,487.00
			Cummulative Subtotal	*$3,492,357.00*
Contractor Mobilization and Bonds - 4%				$139,694.28
			Cummulative Subtotal (Not Including Contingency)	*$3,632,051.28*
Contingency - 20%				$726,410.26
			CONSTRUCTION FEES Total (Includes Contingency)	*$1,183,592.00*
ALL SITEWORK AND CONSTRUCTION FEES Total (Includes Contingency)				*$4,358,462.00*

** Assumes significant install labor provided by volunteer services

Kill Devil Hills - Baum Tract - Option B

Surface 678, PA

PRELIMINARY STATEMENT OF PROBABLE CONSTRUCTION COST

August 11, 2014

PRE-SCHEMATIC PHASE

ITEMS & ASSUMPTIONS	QTY.	UNIT	UNIT COST	TOTAL
SITEWORK				
PRECONSTRUCTION				
Site Preparation & Mobilization				
Includes the following: Temporary Utilities, Construction Office, Traffic Control, Staging, and Existing Conditions Verification		ALLOW		$100,000.00
Site Protection				
Includes the following: Construction fencing, gates, and temporary construction drive		ALLOW		$15,000.00
Erosion Control / Environmental Protection				
Tree Protection Fence - 3' ht.	4,000	lf	$4.00	$16,000.00
Silt Fence - 3' ht.	2,500	lf	$3.00	$7,500.00
Inlet Protection - maintained	25	ea	$250.00	$6,250.00
Demolition / Excavation / Removal				
Clearing and Grubbing	5	ac	$5,000.00	$25,000.00
Earthwork				
Grading		ALLOW		$100,000.00
Unsuitalbe Soil Replacement Allowance		ALLOW		$15,000.00
	PRECONSTRUCTION SITEWORK Subtotal			*$284,750.00*
Dumping Fees - 6%				*$17,085.00*
	PRECONSTRUCTION SITEWORK AND DUMPING FEES Subtotal			*$301,835.00*
SITE CONSTRUCTION				
Hardscapes				
Curbs				
Curb	600	lf	$20.00	$12,000.00
Paving/ Trails				
Asphalt Drive- heavy duty - includes stone base	4,000	sy	$34.00	$136,000.00
Asphalt Parking Stalls - Light Duty - includes stone base	2,200	sy	$30.00	$66,000.00
Asphalt Trail/ Greenway (10' wide; includes greenway & multi-modal trails)	3,200	lf	$30.00	$96,000.00
Concrete Sidewalk & Plaza	4,500	sf	$5.00	$22,500.00
Mulch Trail (6' wide and 3" thick)	0	cy	$30.00	$0.00
Boardwalks				
Boardwalk Trails	700	lf	$120.00	$84,000.00
Decks/ Overlooks at Water's Edge (approx. 300 sf each)	2	ea	$20,000.00	$40,000.00
	Hardscape and Trails Subtotal			*$456,500.00*

Kill Devil Hills - Baum Tract - Option B

Surface 678, PA

PRELIMINARY STATEMENT OF PROBABLE CONSTRUCTION COST

August 11, 2014

PRE-SCHEMATIC PHASE

ITEMS & ASSUMPTIONS	QTY.	UNIT	UNIT COST	TOTAL
Planting/ Landscape				
Trees - Deciduous 16' (3.5" cal.)	40	ea	$600.00	$24,000.00
Trees - Flowering 12' (2" cal.)	40	ea	$300.00	$12,000.00
Trees Evergreen 12' (2" cal.)	70	ea	$350.00	$24,500.00
Shrubs - Evergreen 24" ht. - 30" o.c.	250	ea	$40.00	$10,000.00
Groundcovers 1 gal - 12" o.c.	1,500	ea	$10.00	$15,000.00
Ornamental Grasses/ Perennials 1 gal - 12" o.c.	1,000	ea	$12.00	$12,000.00
Sod - Town Gathering Space	40,000	sf	$0.75	$30,000.00
			Planting Subtotal	*$127,500.00*
Utilities				
Utilities - Electrical - unknown	1	ALLOW	$20,000.00	$20,000.00
Utilities - Sanitary sewer - (to Pavillion Structure)	1,275	lf	$12.00	$15,300.00
Utilities - Sanitary sewer - (to Nature Porch Structure)	1,000	lf	$12.00	$12,000.00
Utilities - Sleeves - (future unknowns)	1	ALLOW	$3,000.00	$3,000.00
Utilities - Storm Drainage - Unknown Piping & Ponds	1	ALLOW	$40,000.00	$40,000.00
Utilities - Waterline Extension - (to Pavillion Structure)	1,300	lf	$25.00	$32,500.00
Utilities - Waterline Extension - (to Nature Porch Structure)	1,000	lf	$25.00	$25,000.00
Pump Station Grinder (Pump from one location to another)	1	ALLOW	$25,000.00	$25,000.00
Sanitary Disposal System	1	ALLOW	$35,000.00	$35,000.00
			Utilities Subtotal	*$207,800.00*
Irrigation - all components				
Irrigation - town gathering space	1	ALLOW	$20,000.00	$20,000.00
Irrigation - landscape beds	1	ALLOW	$15,000.00	$15,000.00
			Irrigation Subtotal	*$35,000.00*
Playground / Children's Play Area				
Playground Structure	1	ALLOW	$50,000.00	$50,000.00
Play Surface	5,500	sf	$9.00	$49,500.00
Fencing	350	lf	$40.00	$14,000.00
Concrete Flush Curb (surrounding sports field)	350	lf	$16.00	$5,600.00
			Playground / Children's Play Subtotal	*$119,100.00*
Disc Golf Course				
Tee boxes and baskets, signage; installation	18	ea	$2,000.00	$36,000.00
** Selective Clearing & Grubbing (1/3 of holes to require min. clearing)	12	ea	$1,000.00	$12,000.00
Adjustment Settings for tee boxes	18	ea	$500.00	$9,000.00
Design Fees	1	ea	$3,000.00	$3,000.00
			Disc Golf Subtotal	*$60,000.00*

Kill Devil Hills - Baum Tract - Option B

Surface 678, PA

PRELIMINARY STATEMENT OF PROBABLE CONSTRUCTION COST

August 11, 2014

PRE-SCHEMATIC PHASE

ITEMS & ASSUMPTIONS	QTY.	UNIT	UNIT COST	TOTAL
Campground				
Selective clearing for tent pad / earthwork requirements	7	ea	$2,000.00	$14,000.00
Tent pad construction	7	ea	$2,500.00	$17,500.00
Furnishings (Table and Trash Receptacle)	7	ea	$1,000.00	$7,000.00
Camper Gathering / Common Space	1	ALLOW	$25,000.00	$25,000.00
			Campground Subtotal	*$63,500.00*
Stage Structure (Town Gathering)				
Stage Structure (includes electric for equipment power)	1	ALLOW	$150,000.00	$150,000.00
Stage Lighting	1	ALLOW	$25,000.00	$25,000.00
Stage Acoustics/ Speakers/ Audio	1	ALLOW	$25,000.00	$25,000.00
			Stage Structure Subtotal	*$200,000.00*
Pavillion Structure				
450 sf of restrooms	450	sf	$250.00	$112,500.00
300 sf of storage space	300	sf	$200.00	$60,000.00
400 sf of covered outdoor porch area	400	sf	$50.00	$20,000.00
			Pavillion Structure Subtotal	*$192,500.00*
Outdoor Education Structure (Nature Porch)				
450 sf of unconditioned gathering space (occupancy for 50 people)	1,000	sf	$125.00	$125,000.00
300 sf of storage space	75	sf	$125.00	$9,375.00
128 sf of single occupant restroom	128	sf	$250.00	$32,000.00
1376 sf of outdoor deck area	1,376	sf	$35.00	$48,160.00
			Outdoor Education Structure Subtotal	*$214,535.00*
Mulching Operation				
Perimeter Fencing	800	lf	$30.00	$24,000.00
Access Gate	1	ea	$5,000.00	$5,000.00
Pavement (Gravel Drive Area)	1	ALLOW	$20,000.00	$20,000.00
			Mulching Operation Subtotal	*$49,000.00*
Site Lighting				
Parking Lot Fixtures - LED	7	ea	$2,500.00	$17,500.00
Pedestrian Pole Fixtures - LED	20	ea	$2,500.00	$50,000.00
Parking & Pedestrian Light Installation	1	ALLOW	$35,000.00	$35,000.00
			Site Lighting Subtotal	*$102,500.00*

Kill Devil Hills - Baum Tract - Option B

Surface 678, PA

PRELIMINARY STATEMENT OF PROBABLE CONSTRUCTION COST

August 11, 2014

PRE-SCHEMATIC PHASE

ITEMS & ASSUMPTIONS	QTY.	UNIT	UNIT COST	TOTAL
Site Furnishings				
Tables	10	ea	$1,340.00	$13,400.00
Seating - Benches	15	ea	$1,000.00	$15,000.00
Trash/Recycle Receptacles	10	ea	$600.00	$6,000.00
Bike Racks	10	ea	$600.00	$6,000.00
Bollards	10	ea	$1,000.00	$10,000.00
			Site Furniture / Amenities Subtotal	*$50,400.00*
			ALL SITEWORK (Preconstruction / Construction / Additional Construction) Subtotal	*$2,180,170.00*
CONSTRUCTION FEES				
			ALL SITEWORK (Preconstruction / Construction / Additional - Construction Fees Basis) Total	*$2,180,170.00*
Contractor Overhead and Profit - 10%				$218,017.00
			Cummulative Subtotal	*$2,398,187.00*
Contractor Mobilization and Bonds - 4%				$95,927.48
			Cummulative Subtotal (Not Including Contingency)	*$2,494,114.48*
Contingency - 20%				$498,822.90
			CONSTRUCTION FEES Total (Includes Contingency)	*$812,767.00*
			ALL SITEWORK AND CONSTRUCTION FEES Total (Includes Contingency)	*$2,992,937.00*

** Assumes significant install labor provided by volunteer services

Kill Devil Hills - Baum Tract - Option C

Surface 678, PA

August 11, 2014

PRELIMINARY STATEMENT OF PROBABLE CONSTRUCTION COST

PRE-SCHEMATIC PHASE

ITEMS & ASSUMPTIONS	QTY.	UNIT	UNIT COST	TOTAL
SITEWORK				
PRECONSTRUCTION				
Site Preparation & Mobilization				
Includes the following: Temporary Utilities, Construction Office, Traffic Control, Staging, and Existing Conditions Verification		ALLOW		$70,000.00
Site Protection				
Includes the following: Construction fencing, gates, and temporary construction drive		ALLOW		$15,000.00
Erosion Control / Environmental Protection				
Tree Protection Fence - 3' ht.	3,000	lf	$4.00	$12,000.00
Silt Fence - 3' ht.	2,500	lf	$3.00	$7,500.00
Inlet Protection - maintained	25	ea	$250.00	$6,250.00
Demolition / Excavation / Removal				
Clearing and Grubbing	3	ac	$5,000.00	$12,500.00
Earthwork				
Grading		ALLOW		$30,000.00
Unsuitalbe Soil Replacement Allowance		ALLOW		$5,000.00
	PRECONSTRUCTION SITEWORK Subtotal			*$158,250.00*
Dumping Fees - 6%				*$9,495.00*
	PRECONSTRUCTION SITEWORK AND DUMPING FEES Subtotal			*$167,745.00*
SITE CONSTRUCTION				
Hardscapes				
Curbs				
Curb	300	lf	$20.00	$6,000.00
Paving/ Trails				
Asphalt Drive- heavy duty - includes stone base	2,550	sy	$34.00	$86,700.00
Asphalt Parking Stalls - Light Duty - includes stone base	550	sy	$30.00	$16,500.00
Asphalt Trail/ Greenway (10' wide; includes greenway & multi-modal trails)	3,200	lf	$30.00	$96,000.00
Concrete Sidewalk & Plaza	1,500	sf	$5.00	$7,500.00
Mulch Trail (6' wide and 3" thick)	0	cy	$30.00	$0.00
Boardwalks				
Boardwalk Trails	700	lf	$120.00	$84,000.00
Decks/ Overlooks at Water's Edge (approx. 300 sf each)	2	ea	$20,000.00	$40,000.00
	Hardscape and Trails Subtotal			*$336,700.00*

Kill Devil Hills - Baum Tract - Option C

Surface 678, PA

PRELIMINARY STATEMENT OF PROBABLE CONSTRUCTION COST

August 11, 2014

PRE-SCHEMATIC PHASE

ITEMS & ASSUMPTIONS	QTY.	UNIT	UNIT COST	TOTAL
Planting/ Landscape				
Trees - Deciduous 16' (3.5" cal.)	15	ea	$600.00	$9,000.00
Trees - Flowering 12' (2" cal.)	15	ea	$300.00	$4,500.00
Trees Evergreen 12' (2" cal.)	40	ea	$350.00	$14,000.00
Shrubs - Evergreen 24" ht. - 30" o.c.	175	ea	$40.00	$7,000.00
Groundcovers 1 gal - 12" o.c.	1,000	ea	$10.00	$10,000.00
Ornamental Grasses/ Perennials 1 gal - 12" o.c.	750	ea	$12.00	$9,000.00
			Planting Subtotal	*$53,500.00*
Utilities				
Utilities - Electrical - unknown	1	ALLOW	$15,000.00	$15,000.00
Utilities - Sanitary sewer - (to Nature Porch Structure)	1,300	lf	$12.00	$15,600.00
Utilities - Sleeves - (future unknowns)	1	ALLOW	$3,000.00	$3,000.00
Utilities - Storm Drainage - Unknown Piping & Ponds	1	ALLOW	$15,000.00	$15,000.00
Utilities - Waterline Extension - (to Nature Porch Structure)	2,300	lf	$25.00	$57,500.00
Pump Station Grinder (Pump from one location to another)	1	ALLOW	$25,000.00	$25,000.00
Sanitary Disposal System	1	ALLOW	$35,000.00	$35,000.00
			Utilities Subtotal	*$166,100.00*
Irrigation - all components				
Irrigation - landscape beds	1	ALLOW	$10,000.00	$10,000.00
			Irrigation Subtotal	*$10,000.00*
Disc Golf Course				
Tee boxes and baskets, signage; installation	18	ea	$2,000.00	$36,000.00
** Selective Clearing & Grubbing	18	ea	$1,000.00	$18,000.00
Adjustment Settings for tee boxes	18	ea	$500.00	$9,000.00
Design Fees	1	ea	$3,000.00	$3,000.00
			Disc Golf Subtotal	*$66,000.00*
Outdoor Education Structure (Nature Porch)				
450 sf of unconditioned gathering space (occupancy for 50 people)	1,000	sf	$125.00	$125,000.00
300 sf of storage space	75	sf	$125.00	$9,375.00
128 sf of single occupant restroom	128	sf	$250.00	$32,000.00
1376 sf of outdoor deck area	1,376	sf	$35.00	$48,160.00
			Outdoor Education Structure Subtotal	*$214,535.00*
Mulching Operation				
Perimeter Fencing	800	lf	$30.00	$24,000.00
Access Gate	1	ea	$5,000.00	$5,000.00
Pavement (Gravel Drive Area)	1	ALLOW	$20,000.00	$20,000.00
			Mulching Operation Subtotal	*$49,000.00*

Kill Devil Hills - Baum Tract - Option C

Surface 678, PA

August 11, 2014

PRELIMINARY STATEMENT OF PROBABLE CONSTRUCTION COST

PRE-SCHEMATIC PHASE

ITEMS & ASSUMPTIONS	QTY.	UNIT	UNIT COST	TOTAL
Site Lighting				
Parking Lot Fixtures - LED	4	ea	$2,500.00	$10,000.00
Pedestrian Pole Fixtures - LED	5	ea	$2,500.00	$12,500.00
Parking & Pedestrian Light Installation	1	ALLOW	$20,000.00	$20,000.00
			Site Lighting Subtotal	*$42,500.00*
Site Furnishings				
Seating - Benches	10	ea	$1,000.00	$10,000.00
Trash/Recycle Receptacles	10	ea	$600.00	$6,000.00
Bike Racks	10	ea	$600.00	$6,000.00
Bollards	5	ea	$1,000.00	$5,000.00
			Site Furniture / Amenities Subtotal	*$27,000.00*
ALL SITEWORK (Preconstruction / Construction / Additional Construction) Subtotal				*$1,133,080.00*

CONSTRUCTION FEES

ALL SITEWORK (Preconstruction / Construction / Additional - Construction Fees Basis) Total		*$1,133,080.00*
Contractor Overhead and Profit - 10%		$113,308.00
	Cummulative Subtotal	*$1,246,388.00*
Contractor Mobilization and Bonds - 4%		$49,855.52
	Cummulative Subtotal (Not Including Contingency)	*$1,296,243.52*
Contingency - 20%		$259,248.70
	CONSTRUCTION FEES Total (Includes Contingency)	*$422,412.00*
ALL SITEWORK AND CONSTRUCTION FEES Total (Includes Contingency)		*$1,555,492.00*

** Assumes significant install labor provided by volunteer services

Kill Devil Hills

Baum Tract

August 11 2014

Option A - Preliminary Cost Summary

CONSTRUCTION TASK	CONSTRUCTION COST/ CAPITAL INVESTMENT	ANNUAL MAINTENANCE	
PRECONSTRUCTION COSTS			
Site Preparation & Mobilization	$100,000		
Site Protection	$15,000		
Erosion Control / Environmental Protection	$29,750		
Demolition / Excavation / Removal	$35,000		
Earthwork	$115,000		
Dumping Fees	$17,685		
SITE CONSTRUCTION COSTS			
Hardscapes (Includes Trails, Boardwalks, Parking)	$472,100	$15,000	
Planting / Landscape	$97,500	$20,000	
Utilities	$207,800	$3,000	
Irrigation	$45,000	$3,000	
Sports Fields	$992,000	$13,000	
Playground / Children's Play Area	$119,100	$15,000	**
Disc Golf Course	$60,000	$8,000	*
Pavilion Structure	$192,500	$1,500	
Outdoor Education Structure (Nature Porch)	$214,535	$2,400	
Mulching Operation	$49,000	$5,000	
Site Lighting	$362,500	$3,000	
Site Furnishing	$50,400	$3,000	
SUBTOTALS			
Sitework Subtotal	**$3,174,870**		
Subtotal w/ 10% Contractor Overhead/ Profit	**$3,492,357**		
Subtotal w/ Contractor Mobilization / Bonds	**$3,632,051**		
Subtotal w/ Contingency 20% Included	**$726,410**		
TOTALS - CONSTRUCTION FEES			
Sitework Total	**$4,358,462**	**$91,900**	

* Assumes volunteer assistance from Town residents or local organizations

** Contributes annual maintenance costs to repair / capital replacement fund based on 10 yr life cycle

Kill Devil Hills

Baum Tract

August 11 2014

Option B - Preliminary Cost Summary

CONSTRUCTION TASK	CONSTRUCTION COST/ CAPITAL INVESTMENT	ANNUAL MAINTENANCE	
PRECONSTRUCTION COSTS			
Site Preparation & Mobilization	$100,000		
Site Protection	$15,000		
Erosion Control / Environmental Protection	$29,750		
Demolition / Excavation / Removal	$25,000		
Earthwork	$115,000		
Dumping Fees	$17,085		
SITE CONSTRUCTION COSTS			
Hardscapes (Includes Trails, Boardwalks, Parking)	$456,500	$14,250	
Planting / Landscape (Includes gathering lawn)	$127,500	$30,000	
Utilities	$207,800	$3,000	
Irrigation	$35,000	$3,000	
Campground	$63,500	$0	*
Playground / Children's Play Area	$119,100	$15,000	**
Disc Golf Course	$60,000	$8,000	*
Pavillion Structure	$192,500	$1,500	
Outdoor Education Structure (Nature Porch)	$214,535	$2,400	
Stage Structure	$200,000	$2,500	
Mulching Operation	$49,000	$5,000	
Site Lighting	$102,500	$3,000	
Site Furnishing	$50,400	$3,000	
SUBTOTALS			
Sitework Subtotal	**$2,180,170**		
Subtotal w/ 10% Contractor Overhead/ Profit	**$2,398,187**		
Subtotal w/ Contractor Mobilization / Bonds	**$2,494,114**		
Subtotal w/ Contingency 20% Included	**$498,823**		
TOTALS - CONSTRUCTION FEES			
Sitework Total	**$2,992,937**	**$90,650**	

* Assumes volunteer assistance from Town residents or local organizations

** Contributes annual maintenance costs to repair / capital replacement fund based on 10 yr life cycle

Kill Devil Hills

Baum Tract

August 11 2014

Option C - Preliminary Cost Summary

PRECONSTRUCTION COSTS

CONSTRUCTION TASK	CONSTRUCTION COST/ CAPITAL INVESTMENT	ANNUAL MAINTENANCE
Site Preparation & Mobilization	$70,000	
Site Protection	$15,000	
Erosion Control / Environmental Protection	$25,750	
Demolition / Excavation / Removal	$12,500	
Earthwork	$35,000	
Dumping Fees	$9,495	

SITE CONSTRUCTION COSTS

Hardscapes (Includes Trails, Boardwalks, Parking)	$336,700	$11,000	
Planting / Landscape (Includes gathering lawn)	$53,500	$10,700	
Utilities	$166,100	$3,000	
Irrigation	$10,000	$1,200	
Disc Golf Course	$66,000	$8,000	*
Outdoor Education Structure (Nature Porch)	$214,535	$2,400	
Mulching Operation	$49,000	$5,000	
Site Lighting	$42,500	$1,800	
Site Furnishing	$27,000	$1,800	

SUBTOTALS

Sitework Subtotal	**$1,133,080**
Subtotal w/ 10% Contractor Overhead/ Profit	**$1,246,388**
Subtotal w/ Contractor Mobilization / Bonds	**$1,296,244**
Subtotal w/ Contingency 20% Included	**$259,249**

TOTALS - CONSTRUCTION FEES

Sitework Total	**$1,555,492**	**$44,900**

* Assumes volunteer assistance from Town residents or local organizations

** Contributes annual maintenance costs to repair / capital replacement fund based on 10 yr life cycle

Kill Devil Hills

KILL DEVIL HILLS BAUM TRACT
SITE DESIGN CONCEPT 08.11.14
SPORTS COMPLEX & COMMUNITY GATHERING OPT A

0 40 80 160 320 640
SCALE 1"=80'

Surface CLEARSCAPES ARCHITECTURE + ARE BASH ConsultEcon

Kill Devil Hills

KILL DEVIL HILLS BAUM TRACT
SITE DESIGN CONCEPT 08.11.14
COMMUNITY GATHERING AND NATURE TRAILS OPT B

0 40 80 160 320 640
SCALE 1"=80'

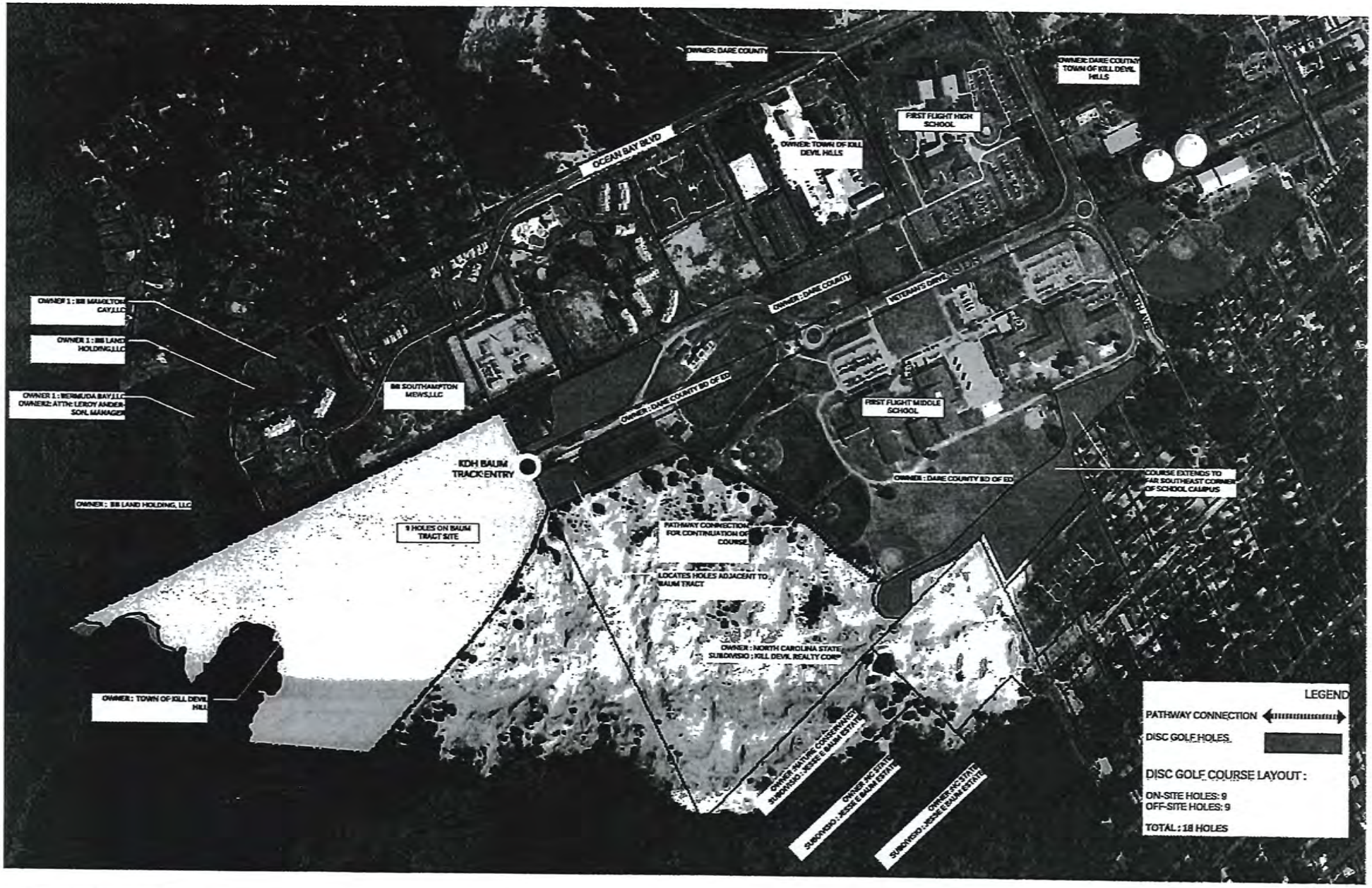
Surface CLEARSCAPES ARCHITECTURE + ART BASSETT ConsultEcon

Kill Devil Hills

KILL DEVIL HILLS BAUM TRACT
SITE DESIGN CONCEPT 08.11.14
DISC GOLF AND NATURE TRAILS OPT C

0 40 80 160 320 640
SCALE 1"=80'

Surface CLEARSCAPES ARCHITECTURE + ART BASSETT ConsultEcon

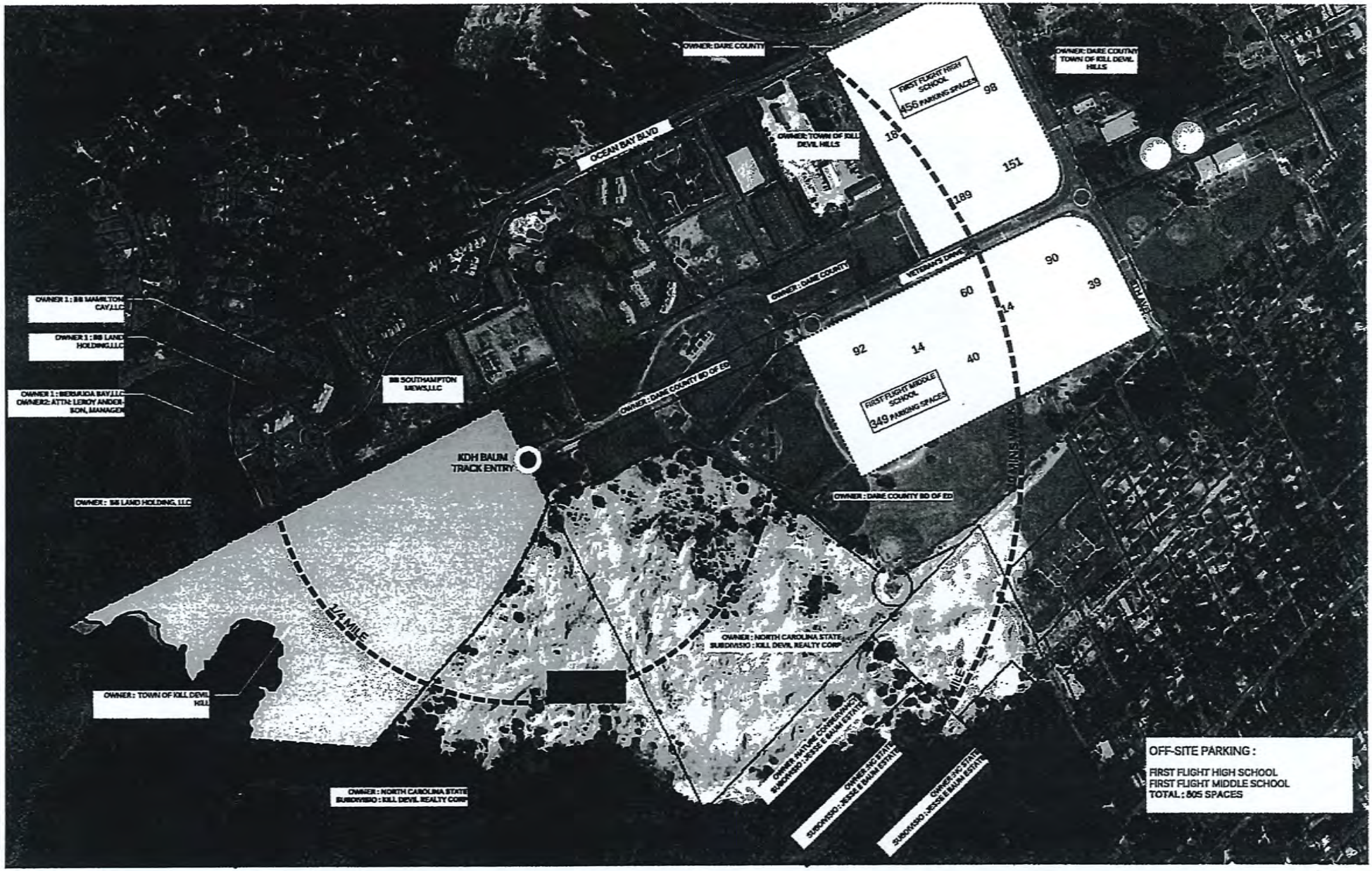


Kill Devil Hills

KILL DEVIL HILLS BAUM TRACT
OFF-SITE DISC-GOLF - FUTURE PHASE
08.11.14

0 200 400 800

Surface CLEARSCAPES ARCHITECTURE + ARE BASSELL ConsultEcon



Kill Devil Hills

KILL DEVIL HILLS BAUM TRACT
OFF-SITE PARKING ANALYSIS
08.11.14

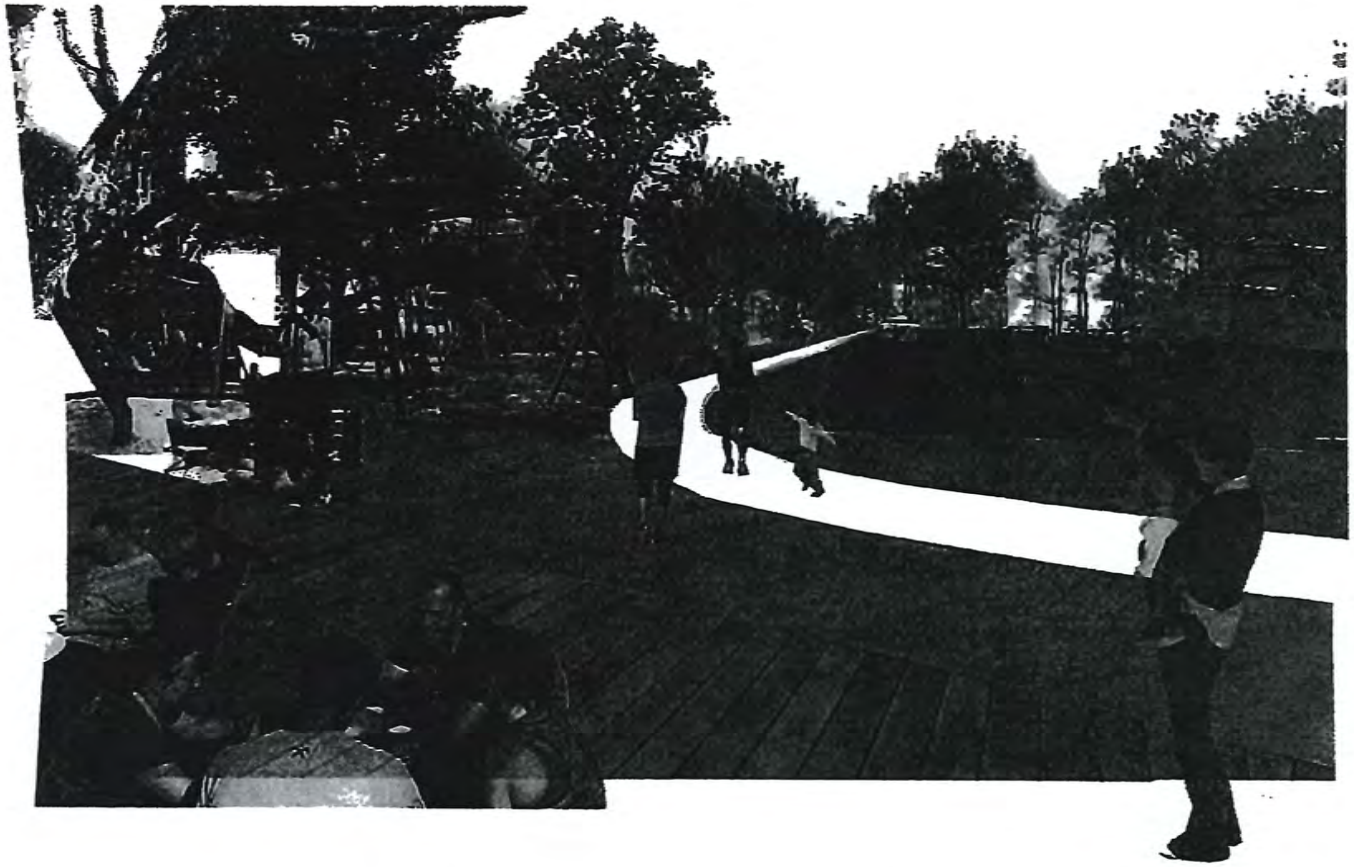
0 200 400 800

Surface CLEARSCAPES ARCHITECTURE + ART BASH ConsultEcon

Normal Daily Average Temperature		Normal Precipitation	
January	40 - 45 F	January	4.0 - 4.5"
February	40 - 45 F	February	3.5 - 4.0"
March	45 - 50 F	March	3.5 - 4.0"
April	50 - 55 F	April	3.5 - 4.0"
May	60 - 65 F	May	3.0 - 3.5"
June	70 - 75 F	June	4.0 - 4.5"
July	75 - 80 F	July	4.5 - 5.0"
August	75 - 80 F	August	5.0 - 5.5"
September	70 - 75 F	September	5.0 - 5.5"
October	65 - 70 F	October	4.0 - 4.5"
November	55 - 60 F	November	3.5 - 4.0"
December	50 - 55 F	December	4.0 - 4.5"

KILL DEVIL HILLS
SITE ANALYSIS 05.06.14

TOWN GATHERING AND EVENT LAWN



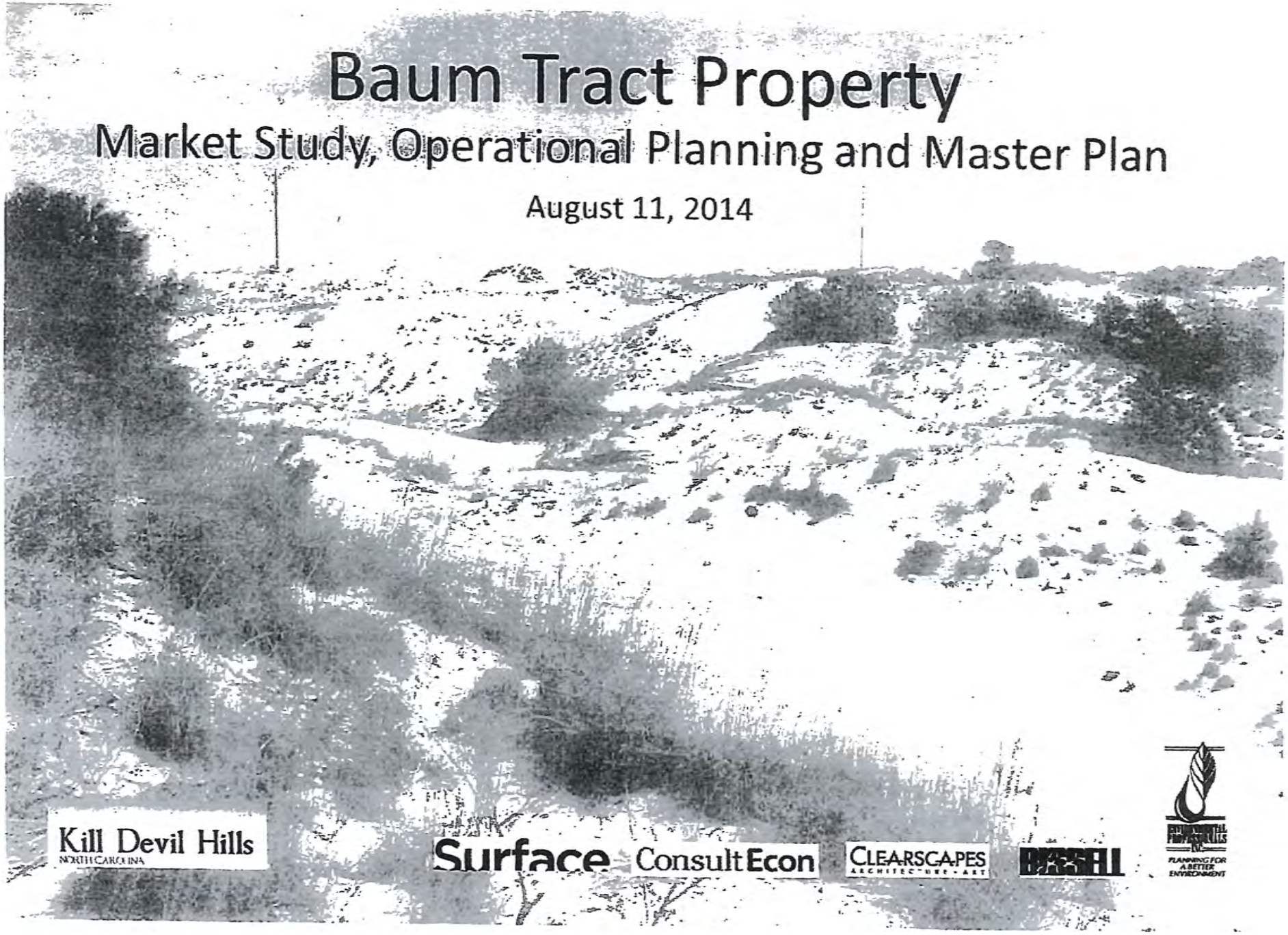
PLAY AND FIELD OVERLOOK FROM PAVILION

WATER'S EDGE OVERLOOK FROM BOARDWALK

Baum Tract Property

Market Study, Operational Planning and Master Plan

August 11, 2014



Kill Devil Hills
NORTH CAROLINA

Surface ConsultEcon CLEARSCAPES ARCHITECTURE • ART

PLANNING FOR A BETTER ENVIRONMENT

Project & Team Introduction

Surface 678, PA (Landscape Architecture)

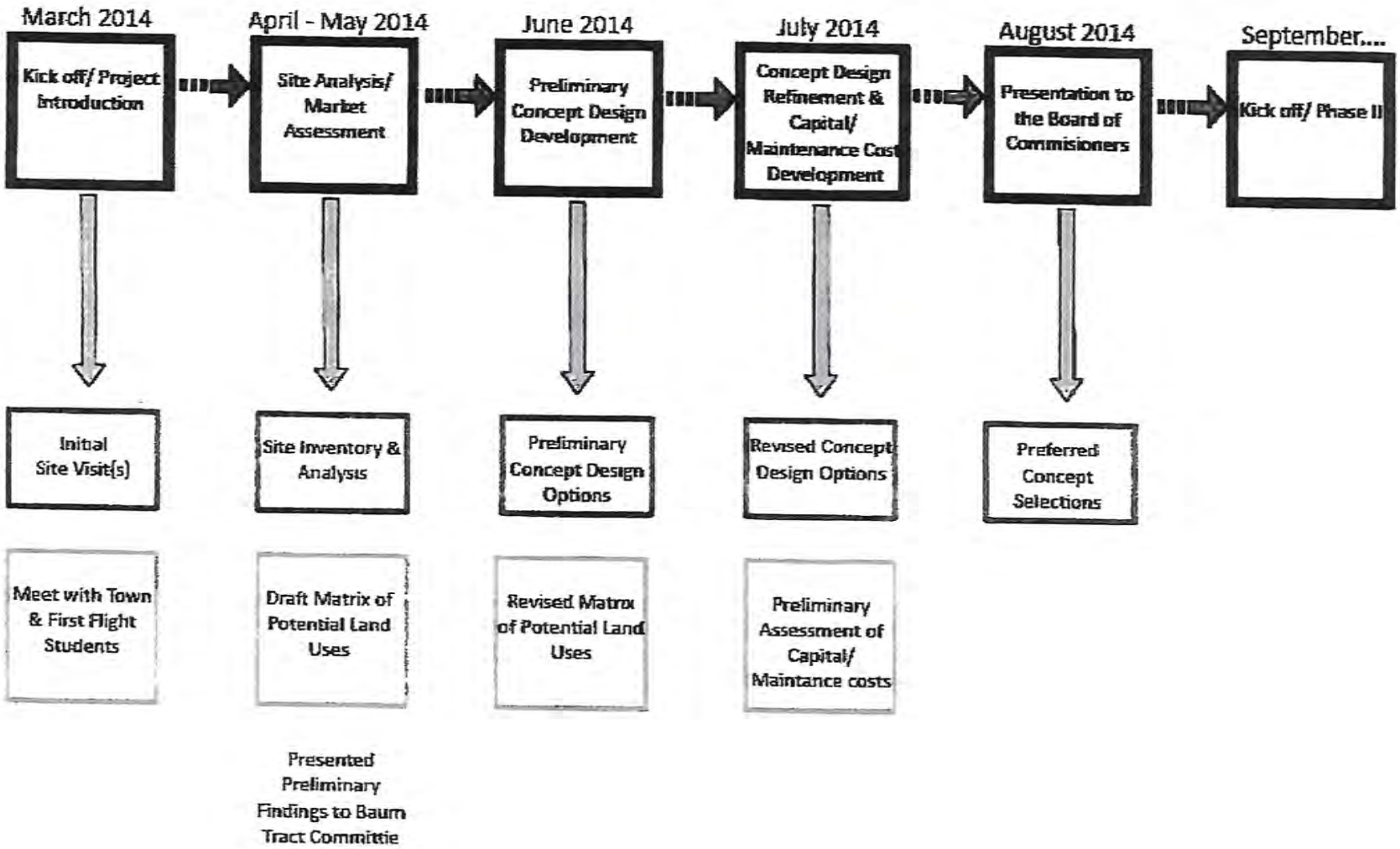
ConsultEcon, Inc. (Management & Economic Consultant)

Clearscapes (Architecture)

Bissell Professional Group (Civil Engineering)

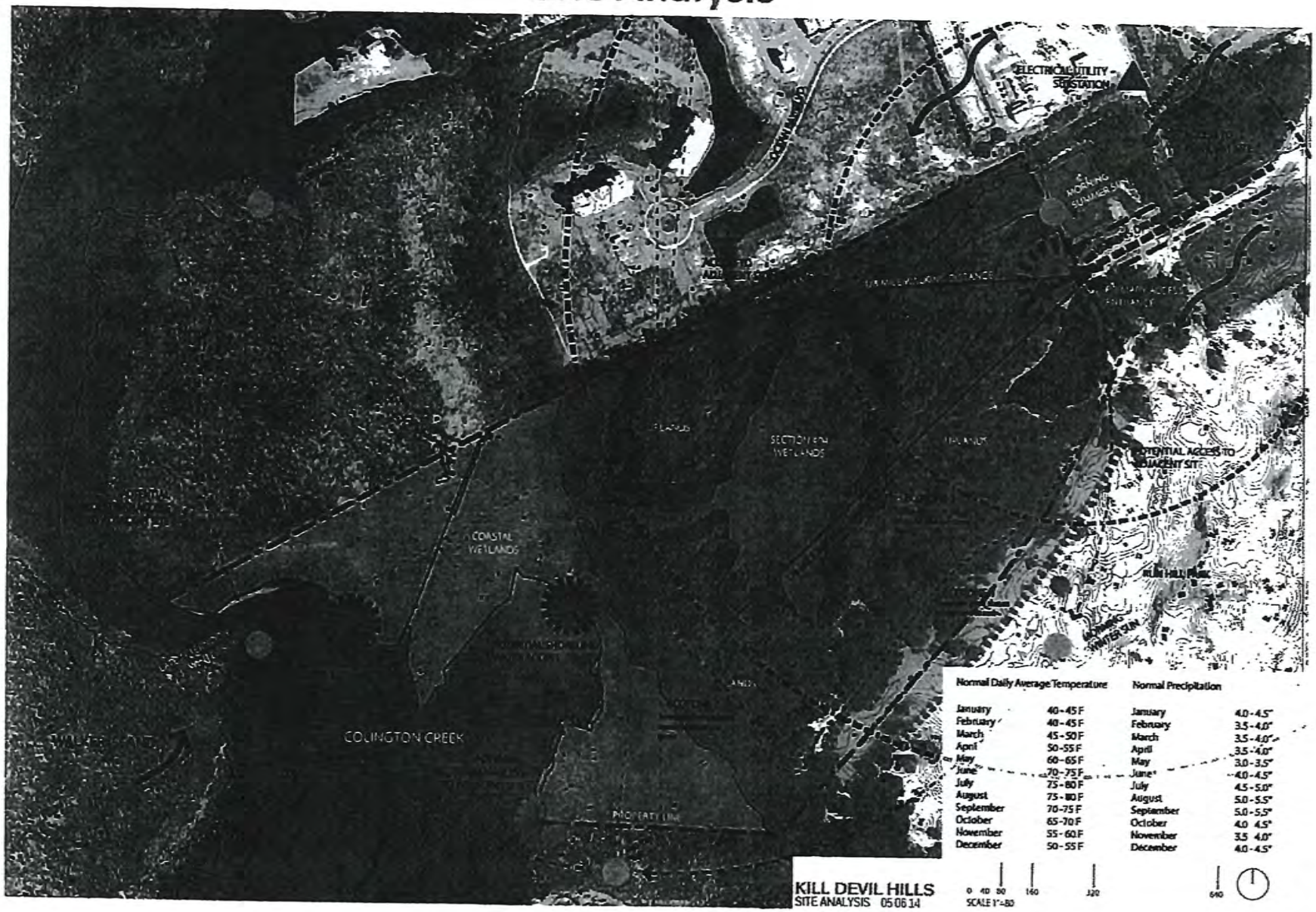
Environmental Professionals, Inc. (Environmental Engineering)

Project Goals & Process – Phase I



Initial Site Visits/ Site Inventory

Site Analysis

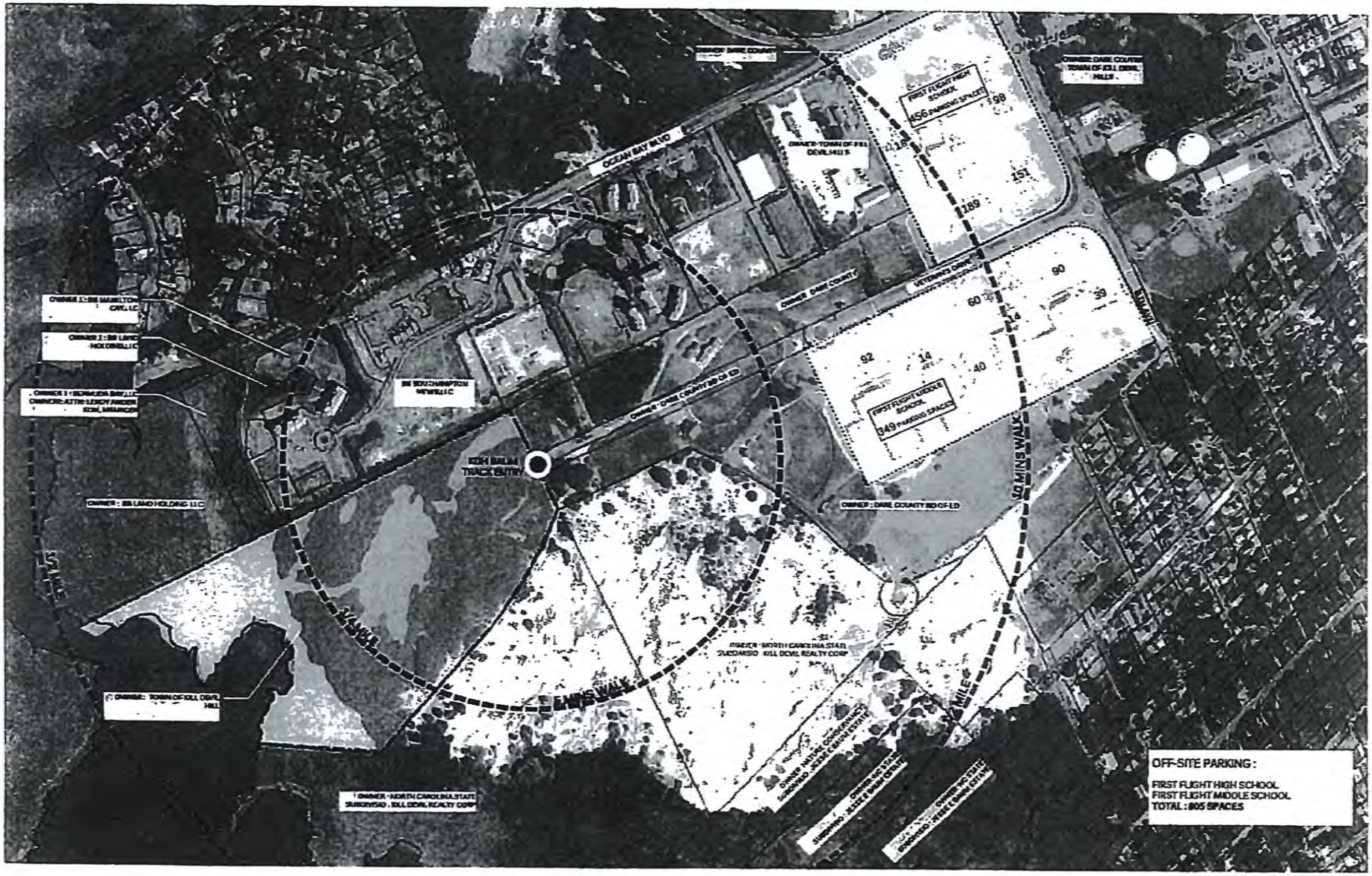


Normal Daily Average Temperature	
January	40-45 F
February	40-45 F
March	45-50 F
April	50-55 F
May	60-65 F
June	70-75 F
July	75-80 F
August	75-80 F
September	70-75 F
October	65-70 F
November	55-60 F
December	50-55 F

Normal Precipitation	
January	4.0-4.5"
February	3.5-4.0"
March	3.5-4.0"
April	3.5-4.0"
May	3.0-3.5"
June	4.0-4.5"
July	4.5-5.0"
August	5.0-5.5"
September	5.0-5.5"
October	4.0 4.5"
November	3.5 4.0"
December	4.0-4.5"

Baum Tract Committee Input on Plan Design

Off-site Parking Analysis



Evaluation & Development of Site Planning Matrix

- Matrix Provides Evaluation Tool for Town
- Matrix Compares Proposed Land Use Options with Evaluation Criteria
- Matrix Segments the Following:
  - Active Uses
  - Nature-based Uses
  - Accessory Uses
  - Supportive Uses
  - Public Works Uses
- Matrix Informed Land Use Plan Options

Land Uses Evaluated for Potential Implementation on Baum Tract Site

- **Active Recreation Uses**
  - Town Gathering/ Pavilion/ Amphitheater
  - Disc Golf Course
  - Multi-purpose Sports Field
- **Nature-based Recreation Uses**
  - Boardwalk and Nature Preservation
  - Kayak/ Canoe Launch
- **Accessory Uses**
  - Fenced Dog Park
  - Children's Playground
  - Camping Facilities for Organized Groups
- **Supportive Uses**
  - Restrooms
  - Parking
  - Snack Bar / Concession Stand
- **Public Works Uses**
  - Mulching Operation Facility
- **Other Uses**
  - Municipally Owned & Operated Pool
  - Vehicle Impound Facility
  - Wastewater Treatment/ Spray Irrigation

Audience Segments Considered as Possible User Groups for Recreational Development

- **Audience types include those interested in:**
  - Passive Recreation
  - Active Recreation & Organized Sports
  - A Recreational Disc Golf Experience
  - Preserving and Experiencing the Natural World Unique to the Outer Banks

- **All audience groups include area residents, as well as tourists**

Site Considerations Used to Evaluate Potential Land Use Options

- Acreage Required/ Allocated for Use
- Infrastructure Requirements
- Required Zoning & Compatible Uses
- Potential for Shared Use of Allocated Space
- Leverage of Adjacent Uses
- Site Suitability for a Potential Use
- Location Within the Site/ Potential for Phasing

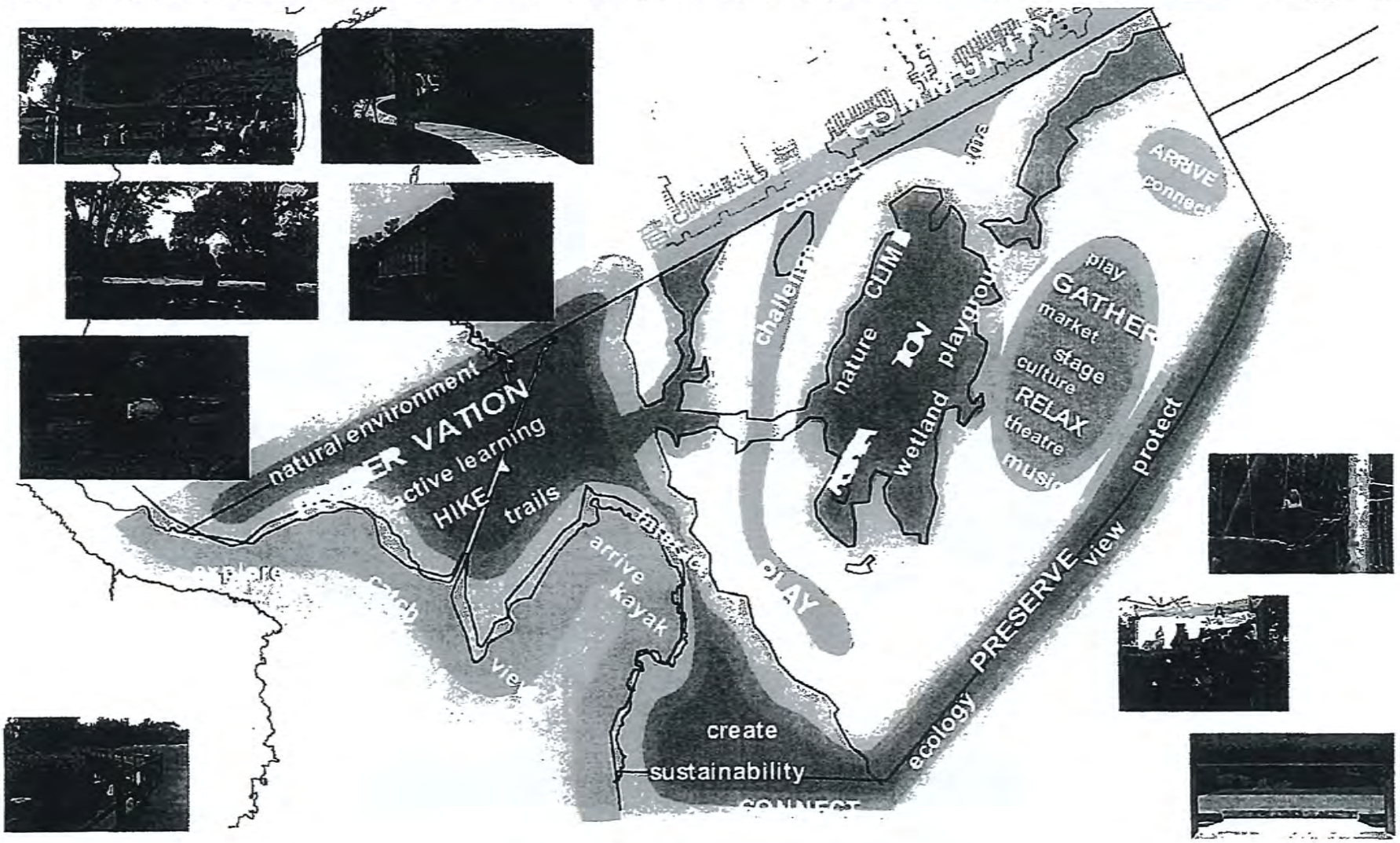
Market Considerations Used to Evaluate Potential Land Use Options

- Target Audiences (Resident, Tourists, Events)
- Serves Multiple Users and/ or Seasonality of Use
- Presence of Regional Competitor
- Economic / Tourism Impacts
- Quality of Life/ Resident Impacts
- Difficulty or Ease of Permitting Potential Use
- Potential Funding Sources

Operating Considerations Used to Evaluate Potential Land Use Options

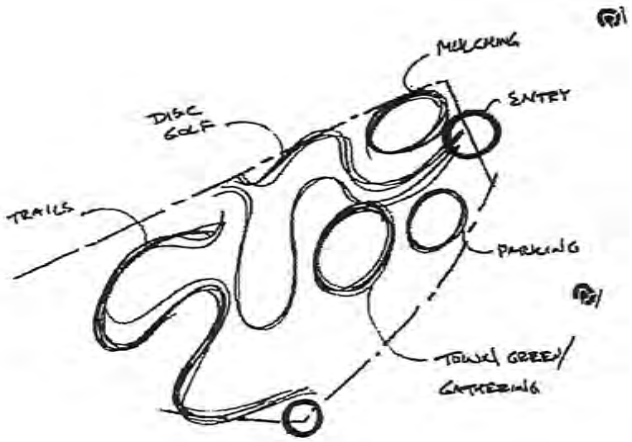
- Volume and Timing of Vehicular Trips
- Parking Requirements and Shared Parking Potential
- Earned Revenue Potential
- Capital Costs (Order of Magnitude)
- Maintenance/ Operating Costs (Order of Magnitude)
- Personnel Requirements
- Capital Renewal Requirements

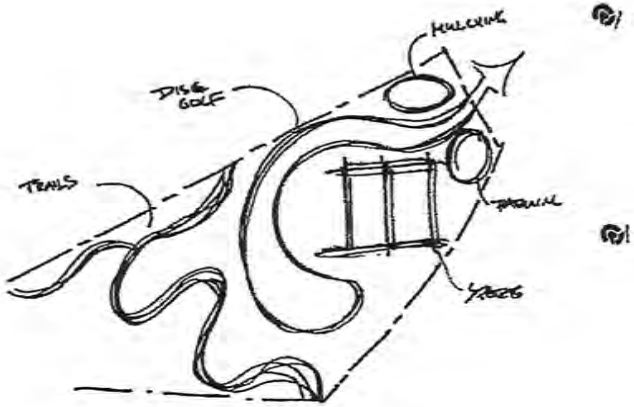
civic: of or proper to a city or town . of citizens or citizenship . belonging to citizens . the good of the community . active in communal affairs . engagement

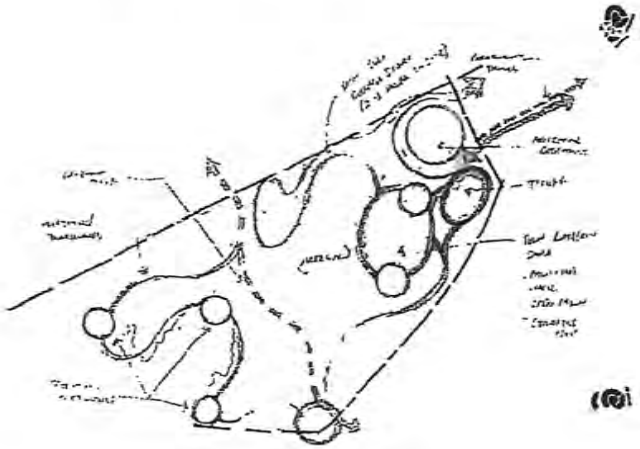


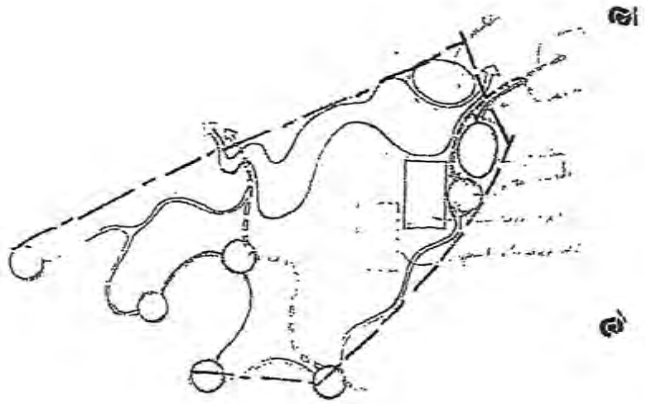
Civic Spaces

Preliminary Design
Concept Development





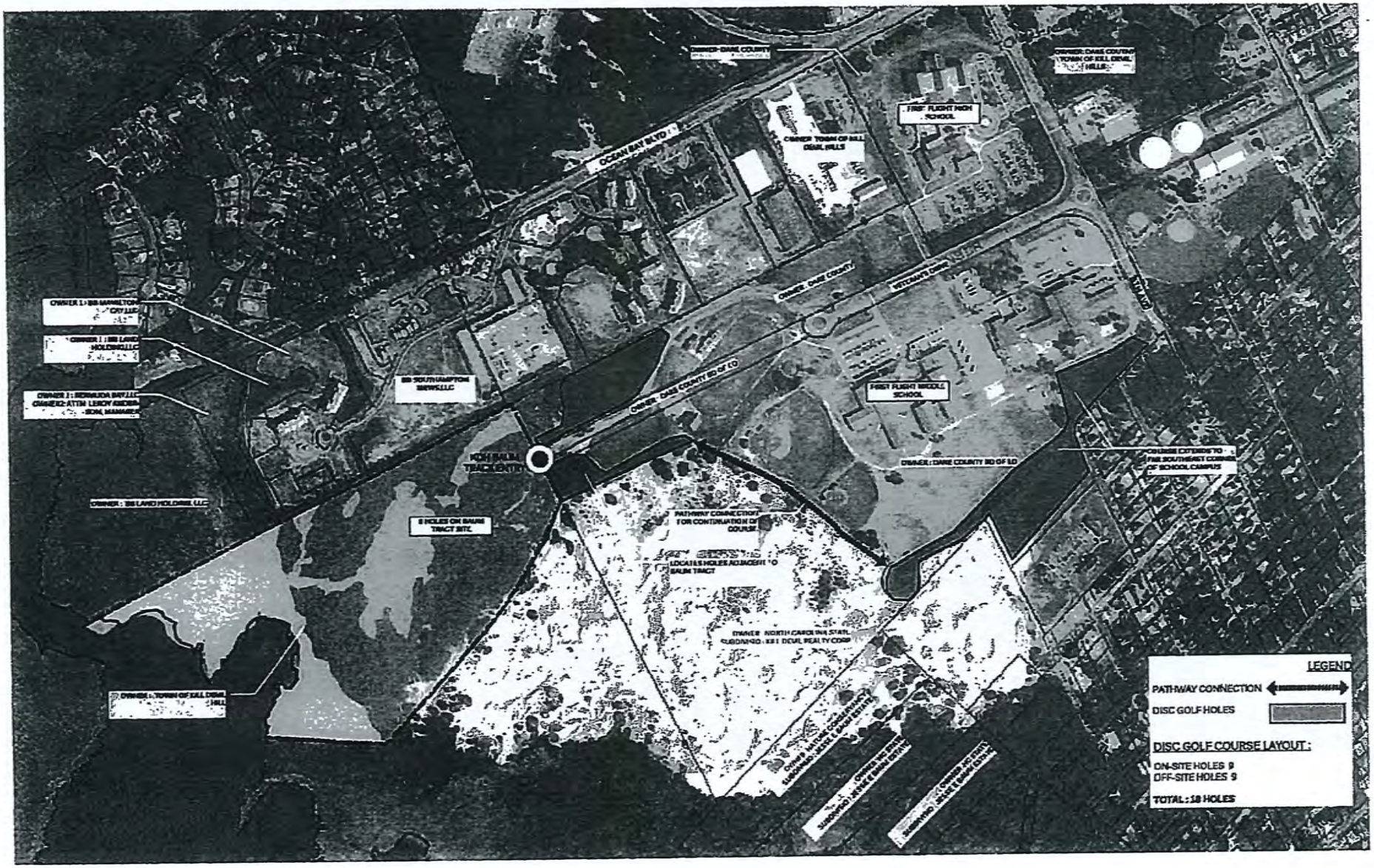




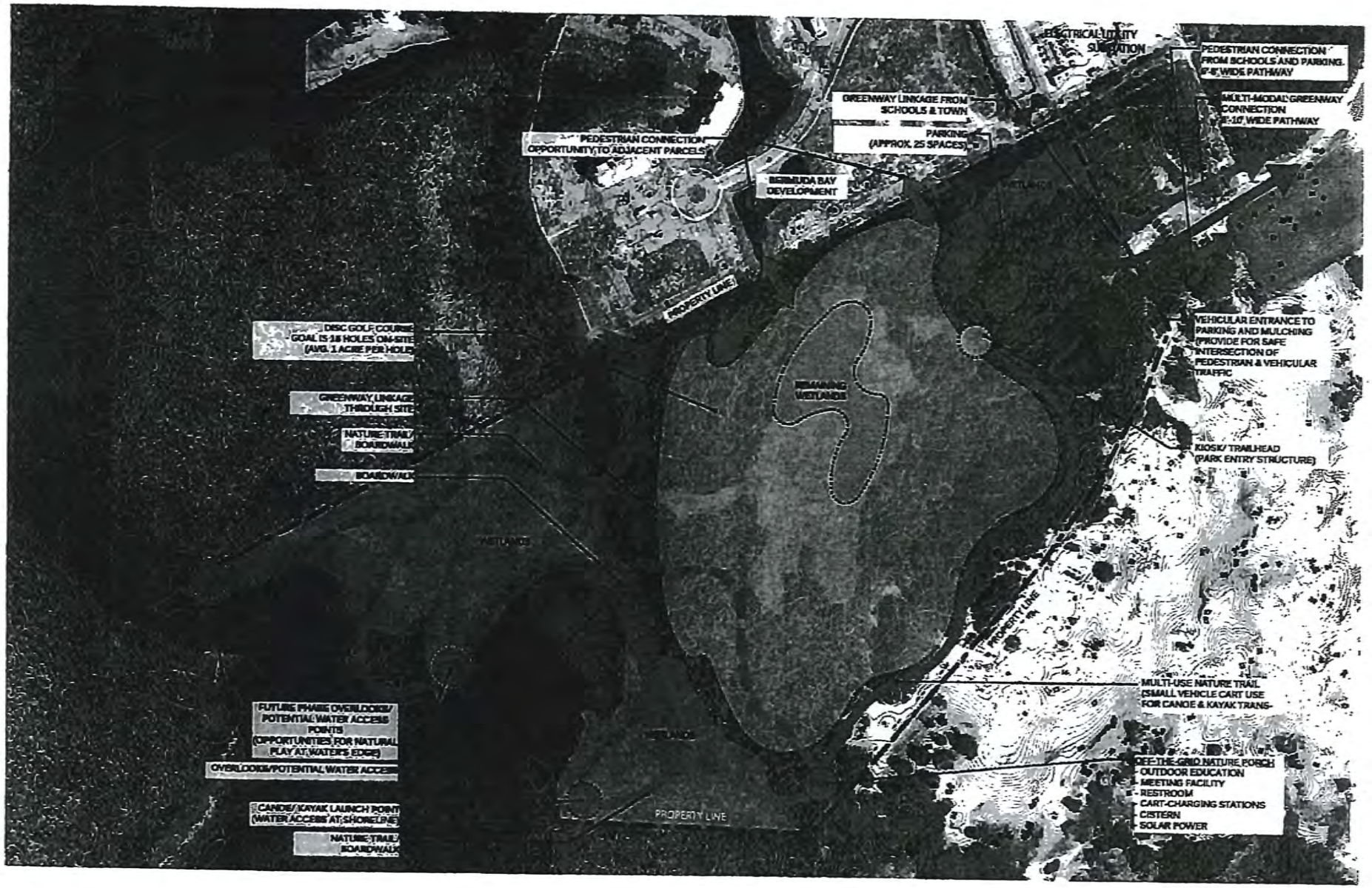
Design Option A

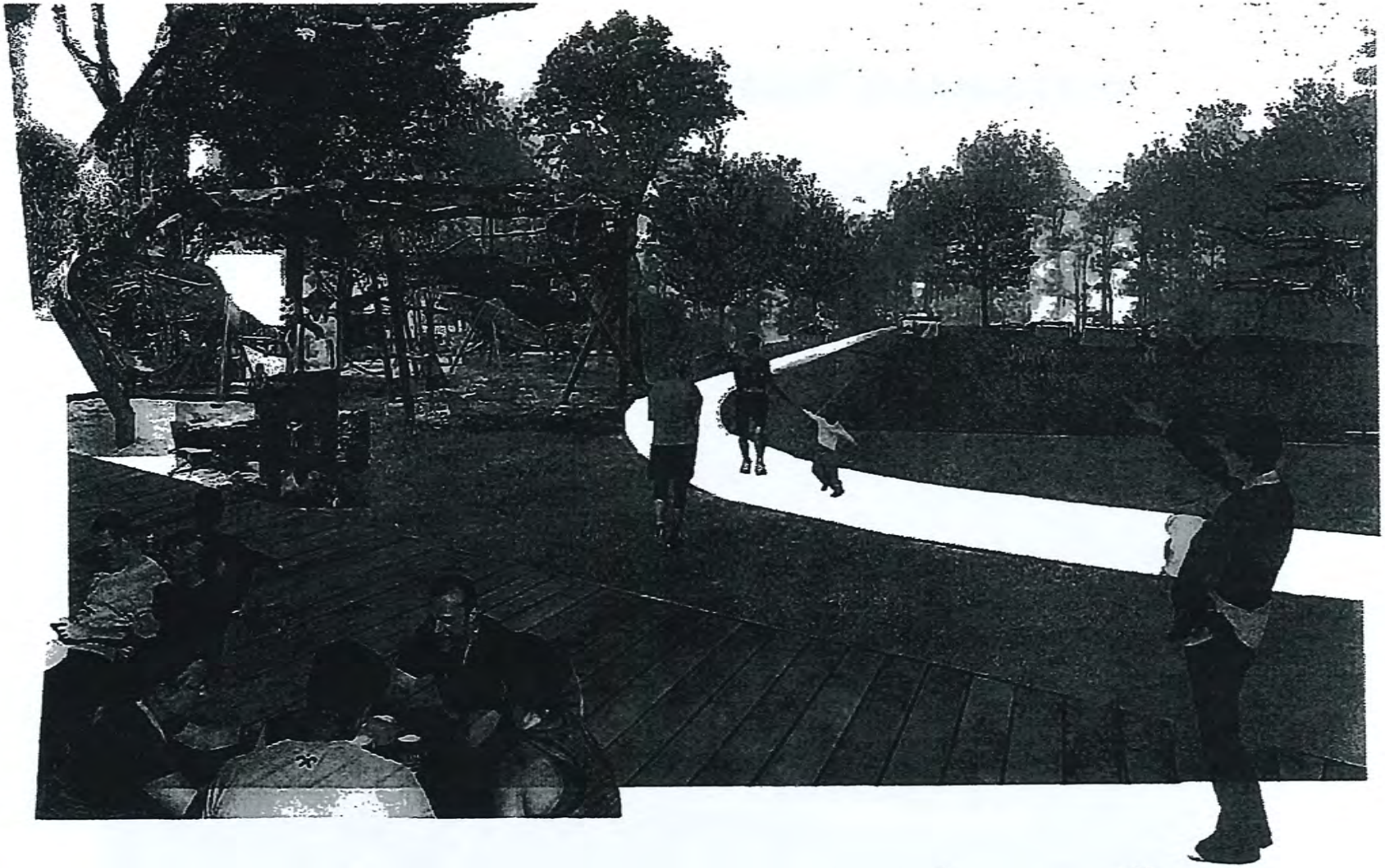
Design Option B

Off-site Disc Golf Course Opportunities



Design Option C





Option A - Play & Field Overlook from Pavilion

Option B - Town Gathering & Event Lawn

Water's Edge Overlook from Boardwalk

Estimated Capital Costs

- **Option A w/ Sports Field & Pavilion**
  - Cost Opinion = $4,358,462.00
- **Option B w/ Town Gathering, Pavilion & Stage**
  - Cost Opinion = $2,992,937.00
- **Option C w/ 18 Hole Disc Golf (on-site) & Nature Porch**
  - Cost Opinion = $1,555,492.00

Estimated Maintenance Costs

Options A & B

- Analyzed Individually by Use Type
- Reviewed by Total Cost Comparison
- Uses Evaluated
  - Town Gathering Park
  - Pavilion
  - Multi-purpose Sports Field
  - Disc Golf Course
  - Boardwalk
  - Canoe/ Kayak Launch
  - Nature Trails
  - Camping Facility
  - Children's Playground
  - Parking Lot(s)
  - Infrastrure/Utilities
- Preliminary Total Maintenance Costs (annually) = $70,000 to $95,0000

Summary of Site Evaluation

- Alteration of Landscape and Wetlands
- Traffic Patterns and Impacts
- Parking Requirements

Summary of Market Evaluation

- Residents and Tourists
- Market Segments – Broad or Niche Audiences
- On-site Population – Number and Density
- Patterns of Use – Seasonality and Demographics

Summary of Operating Evaluation

- Capital Costs
- Operating Costs
- Earned Revenue to the Town
- Market Revenue to be Determined based upon Option selection

Questions and Answers.....