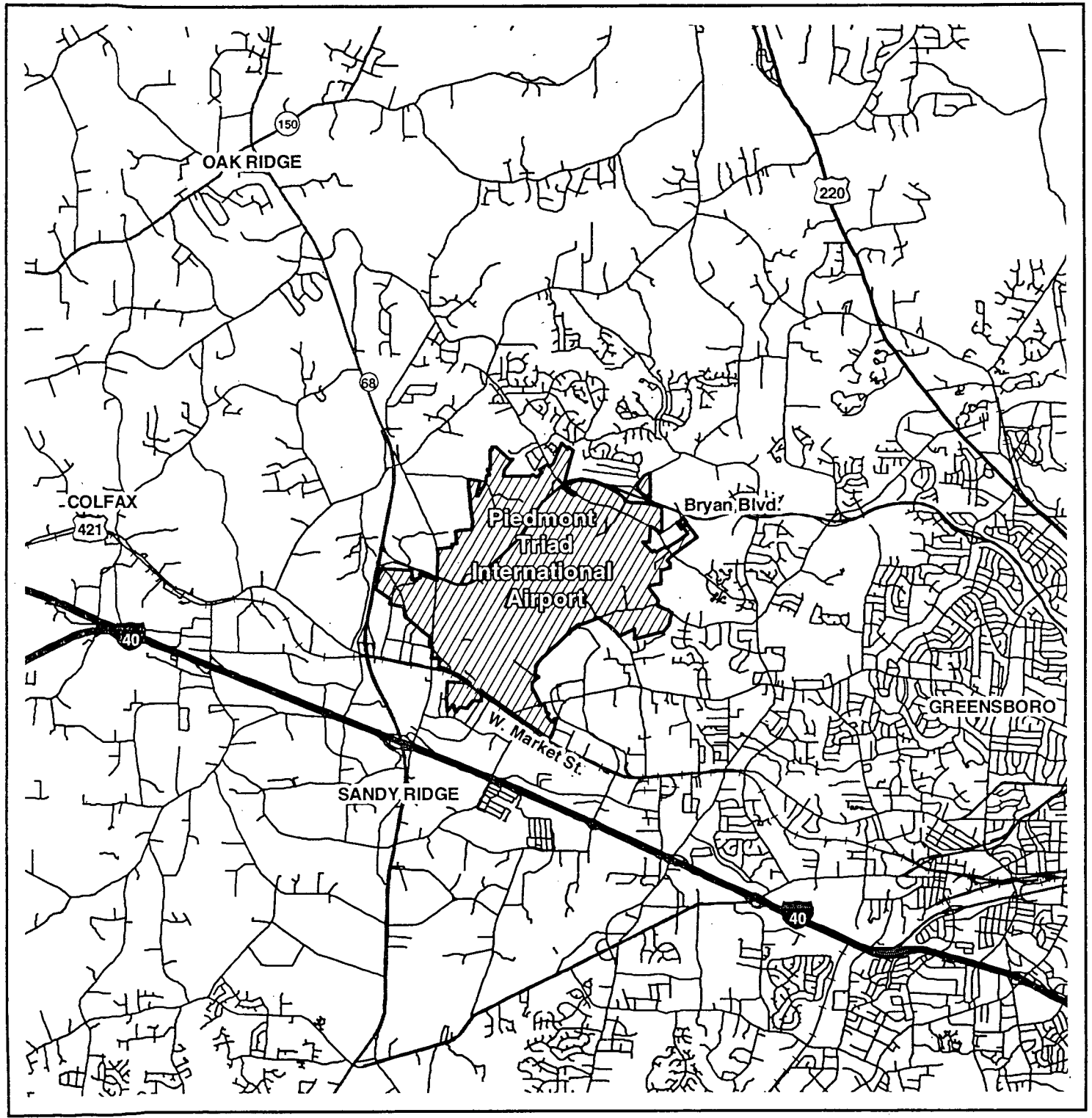
Piedmont Triad Airport Authority
Section 404 Perrmit Application
Greensboro, North Carolina

Vicinity Map



MACTEC

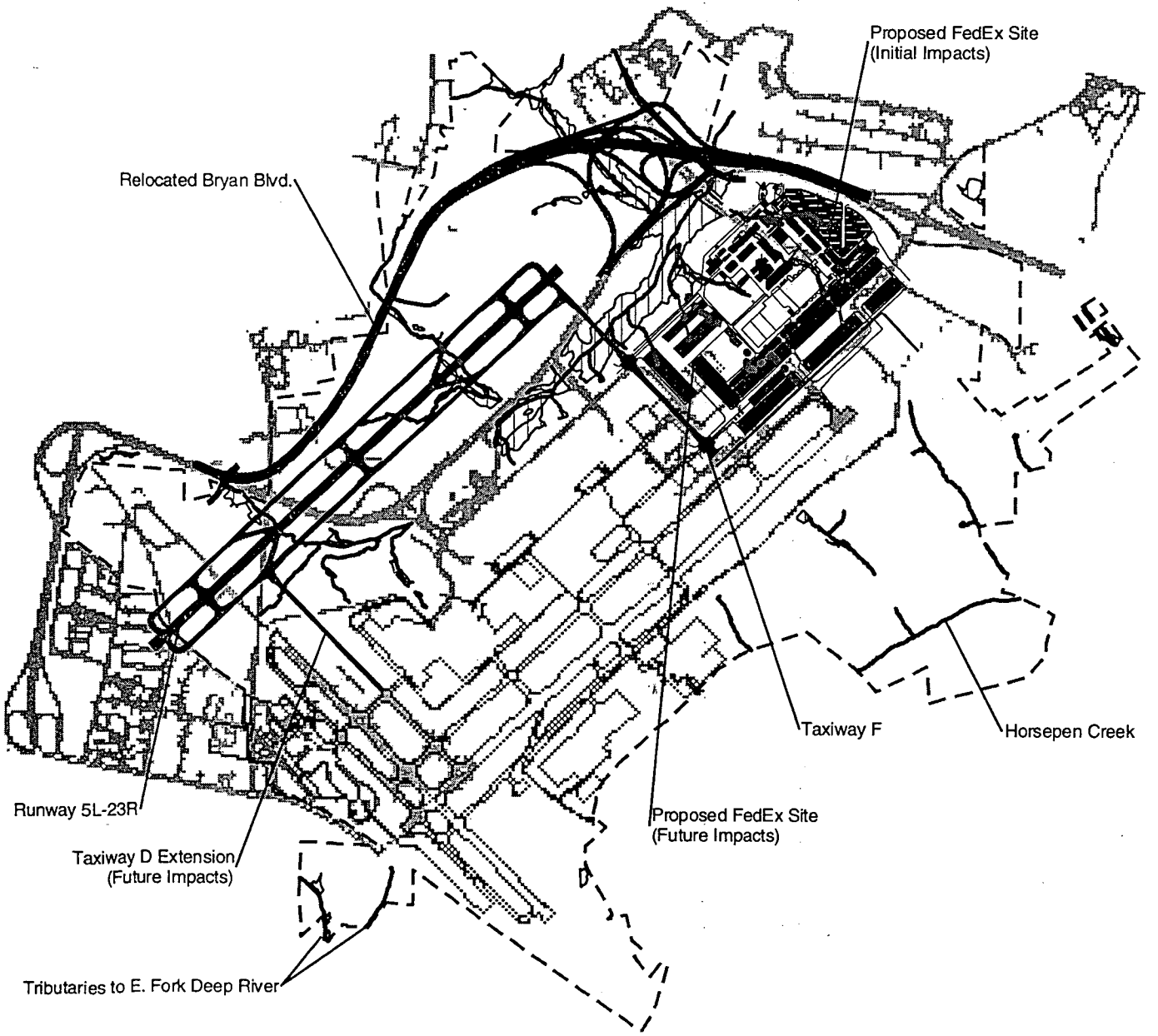
0 0.5 1 2
Miles

Figure 1 (rev)
Project: 30740-0-4253
Prepared by/Date: 10/15/03
Checked by/Date: 10/16/03

Source(s): Baker & Associates, 6/10/02; NCDOT GIS

Piedmont Triad Airport Authority
Section 404 Perrmit Application
Greensboro, North Carolina

Proposed Project Components



Legend:

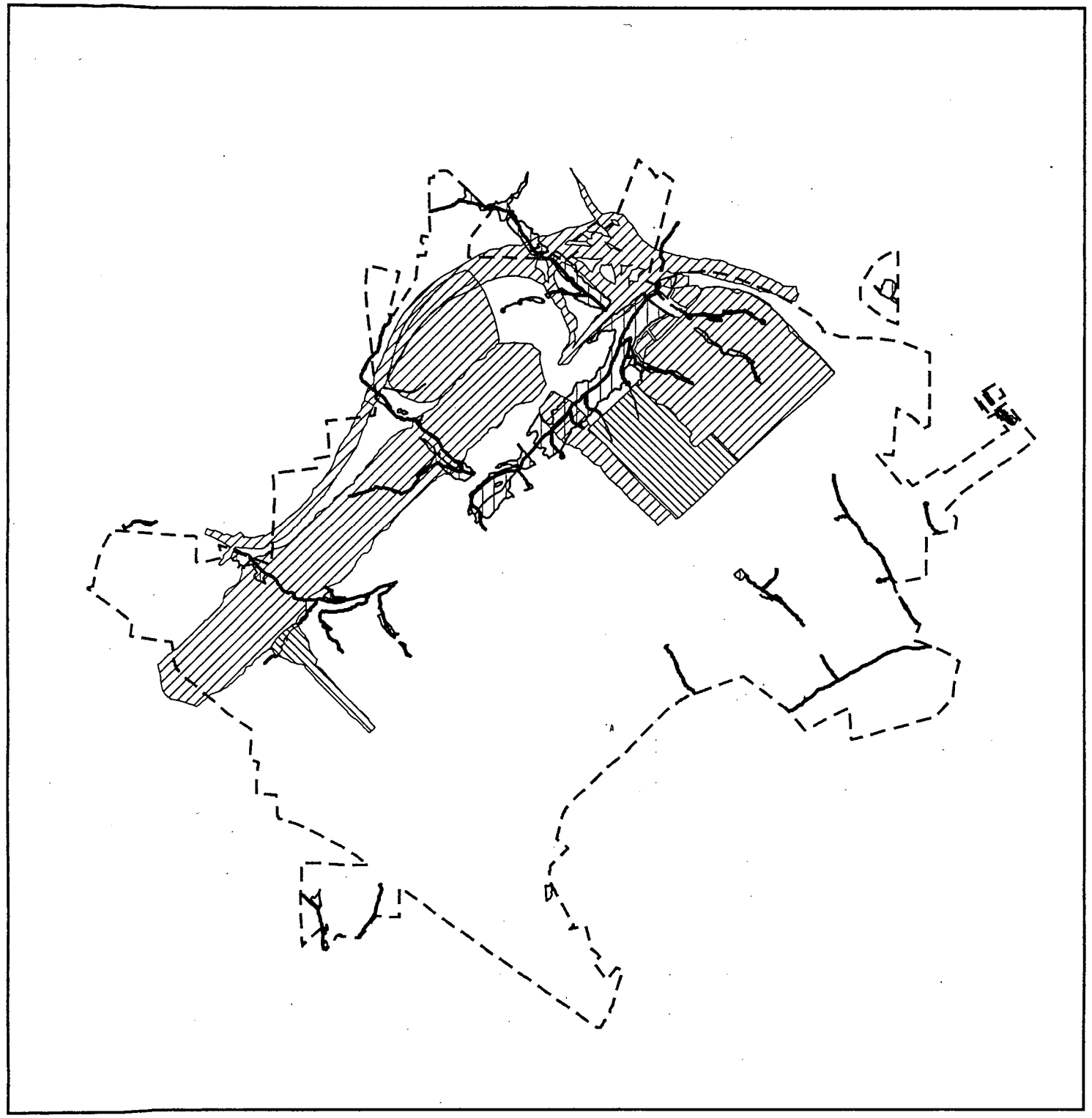
- Piedmont Triad International Airport Property
- Perennial/Permanent Stream Channel (PP)
- Important Intermittent Stream Channel (II)
- Unimportant Intermittent Stream Channel (UI)
- Wetlands
- FedEx Initial/Future Phase Boundary

MACTEC

0 1,350 2,700 5,400
SCALE IN FEET

Figure 2 (rev)
Project: 30740-0-4253
Prepared by/Date: JRS 10/15/03
Checked by/Date: RBA 10/16/03

Source(s): Baker & Associates, 6/10/02;
Ko & Associates, 6/19/03



Piedmont Triad Airport Authority
Section 404 Perrmit Application
Greensboro, North Carolina

Location Map

Legend:

- Piedmont Triad International Airport Property (+/- 3,000 Acres Total)
- Perennial/Permanent Stream Channel (PP) (51,263 lf Total)
- Important Intermittent Stream Channel (II) (1,291 lf Total)
- Unimportant Intermittent Stream Channel (UI) (0.13 ac Total)
- Wetlands (103.84 Acres Total)
- Initial Impact Areas (675 Acres Total)
- Future Impact Areas (95 Acres Total)

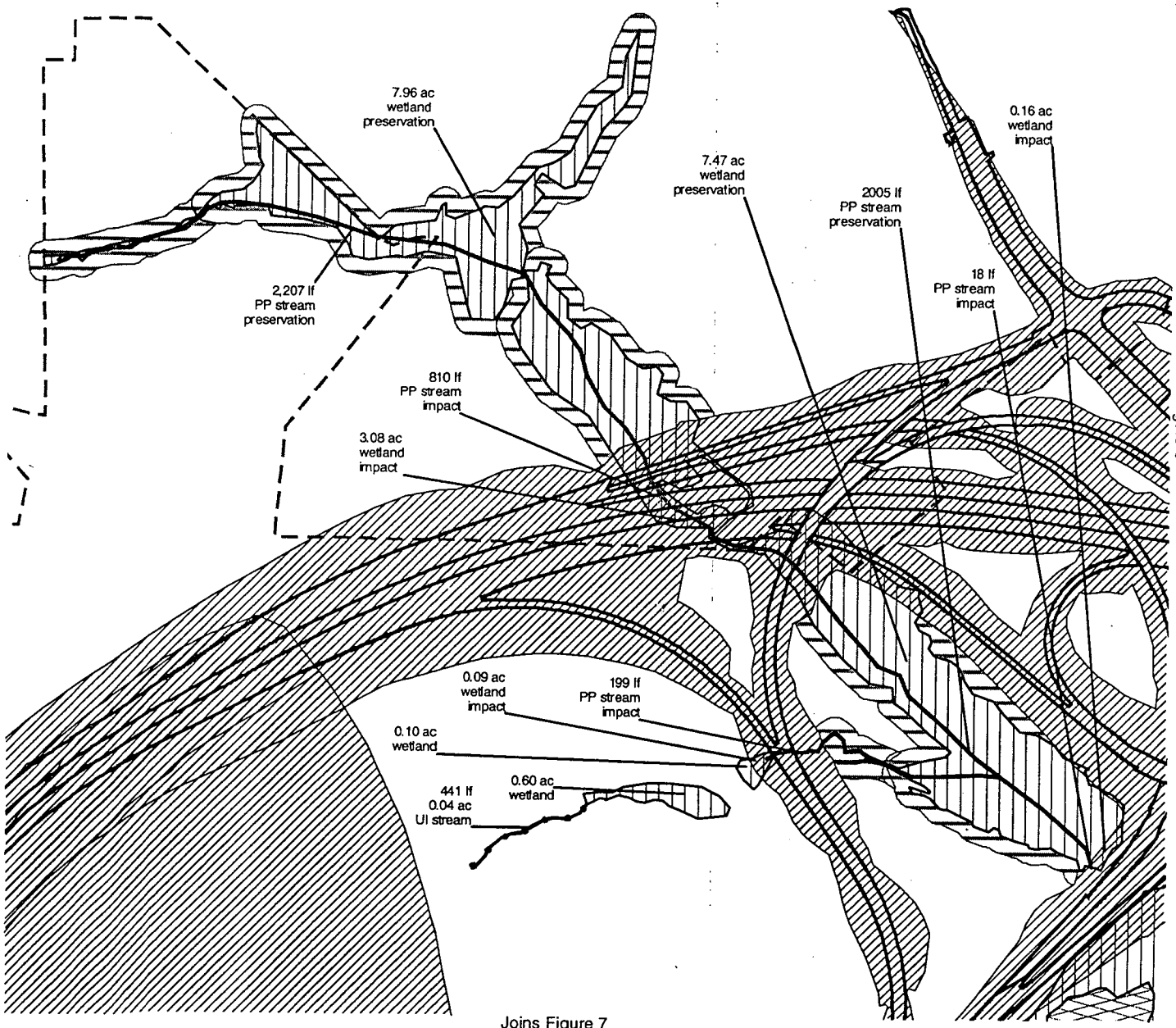
Note:
Impacted Wetlands & UI Streams = 22.88 ac
Impacted II & PP Streams = 12,823 lf

MACTEC

0 1,350 2,700 5,400
SCALE IN FEET

Figure 3 (rev)
Project: 30740-0-4253
Prepared by/Date: SRS 10/16/03
Checked by/Date: RBN 10/16/03

Source(s): Baker & Associates, 6/10/02;
Ko & Associates, 6/19/03



Piedmont Triad Airport Authority
Section 404 Perrmit Application
Greensboro, North Carolina

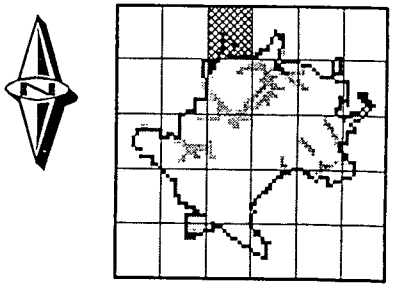
Proposed Wetland and Stream Impacts

Legend:

- Piedmont Triad International Airport Property
- Perennial/Permanent Stream Channel (PP)
- Important Intermittent Stream Channel (II)
- Unimportant Intermittent Stream Channel (UI)
- Vegetative Buffer (33.5 ac total)
- Stream Restoration
- Wetland Restoration
- Wetland Creation
- Wetlands
- Initial Impacts
- Future Impacts

Streams: length in linear footage (lf)
Wetlands: area in acres (ac)

Approximate Location Map



MACTEC

0 250 500 1,000
SCALE IN FEET

Figure 4 (rev)
Project: 30740-0-4253
Prepared by/Date: JRJ 10/10/03
Checked by/Date: KBD 10/16/03

Source(s): Baker & Associates, 6/10/02;
Ko & Associates, 6/19/03

Joins Figure 4

2.33 ac wetland impact

1081 lf PP stream preservation

652 lf PP stream

395 lf PP stream impact

57 lf PP stream impact

1.33 ac wetland impact

354 lf stream restoration

0.81 ac wetland preservation

2.40 ac wetland restoration

0.78 ac wetland restoration

Stormwater Management (SWM)

Joins Figure 8

Piedmont Triad Airport Authority Section 404 Perrmit Application Greensboro, North Carolina

Proposed Wetland and Stream Impacts

Legend:

- Piedmont Triad International Airport Property
- Perennial/Permanent Stream Channel (PP)
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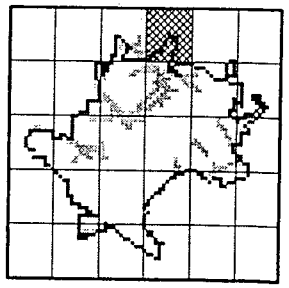
- Unimportant Intermittent Stream Channel (UI)
- Vegetative Buffer (33.5 ac total)
- Stream Restoration
- Wetland Restoration
- Wetland Creation
- Wetlands
- Initial Impacts
- Future Impacts

Streams: length in linear footage (lf)
Wetlands: area in acres (ac)

Approximate Location Map



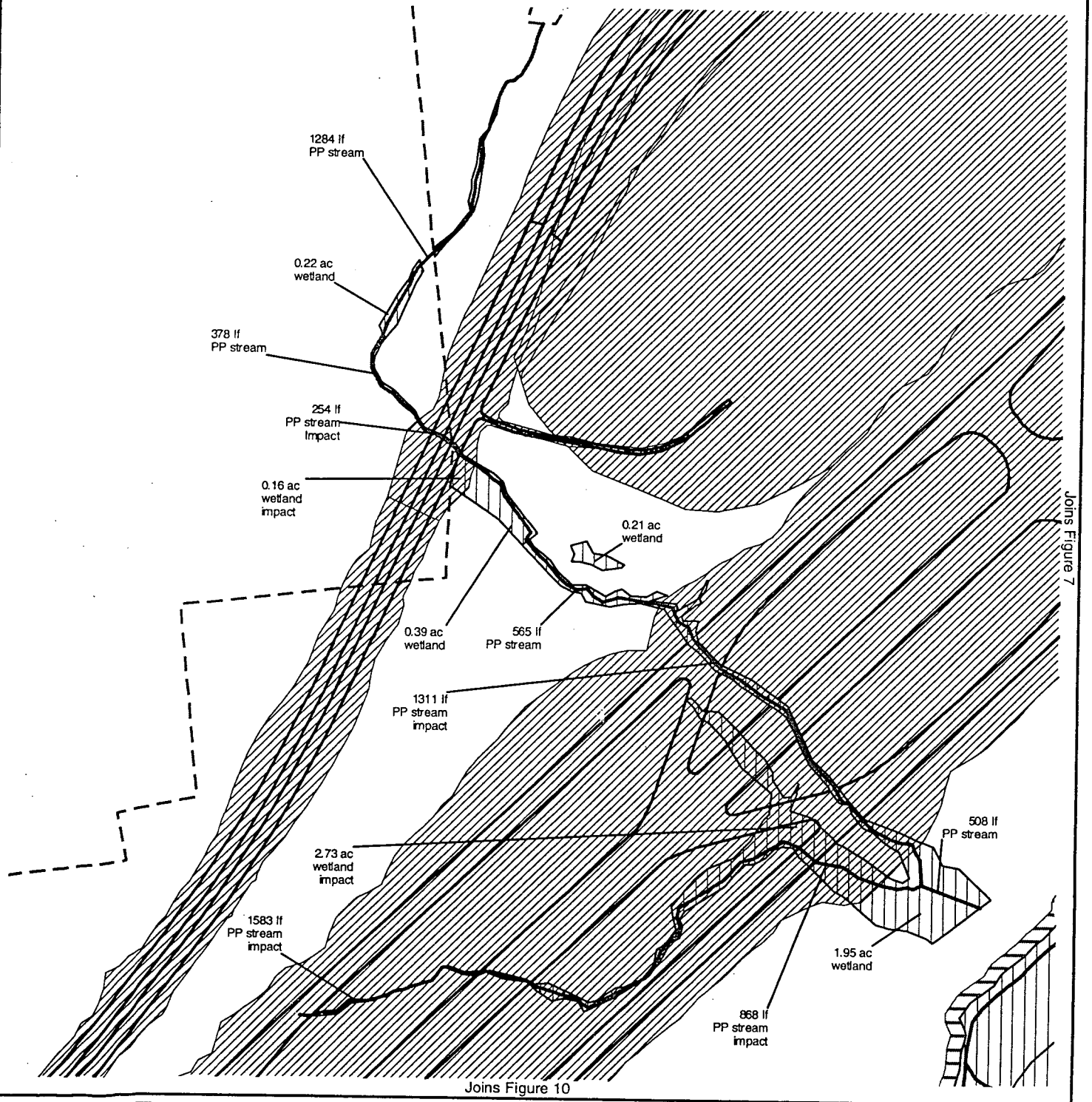
MACTEC

0 250 500 1,000

SCALE IN FEET

Figure 5 (rev)
Project: 30740-0-4253
Prepared by/Date: SAT 10/16/03
Checked by/Date: KAD 10/16/03

Source(s): Baker & Associates, 6/10/02; Ko & Associates, 6/10/02



Piedmont Triad Airport Authority
Section 404 Perrmit Application
Greensboro, North Carolina

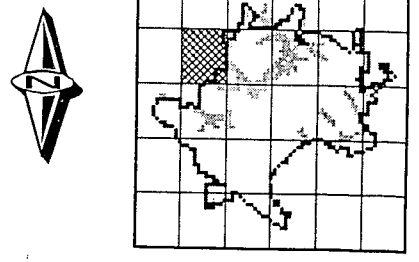
Proposed Wetland and Stream Impacts

Legend:

- Piedmont Triad International Airport Property
- Perennial/Permanent Stream Channel (PP)
- Important Intermittent Stream Channel (II)
- Unimportant Intermittent Stream Channel (UI)
- Vegetative Buffer (33.5 ac total)
- Stream Restoration
- Wetland Restoration
- Wetland Creation
- Wetlands
- Initial Impacts
- Future Impacts

Streams: length in linear footage (lf)
Wetlands: area in acres (ac)

Approximate Location Map

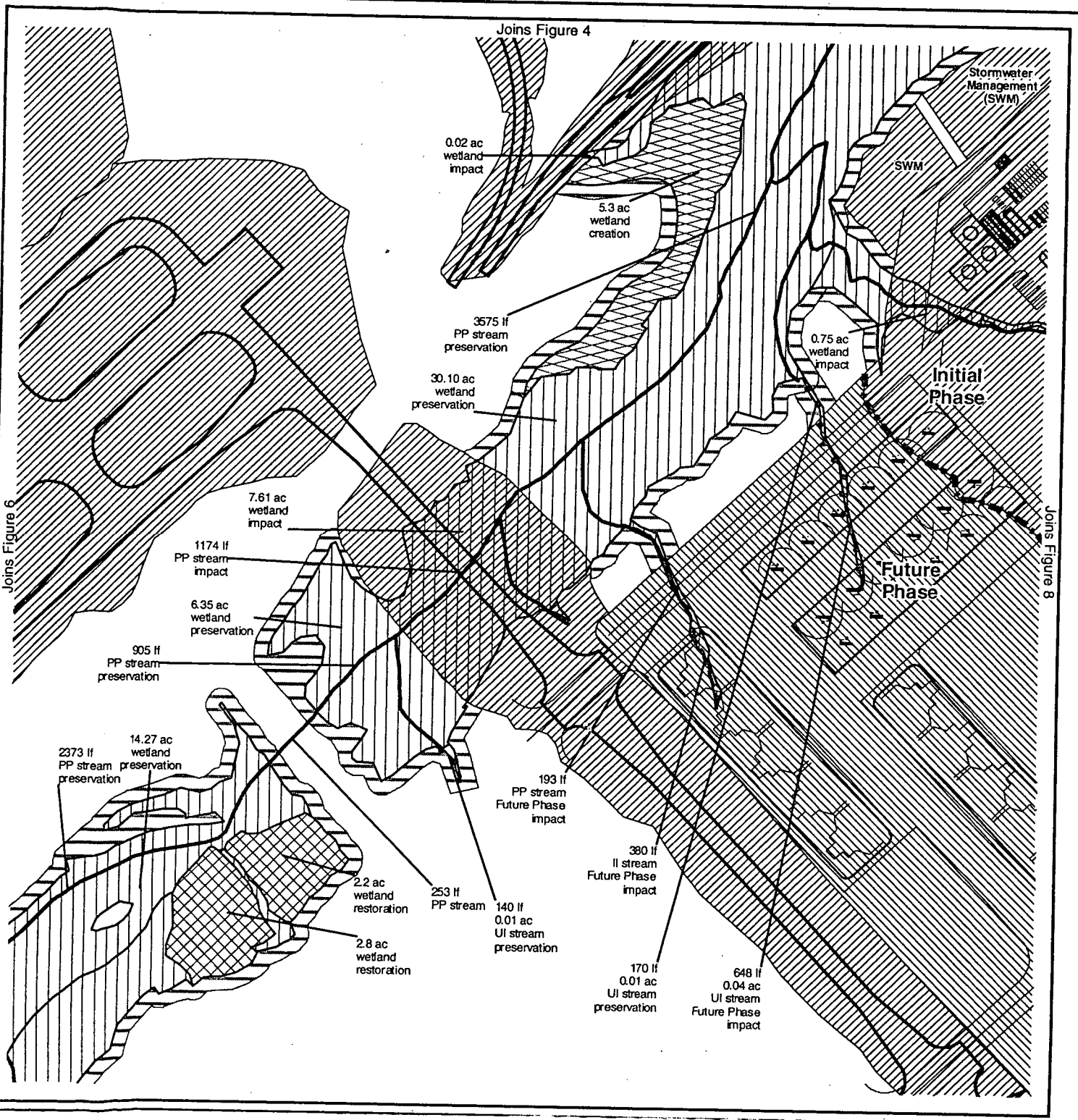


MACTEC

0 250 500 1,000
SCALE IN FEET

Figure 6 (rev)
Project: 30740-0-4253
Prepared by/Date: JJT 10/16/03
Checked by/Date: RAD 10/16/03

Source(s): Baker & Associates, 6/10/02;
Ko & Associates, 6/19/03



Piedmont Triad Airport Authority
Section 404 Perrmit Application
Greensboro, North Carolina

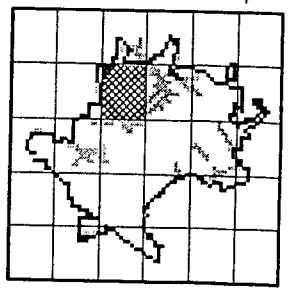
Proposed Wetland and Stream Impacts

Legend:

- Piedmont Triad International Airport Property
- Perennial/Permanent Stream Channel (PP)
- Important Intermittent Stream Channel (II)
- Unimportant Intermittent Stream Channel (UI)
- Vegetative Buffer (33.5 ac total)
- Stream Restoration
- Wetland Restoration
- Wetland Creation
- Wetlands
- Initial Impacts
- Future Impacts

Streams: length in linear footage (lf)
Wetlands: area in acres (ac)

Approximate Location Map

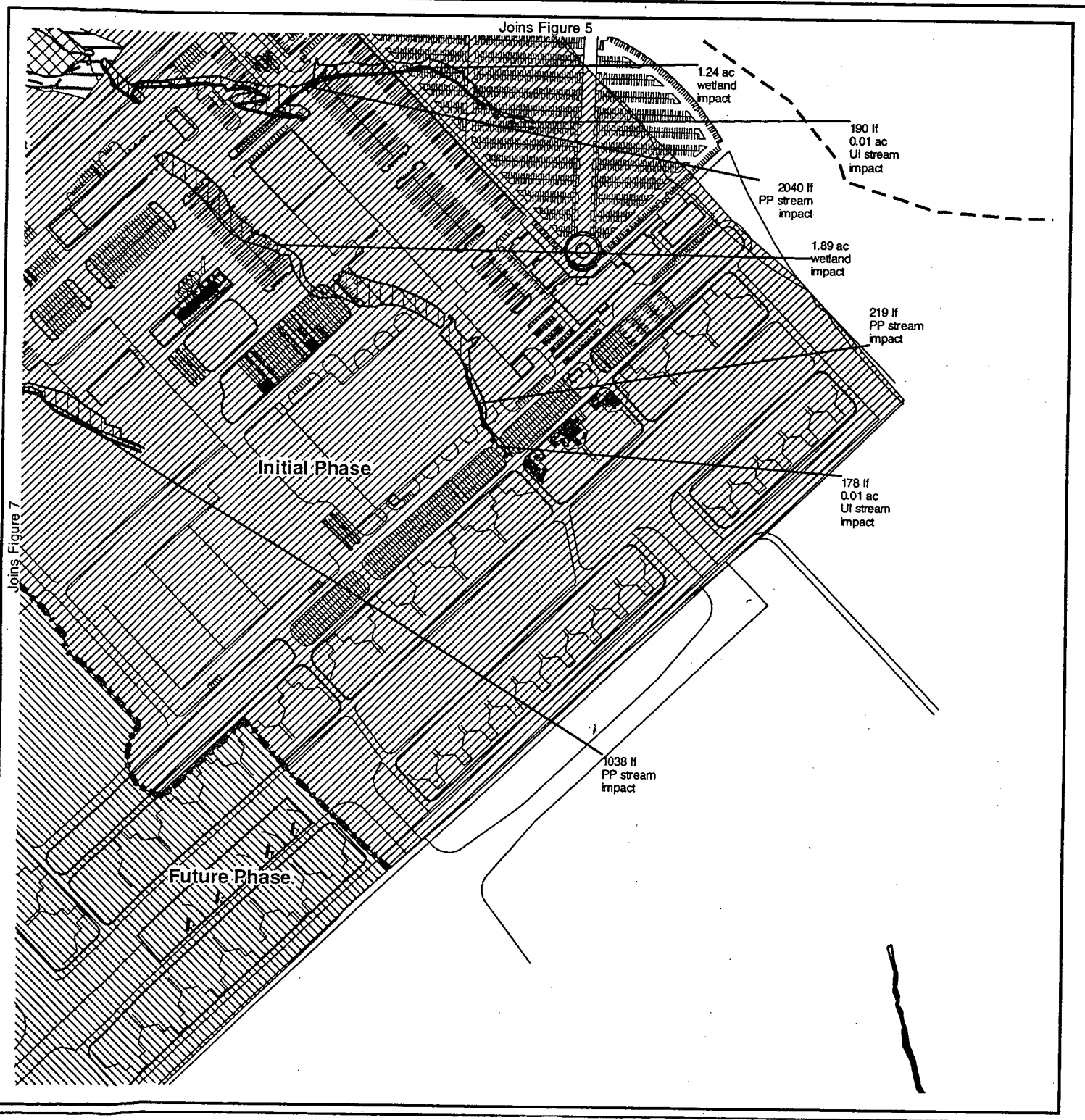


MACTEC

0 250 500 1,000
SCALE IN FEET

Figure 7 (rev)
Project: 30740-0-4253
Prepared by/Date: JJT 10/15/03
Checked by/Date: PBA 10/16/03

Source(s): Baker & Associates, 6/10/02;



Piedmont Triad Airport Authority
Section 404 Perrmit Application
Greensboro, North Carolina

Proposed Wetland and Stream Impacts

Legend:

- Piedmont Triad International Airport Property
- Perennial/Permanent Stream Channel (PP)
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- Unimportant Intermittent Stream Channel (UI)
- Vegetative Buffer (33.5 ac total)
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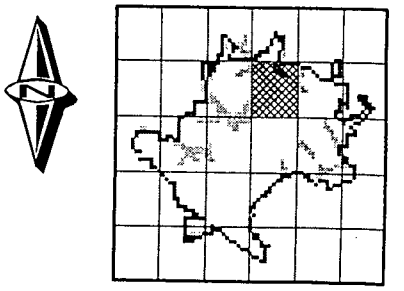
- Wetland Restoration
- Wetland Creation
- Wetlands
- Initial Impacts
- Future Impacts

Streams: length in linear footage (lf)
Wetlands: area in acres (ac)

Approximate Location Map

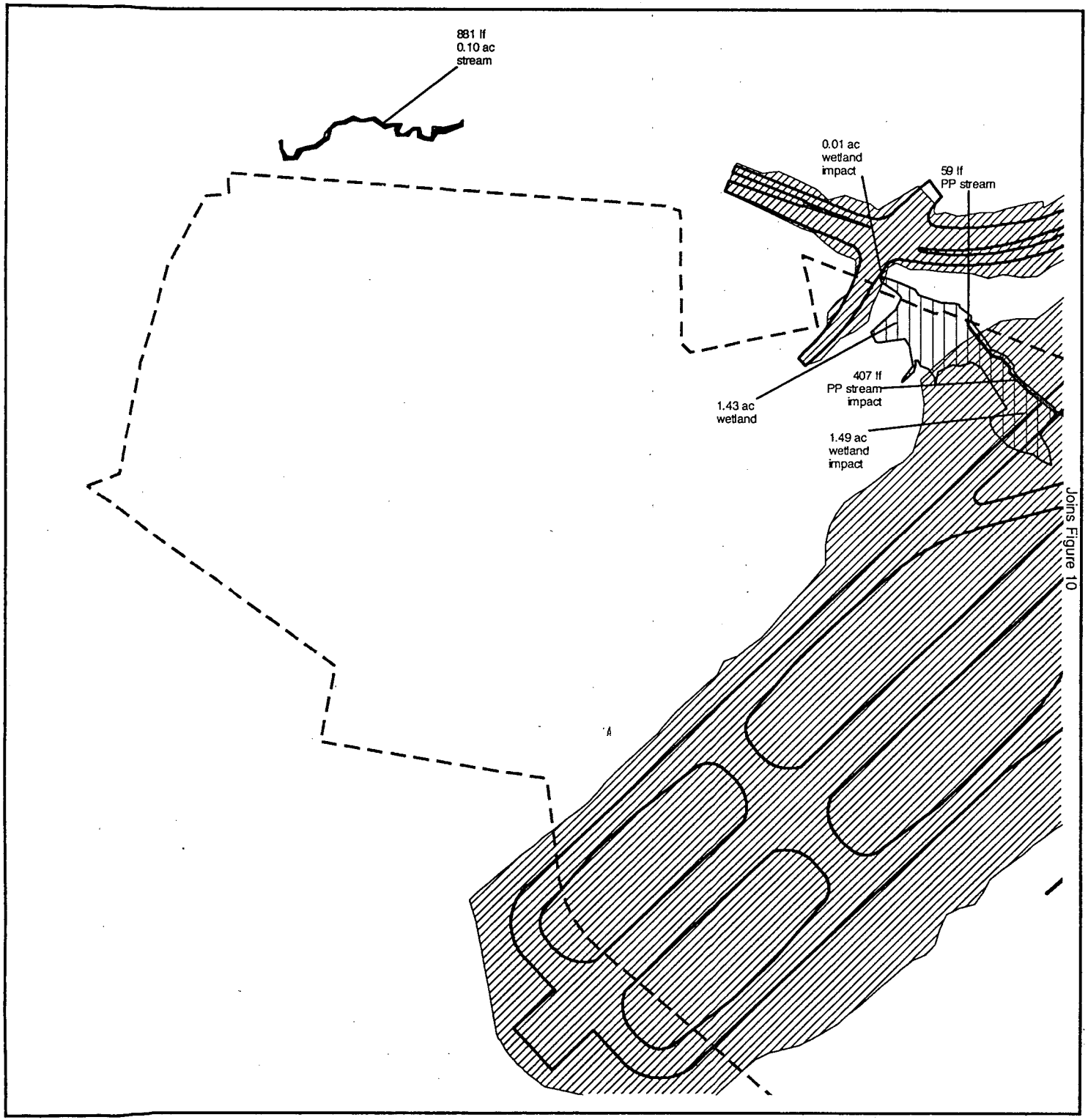


MACTEC

0 250 500 1,000
SCALE IN FEET

Figure 8 (rev)
Project: 30740-0-4253
Prepared by/Date: JJN 10/16/03
Checked by/Date: RBD 10/16/03

Source(s): Baker & Associates, 6/10/02;
Ko & Associates, 6/19/03



Piedmont Triad Airport Authority
Section 404 Perrmit Application
Greensboro, North Carolina

Proposed Wetland and Stream Impacts

Legend:

- Piedmont Triad International Airport Property
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- Important Intermittent Stream Channel (II)
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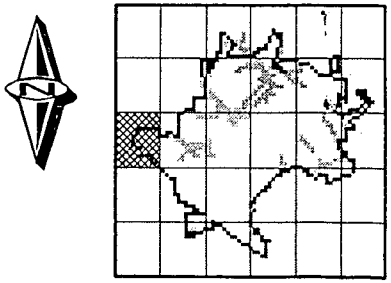
- Stream Restoration
- Wetland Restoration
- Wetland Creation
- Wetlands
- Initial Impacts
- Future Impacts

Streams: length in linear footage (lf)
Wetlands: area in acres (ac)

Approximate Location Map

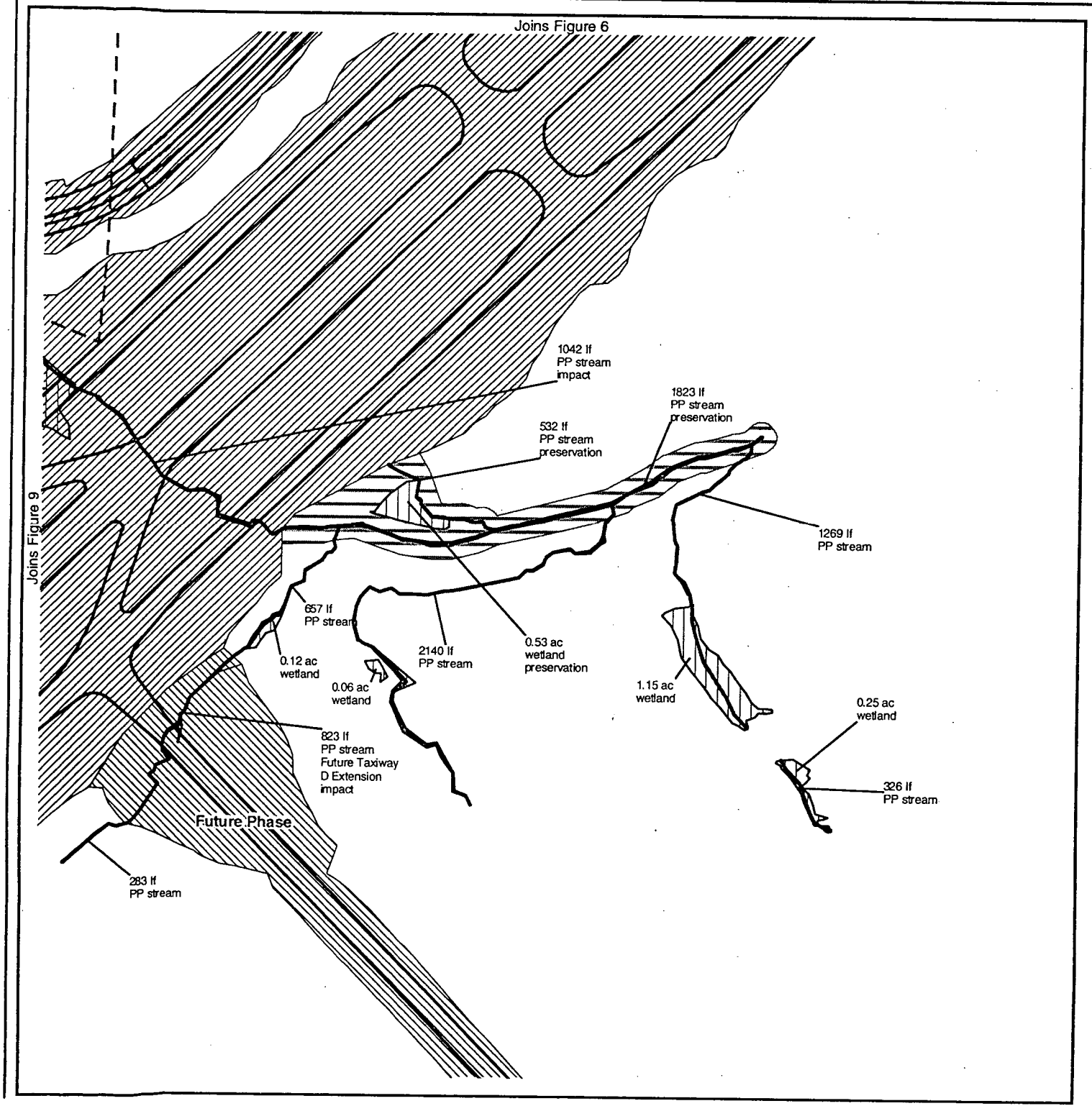


MACTEC

0 250 500 1,000
SCALE IN FEET

Figure 9 (rev)
Project: 30740-0-4253
Prepared by/Date: JRJ 10/15/03
Checked by/Date: RAB 10/16/03

Source(s): Baker & Associates, 6/10/02;
Ko & Associates, 6/19/03



Piedmont Triad Airport Authority
Section 404 Perrmit Application
Greensboro, North Carolina

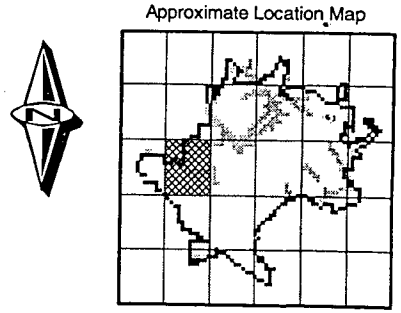
Proposed Wetland and Stream Impacts

Legend:

- Piedmont Triad International Airport Property
- Perennial/Permanent Stream Channel (PP)
- Important Intermittent Stream Channel (II)
- Unimportant Intermittent Stream Channel (UI)
- Vegetative Buffer (33.5 ac total)
- Stream Restoration
- Wetland Restoration
- Wetland Creation
- Wetlands
- Initial Impacts
- Future Impacts

Streams: length in linear footage (lf)
Wetlands: area in acres (ac)

Approximate Location Map



MACTEC

0 250 500 1,000
SCALE IN FEET

Figure 10 (rev)
Project: 30740-0-4253
Prepared by/Date: JAS 10/16/03
Checked by/Date: KRD 10/16/03

Source(s): Baker & Associates, 6/10/02;

Channel Mitigation Monitoring Sheets I, II, III, AND IV
Monitoring Data Record

Project Title: _____ COE Action ID: _____
Stream Name: _____ DWQ Number: _____
City, County and other Location Information: _____
Date Construction Completed: _____ Monitoring Year: ( ) of 5
Ecoregion: _____ 8 digit HUC unit _____
USGS Quad Name and Coordinates: _____
Rosgen Classification: _____
Length of Project: _____ Urban or Rural: _____ Watershed Size: _____
Monitoring DATA collected by: _____ Date: _____
Applicant Information:
Name: _____
Address: _____
_____
Telephone Number: _____ Email address: _____
Consultant Information:
Name: _____
Address: _____
_____
Telephone Number: _____ Email address: _____
Project Status: _____
_____

Monitoring Level required by COE and DWQ (404/Sect. 10 permit/ 401 Cert.: Level 1 2 3 *(circle one)*
Monitoring Level 3 requires completion of *Section 1*
Monitoring Level 2 requires completion of *Section 1 and Section 2*
Monitoring Level 1 requires completion of *Section 1, Section 2 and Section 3*
If biological monitoring is required by DWQ, then Section 4 should also be completed

Section 1. PHOTO REFERENCE SITES
(Monitoring at all levels must complete this section)
Attach site map showing the location and angle of all reference photos with a site designation (name, number, letter, etc.) assigned to each reference photo location. Photos should be provided for all structures and cross section locations, should show both banks and include an upstream and downstream view. Photos taken to document physical stability should be taken in winter. Photos taken to document vegetation should be taken in summer (at representative locations). Attach photos and a description of each reference photo or location. We recommend the use of a photo identification board in each photo to identify location.

Total number of reference photo locations at this site: _____
Dates reference photos have been taken at this site: _____
_____
Individual from whom additional photos can be obtained (name, address, phone): _____
_____
Other Information relative to site photo reference: _____
_____

If required to complete Level 3 monitoring only stop here; otherwise, complete section 2.

Section 2. PLANT SURVIVAL

Attach plan sheet indicating plots and sample area locations and reference photos.

Survival plots:

DATE:					
Area within the easement is:					
Area sampled by survival plots:					
Number of survival plots sampled:					
Random or nonrandom site selection:					
% Coverage within survival plots is:					
Photos of reference plots taken: yes/no					

Provide a written description of specific data or findings and photos as needed for clarity.

Live Stake counts:

DATE:					
Area within the easement is:					
Area sampled for stake survival:					
Number of plots sampled:					
Random or nonrandom site selection:					
Average number of surviving stakes:					
Range of survival for all plots:					

Provide a written description of specific data or findings as needed for clarity.

Tree counts:

DATE:					
Area within the easement is:					
Area sampled for tree survival:					
Number of plots sampled:					
Random or nonrandom site selection:					
Average number of surviving trees:					
Range of survival for all plots:					

Provide a written description of specific data or findings as needed for clarity.

Bankfull Events:

Date measured:					
Method of Verification:					

COMMENTS: _____

If required to complete Level 1 and Level 2 monitoring only stop here; otherwise, complete section 3.

Section 3. CHANNEL STABILITY

Attach plan sheet(s) indicating the locations of cross-sections and beginning and ending of longitudinal profiles if the entire reach is not profiled. Year to year changes in cross-sections, longitudinal profile and bed material should be plotted and submitted. Comparison overlays from previous years for profile and cross-section monitoring should be provided.

Cross-sections: attach plots of each cross-section showing year to year changes.
Provide the following data for each cross-section:

Date measured					
Cross-section being measured					
Cross-sectional area: as-built/present					
Bankfull width: as-built/present					
Floodprone Width: as-built/present					
Width/depth: as-built/present					
Entrenchment ratio: as-built/present					
Stream Type: as-built/present*					

* only required for riffle cross-sections

Longitudinal profiles: attach plots of the longitudinal profile showing year to year changes and the locations of installed or natural structures that affect profile.

Date measured	
Avg. slope riffles: as-built/present	
Avg. slope pools: as-built/present	
Number of riffles: as-built/present	
Number of pools: as-built/present	

Pebble counts: Attach a printout of pebble count data and a graphical plot of bed material showing the cumulative % finer than X millimeters and the number of particles in standard size classes. Year to year changes in bed material should also be plotted and provided.

Date measured					
Cross-section being measured					
D16: as-built/present					
D50: as-built/present					
D84: as-built/present					

Visual Inspection: The entire stream project as well as each instream structure and bank stabilization/revetment structure must be evaluated and problems addressed.

Date Inspected	Station Number	Station Number	Station Number	Station Number	Station Number
Structure Type					
Is water piping through or around structure?					
Head cut or down cut present?					
Bank or scour erosion present?					
Other problems noted?					

NOTE: Attach separate narrative sheets to each monitoring report describing/discussing the overall monitoring results. Include the identification of specific problem areas/channel failures, estimated cause and proposed/required remedial action. This should include a brief discussion of any parameter that has changed significantly from as-built. (See success criteria discussion in Section 11.)

Appendix II. General criteria used to evaluate the success or failure of activities at mitigation sites and required remedial actions to be implemented should monitoring indicate failure of a component.

Mitigation Component	Success (requires no action)	Failure →	Action
(1.) Photo Reference Sites Longitudinal photos Lateral photos	No substantial* aggradation, degradation or bank erosion.	Substantial aggradation, degradation or bank erosion.	When substantial aggradation, degradation or bank erosion occurs, remedial actions will be planned, approved, and implemented.
(2.) Plant Survival Survival plots Stake counts Tree counts	≥ 75% Coverage in Photo Plots Survival and growth of at least 320 trees/acre through year 3, then 10% mortality allowed in year 4 (288 trees/acre) and additional 10% mortality in year 5 for 260 trees/acre through year 5.	< 75% coverage in photo plots for herbaceous cover. Survival of less than 320 trees per acre through year 3 and then less than the success criteria for years 4 and 5.	Areas of less than 75% coverage will be re-seeded and or fertilized, live stakes and bare rooted trees will be planted to achieve desired densities.
(3.) Channel Stability Cross-sections Longitudinal profiles Pebble counts	Minimal evidence of instability (down-cutting, deposition, bank erosion, increase in sands or finer substrate material).	Substantial* evidence of instability.	When Substantial evidence of instability occurs, remedial actions will be planned, approved, and implemented.
(4.) Biological Indicators Invertebrate populations Fish populations	Population measurements remain the same or improve, and species composition indicates a positive trend.	Population measurements and species composition indicate a negative trend.	Reasons for failure will be evaluated and remedial action plans developed, approved, and implemented.

***Substantial or subjective determinations of success will be made by the mitigation sponsor and confirmed by COE and review agencies.**

Monitoring Level 1 will include items 1, 2, and 3, and may include item 4 based on the project review.

Monitoring Level 2 will include items 1 and 2, and may include item 3 based on the project review.

Monitoring Level 3 will include only item 1.