PUBLIC INFORMATION

ITEM NO. 1

DATE OF MEETING: May 4, 2009

REQUESTED BY: Michael G. Mack, Director, PCU

SHORT TITLE: Presentation of the Cape Fear Public Utility Authority's US 421 Corridor Wastewater Master Plan by McKim & Creed

BACKGROUND: The Cape Fear Public Utility Authority, recognizing the benefits of comprehensive master planning, and desiring to determine the best strategy to provide wastewater service to the US 421 Corridor and preserve the Authority's NPDES permit for discharge of 4 million gallons per day of treated wastewater effluent to the Cape Fear River, authorized McKim & Creed to prepare a US 421 Corridor Wastewater Master Plan.

The scope of the project was focused on the US 421 corridor in New Hanover County with the goal of developing the optimal strategy and infrastructure to provide wastewater service to the area. Additionally, an opportunity for a regional approach in conjunction with Pender County's shared interest in developing a public wastewater system in this area has Pender County as a primary participant and stakeholder in the development of the Master Plan.

Cape Fear
Public Utility Authority
Stewardship. Sustainability. Service.

US 421 Corridor Wastewater Master Plan

April 2009

EXECUTIVE SUMMARY

Purpose

The Cape Fear Public Utility Authority (Authority), recognizing the benefits of comprehensive master planning, and desiring to determine the best strategy to provide wastewater service to the US 421 Corridor, authorized McKim & Creed, PA to prepare this US 421 Corridor Wastewater Master Plan. The purpose of this project is to determine the best strategy to meet the near-term and long-term wastewater needs of the US 421 Corridor and to preserve the Authority's US 421 WWTF NPDES permit for the discharge of 4 million gallons per day (MGD) of treated wastewater effluent to the Cape Fear River.

Scope

The scope of the project was focused on the US 421 corridor in New Hanover County with the goal of developing the optimal strategy and infrastructure to provide wastewater service to this area. Additionally, an opportunity for a regional approach in conjunction with Pender County to provide wastewater service in the corridor was identified and evaluated. Pender County has indicated a significant interest in developing a public wastewater system in this area, which was evaluated in the *Pender County Wastewater Master Plan* (McKim & Creed, 2006). Subsequently, Pender County has been a primary participant and stakeholder in the development of this document.

This document includes wastewater flow projections, an alternatives analysis for wastewater infrastructure, and a recommended wastewater solution to meet the 20-year wastewater needs of the US 421 Corridor. Recommendations are provided in a Capital Improvements Plan (CIP) format.

Wastewater Flow Projections

Wastewater flow projections for the New Hanover County portion of the US 421 Corridor were taken from the *New Hanover County and City of Wilmington 2007 Wastewater Master Plan Update* (McKim & Creed, 2007). Wastewater flow projections for Pender County were taken from the *Pender County Wastewater Master Plan*. The wastewater flow projections that were developed as a basis for this alternatives analysis are as follows:

Table 1 –New Hanover County Portion of US 421 Wastewater Flow Projections

	2011	2016	2021	2026
Total Projected Wastewater Flow, MGD	2.0	3.0	4.0	5.3

Table 2 – Pender County Western Region Wastewater Flow Projections

	2010	2015	2020	2025	2030
Total Projected Wastewater Flow, MGD	0.59	1.66	3.25	4.53	5.67

The New Hanover County portion of the US 421 Corridor was divided into four regional basins to aid in the conveyance infrastructure portion of the alternatives analysis. The resulting basins and wastewater flow projections, which were approved by Authority staff, are provided in Exhibit 1.

Alternatives Analysis

An alternatives analysis was conducted to determine the best strategy for providing wastewater service to the US 421 Corridor. The following alternatives were considered both individually and in combination with one another.

Alternative A – Construct a regional wastewater treatment facility (WWTF) at the Pender County Industrial Park, which is located along US 421 near the Pender / New Hanover County line. This facility could potentially serve the needs of both the Authority and Pender County on the US 421 Corridor.

Alternative B – Construct a wastewater treatment facility in New Hanover County to serve only the Authority's demands. This alternative assumes that Pender County will pursue their own solution to wastewater needs along the corridor. For the purposes of this report, two potential wastewater treatment facility sites, one in southern New Hanover County (B1) and one in northern New Hanover County (B2) were evaluated.

Alternative C – Construct a regional pump station at Point Harbor Marina, just south of the Isabel Holmes Bridge and redundant force mains under the Northeast Cape Fear River, discharging to the Authority's existing Pump Station No. 12, which ultimately conveys wastewater flow to Northside WWTP. Due to capacity constraints in the existing Authority system, only a portion of the flow from the southern New Hanover County corridor can be accommodated under Alternative C.

Alternative locations are shown in Exhibit 1A.

Recommendations

After a thorough analysis of the alternatives, it was determined that Alternative A and C, construction of a wastewater treatment facility at the Pender County Industrial Park and construction of a regional pump station and force main at Point Harbor, is the most advantageous solution to meet the wastewater needs of the US 421 Corridor.

The WWTF (Alternative A) would serve basins 1 and 2 as well as wastewater generated by Pender County. The Pender Industrial Park WWTF location is consistent with the *Pender County Wastewater Master Plan* recommendations, which identifies construction of a WWTF at this site.

The Point Harbor pump station and force main (Alternative C) would convey flow from basins 3 and 4 to Pump Station No. 12 and ultimately to the Northside WWTF. Five Points Development (Five Points), a private entity, is in the planning stages of a project known as "Point Harbor Marina", located adjacent to the Northeast Cape Fear River, and south of the

Isabel Holmes Bridge (See Exhibit 6A). Five Points has an agreement with the Authority, that will allow them to construct a pump station at Point Harbor Marina and a force main under the Northeast Cape Fear River to convey wastewater flow generated by the development to Pump Station No. 12. Implementation of Alternative C would entail upsizing of the Point Harbor Marina infrastructure by the Authority to provide additional wastewater capacity in the southern US 421 Corridor.

These Alternatives would be constructed in phases commensurate with demands. A phasing strategy is presented in this document as follows:

Phase 1 – Initial Phase

- Construct a 0.5 MGD WWTF at the Pender Industrial Park to serve New Hanover County basins 1 and 2 as well as Pender County wastewater needs.
- Utilize the US 421 WWTF NPDES permit to direct discharge the wastewater effluent to the Cape Fear River. Potentially acquire and utilize an industry-owned (BASF) existing 12-inch outfall to the Cape Fear River for effluent discharge.
- Construct two regional pump stations and corresponding force mains along US 421 to convey wastewater flow from basins 1 and 2 to the Pender Industrial Park WWTF.
- Construct two regional pump stations and corresponding force mains along US 421 and two 16-inch force mains (for redundancy) under the Northeast Cape Fear River from the Point Harbor Marina to Pump Station No. 12. Wastewater generated in basins 3 and 4 (0.10 MGD initially) to Pump Station No. 12 and ultimately the Northside WWTF.

Exhibit 9 provides a schematic of Phase 1.

Phase 2 – 20 Year Demands

- Construct an 11 MGD wastewater treatment facility at the Pender Industrial Park to serve basins 1 and 2 as well as Pender County wastewater needs.
- Utilize the US 421 WWTF NPDES permit to direct discharge up to 4 MGD of the wastewater effluent to the Cape Fear River. Beyond the 4 MGD designated in the NPDES permit, it is anticipated that conjunctive use dispersal will be required. For the purpose of this report, it was assumed that the dispersal solution would consist of direct discharge of 4 MGD as well as dispersal of 7 MGD through high rate infiltration basins. It may be possible to discharge more than 4 MGD; however, DWQ would need to make that determination when the plant expansion beyond 4 MGD is permitted.
- This alternative would ultimately require a new outfall to the Cape Fear River sized for the total direct discharge flow approved by DWQ.
- Upgrade the conveyance system to provide capacity for year 2026 wastewater flows by expanding the pump stations and installing parallel force mains along US 421.

- Continue to convey flow from basins 3 and 4 to Pump Station No. 12 and ultimately to Northside WWTF.
- Point Harbor Marina infrastructure will require pump upgrades to meet increased demands up to a maximum 0.85 MGD.

Exhibit 10 provides a schematic of Phase 2.

Advantages and disadvantages associated with the recommended alternatives are as follows:

Advantages

- Regional approach to meeting wastewater needs of the US 421 Corridor.
- Provides viable means to protect and preserve the 4 MGD NPDES Permit.
- Potential for cost sharing and mutual benefits with Pender County and Five Points Development.
- Wastewater Treatment Plant site is owned by Pender County, eliminating the need to acquire land or to conduct extensive due diligence investigations for Phase 1. This alternative can be implemented under a shorter timeline than identifying and constructing a WWTF on a site that is not currently owned by the Authority or Pender County.
- Potential to utilize existing 12-inch BASF outfall.
- Proximity to Pender County Water Treatment Plant and potential to share facilities and operations staff.
- Potential consolidation of BASF's NPDES permit. A condition of the US 421 WWTF permit is consolidation of existing NPDES discharges along the corridor.
- Alternative C (Point Harbor Marina) approach is fast, accessible and far more cost effective, for both capital and maintenance costs, than a new WWTF.
- Potential for future event management.
- Minimizes wetlands and CAMA impacts by utilizing existing BASF Outfall.

Disadvantages

- Conveyance infrastructure sizing – Conveyance would be more costly compared to that for a plant more centrally located to New Hanover County.
- Environmental Assessment – Potential secondary and cumulative impacts for larger service area.
- US 421 was not included in the original Northside WWTF service area and flow from US 421 could have a capacity impact at Northside WWTF. However, based on the *2007 Master Plan,*

the additional 0.85 MGD of flow identified from US 421 would have a negligible impact on this facility or the need for future expansion.

- Requires Pump Station No. 10 and 12 upgrade. However, upgrades for these stations are currently planned by CFPUA, which can incorporate demands projected in this document.
- Replace 1100 LF of 24-inch sewer with 30-inch (Burnt Mill Outfall, between10th and Fanning).

Cost Opinion

A. An opinion of probable project cost for this alternative is provided in the following table.

*Table 3 – Opinion of Probable Project Cost**

Item	Phase 1	Phase 2
WWTP and Dispersal	$12.9 M	$230.6 M
Conveyance System	$5.1 M	$9.8 M
Point Harbor	$5 M	N/A
TOTAL	**$23.08 M**	**$240.4 M**

**Note that costs shown are total costs. The potential for cost sharing with Pender County and Five Points Development were not evaluated as part of this Master Plan.*

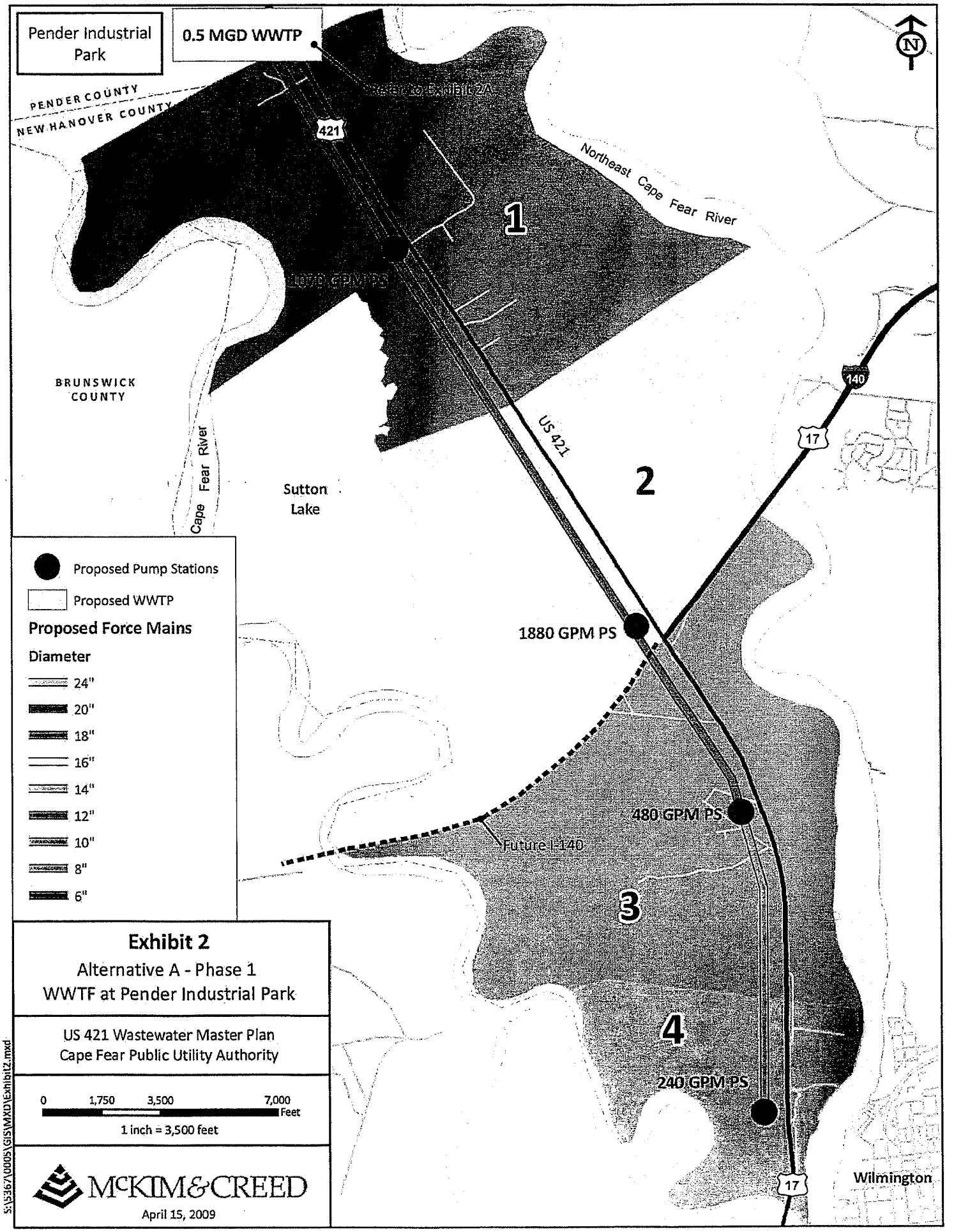
The following table summarizes the implementation schedule for the recommended alternative:

Table 4 – Implementation Schedule

Task	Completion Date	Estimated Cost
Revise EA and EAA	Dec, 2009	$80,000
Design of WWTP	Dec, 2009	$600,000
Bid and Award of WWTP	Sept, 2010	$35,000
Construction of WWTP	Nov, 2011	$13,000,000
Pt. Harbor Construction	TBD	$5,000,000

Conclusions

In summary, it is recommended that the Authority pursue implementation of Alternate A and Alternate C, which includes construction of a regional wastewater treatment facility at the Pender County Industrial Park and construction of a regional pump station and force main at Point Harbor Marina to meet the wastewater needs of the US 421 Corridor and preserve the US 421 NPDES WWTF permit.


Pender Industrial Park
0.5 MGD WWTP
PENDER COUNTY
NEW HANOVER COUNTY
421
Refer to Exhibit 2A
Northeast Cape Fear River
1
1070 GPM PS
BRUNSWICK COUNTY
Cape Fear River
Sutton Lake
US 421
2
140
17
Proposed Pump Stations
Proposed WWTP
Proposed Force Mains
Diameter
24"
20"
18"
16"
14"
12"
10"
8"
6"
1880 GPM PS
480 GPM PS
Future I-140
3
4
240 GPM PS
17
Wilmington
Exhibit 2
Alternative A - Phase 1
WWTF at Pender Industrial Park
US 421 Wastewater Master Plan
Cape Fear Public Utility Authority
0 1,750 3,500 7,000 Feet
1 inch = 3,500 feet
McKIM&CREED
April 15, 2009
S:\SES\0700\769\GIS\MXD\Exhibit2.mxd

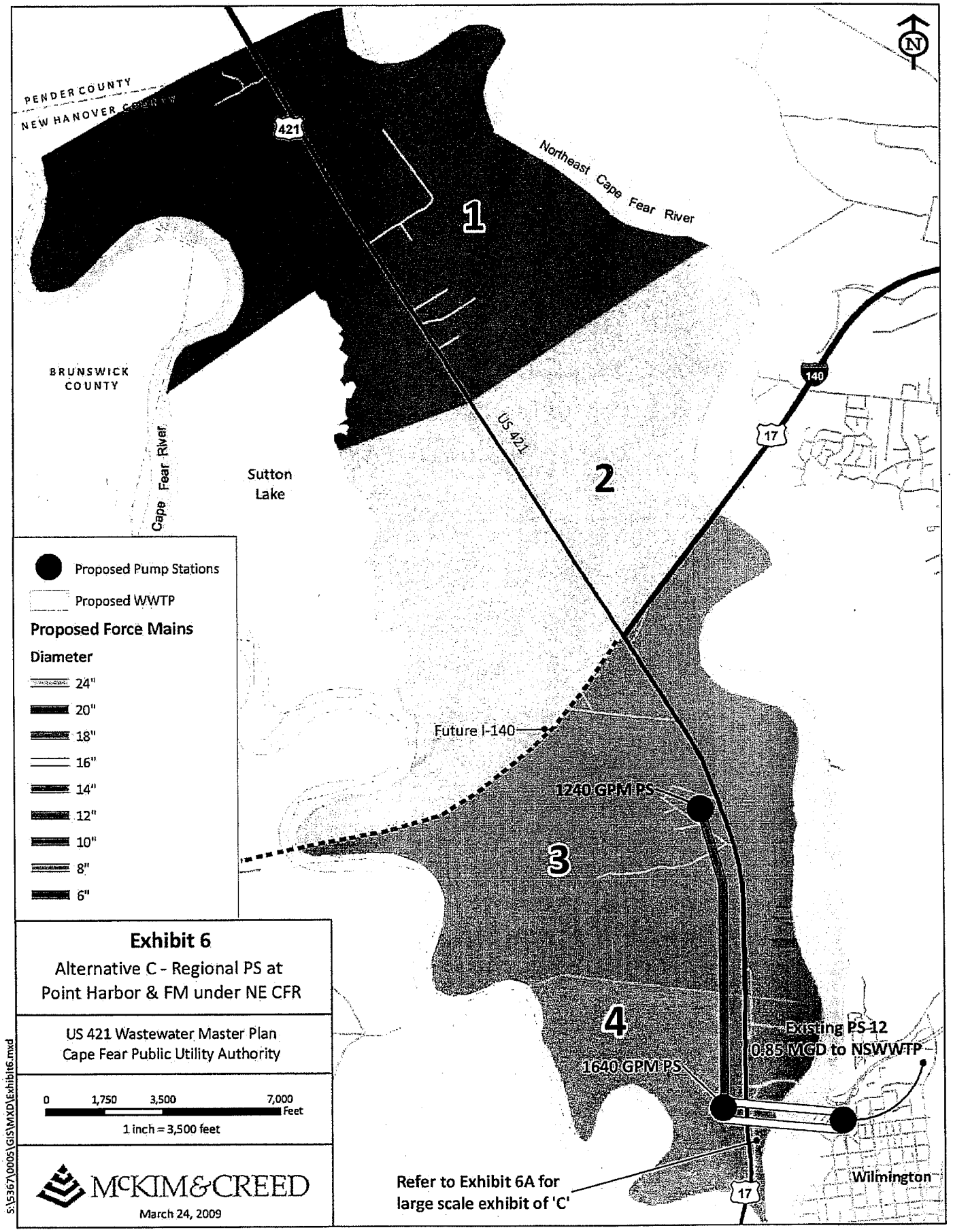


Exhibit 6

Alternative C - Regional PS at Point Harbor & FM under NE CFR

US 421 Wastewater Master Plan
Cape Fear Public Utility Authority

0 1,750 3,500 7,000 Feet

1 inch = 3,500 feet

McKIM&CREED

March 24, 2009

S:\5367\0005\GIS\MXD\Exhibit6.mxd

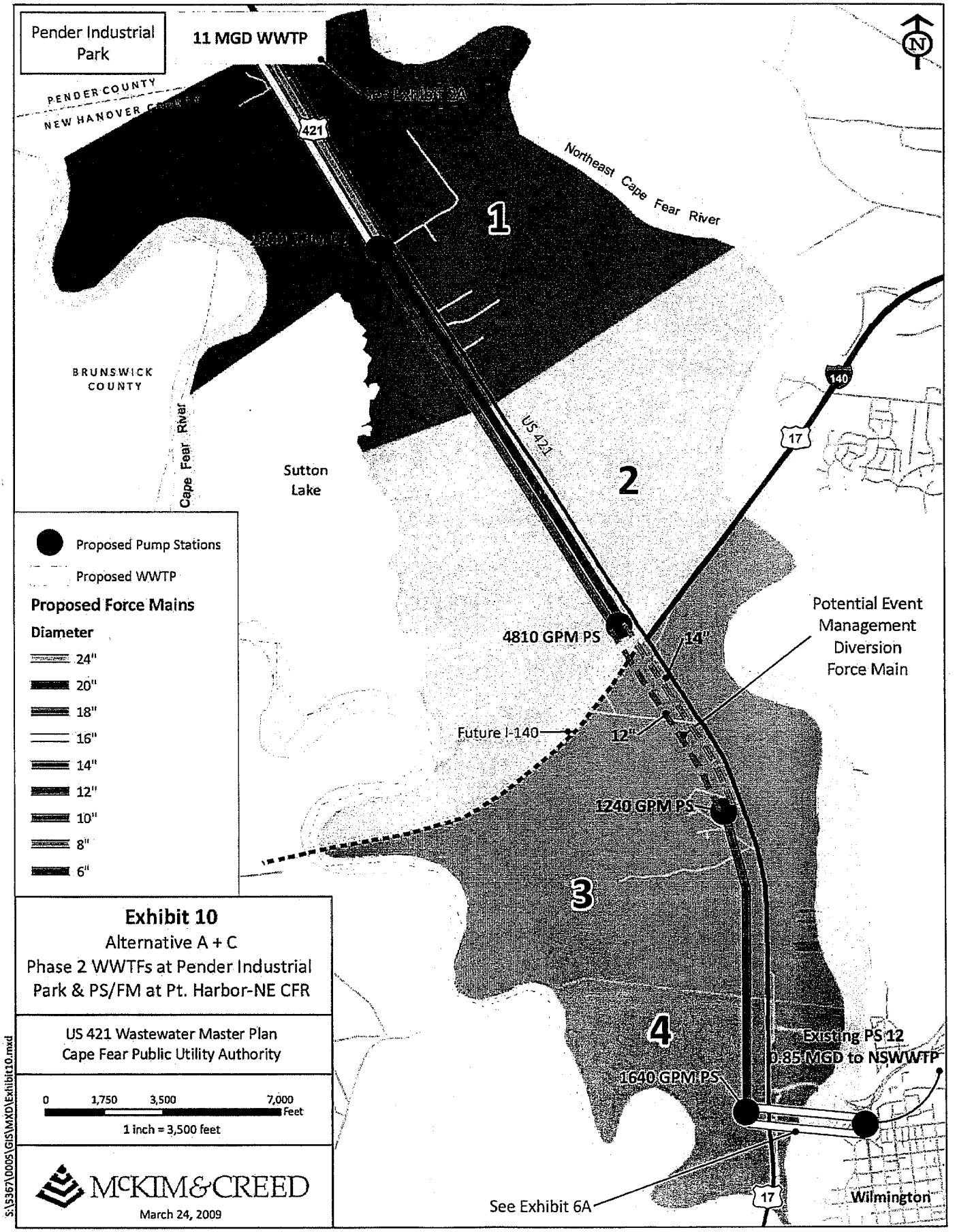

Pender Industrial Park
11 MGD WWTP
PENDER COUNTY
NEW HANOVER COUNTY
421
Northeast Cape Fear River
1
BRUNSWICK COUNTY
Cape Fear River
Sutton Lake
US 421
2
140
17
Proposed Pump Stations
Proposed WWTP
Proposed Force Mains
Diameter
24"
20"
18"
16"
14"
12"
10"
8"
6"
4810 GPM PS
14"
Potential Event Management Diversion Force Main
Future I-140
12"
1240 GPM PS
3
4
1640 GPM PS
Existing PS 12
0.85 MGD to NSWWTP
See Exhibit 6A
17
Wilmington
Exhibit 10
Alternative A + C
Phase 2 WWTFs at Pender Industrial Park & PS/FM at Pt. Harbor-NE CFR
US 421 Wastewater Master Plan
Cape Fear Public Utility Authority
0 1,750 3,500 7,000 Feet
1 inch = 3,500 feet
McKIM&CREED
March 24, 2009
S:\5367\0005\GIS\MXD\Exhibit10.mxd

EXHIBIT 14 A- Alternative A + C Phase 1

Engineer's Opinion of Probable Project Cost

McKIM&CREED

Project # 5367-0005

Item	Description	Quantity		Unit Price		Total Cost
1	0.5 MGD WWTP	1	LS	$10,000,000	/LS	$10,000,000
2	Dispersal Connection to Existing BASF Outfall	1	LS	$280,000	/LS	$280,000
3	Conveyance System (Basins 1 and 2)					
a	12-Inch Force Main	13000	LF	$75	/LF	$975,000
b	16-Inch Force Main	15000	LF	$105	/LF	$1,575,000
c	Pump Station (1070 GPM)	1	LS	$600,000	/LS	$600,000
d	Pump Station (1880 GPM)	1	LS	$1,000,000	/LS	$1,000,000
4	Conveyance System (Point Harbor - Basins 3 and 4)					
a	16-Inch Force Mains from Pt. Harbor to PS 12	2	LS	$550,000	LS	$1,100,000
b	Replace 1100 LF 24-Inch Gravity Sewer with 30-Inch	1	LS	$450,000	LS	$450,000
c	12-Inch Force Main	10000	LF	$75	/LF	$750,000
d	Pump Station (1240 GPM)	1	LS	$700,000	/LS	$700,000
e	Pump Station (1640 GPM)	1	LS	$950,000	/LS	$950,000
Total						**$18,500,000**

Total, Including 25% Contingency **$23,000,000**

EXHIBIT 14 B - Alternative A + C Phase 2

Engineer's Opinion of Probable Project Cost

McKIM&CREED

Project # 5367-0005

Item	Description	Quantity		Unit Price		Total Cost
1	11 MGD WWTP	1	LS	$148,500,000	/LS	$148,500,000
2	New Outfall for Dispersal	1	LS	$1,900,000	/LS	$1,900,000
3	Infiltration Basins (8 MGD)	1	LS	$34,000,000	/LS	$34,000,000
4	Conveyance System (Basins 1 and 2)					
a	24-Inch Force Main	7000	LF	$140	/LF	$980,000
b	20-Inch Force Main	15000	LF	$125	/LF	$1,875,000
c	14-Inch Force Main	7000	LF	$85	/LF	$595,000
d	Pump Station (2800 GPM)	1	LS	$1,650,000	/LS	$1,650,000
e	Pump Station (4810 GPM)	1	LS	$2,700,000	/LS	$2,700,000
Total						**$192,000,000**
Total, Including 25% Contingency						**$240,000,000**

Note that Point Harbor Conveyance system was included in Phase 1.