CHESTERFIELD COUNTY, VIRGINIA

MEADOWVILLE TECHNOLOGY PARK

THE TIMMONS REPORT

Draft
Executive Summary of Preliminary Engineering, Environmental and Master Planning Report for Meadowville Technology Park Chesterfield County, Virginia

Submitted to:
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PREFACE

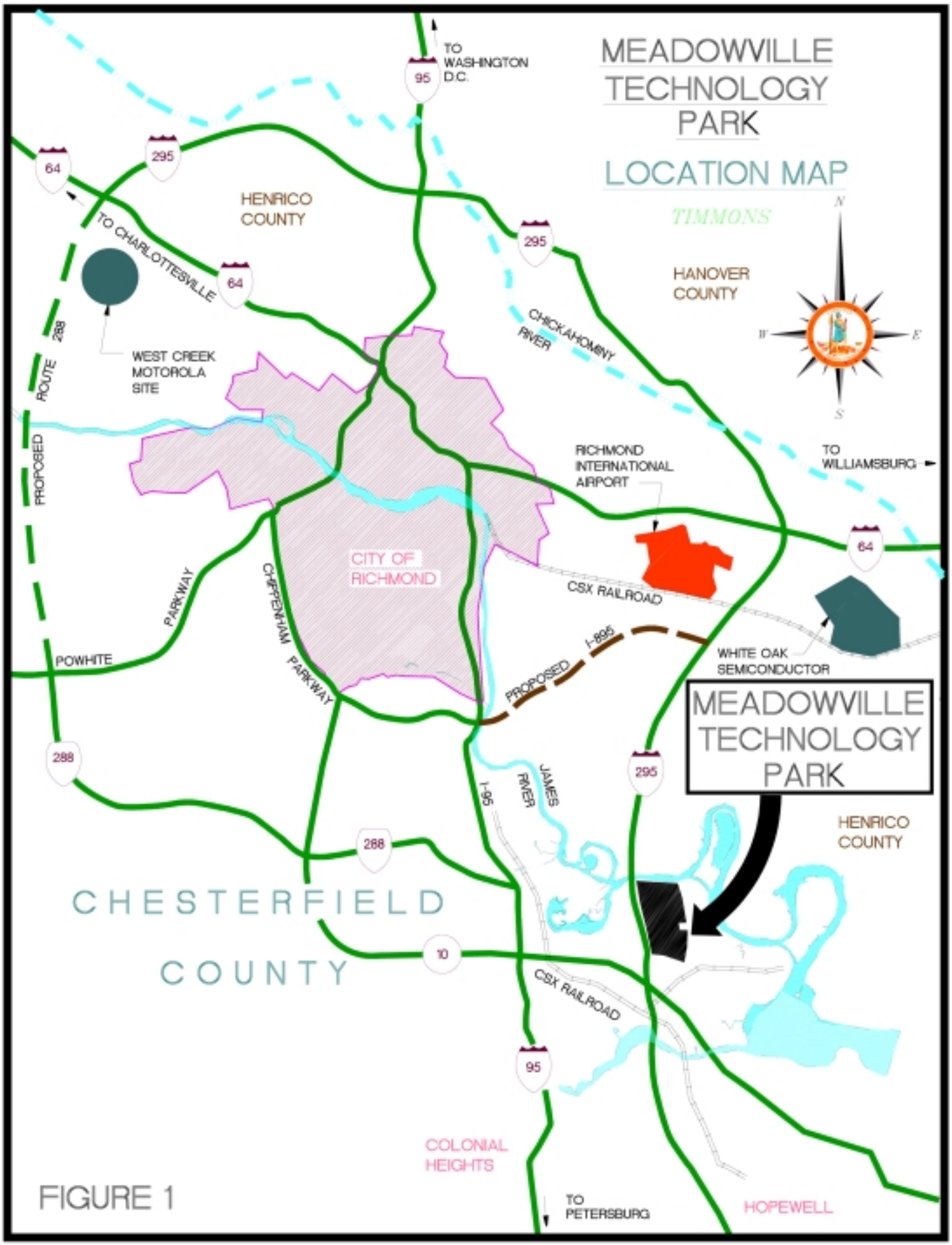
The Meadowville Technology Park provides a unique opportunity for Chesterfield County to attract major industrial clients to share one of the county's most majestic and beautiful resources. The Meadowville Tract includes more than 1,600 acres bordering the James River for approximately 6,000 feet just southeast of the Interstate 295 Varina-Enon Bridge (See Figure 1 - Location Map). The property's river frontage contains steep overlooks that provide spectacular views of the river, bridge and surrounding property. The site also borders Interstate 295 for approximately 2.5 miles, and includes a proposed interchange that is already approved by federal, state, and local officials. The County has completed the zoning, environmental, and utility infrastructure studies that are necessary for potential industrial users to evaluate this site. The County has also constructed phase one of the utility infrastructure necessary to serve its feature property. This report compiles the previous studies with detailed engineering and master planning efforts to create a flexible, dynamic, and comprehensive guide for developing the site to best utilize its resources and natural beauty.

Chesterfield County has invested significant resources towards development of the Meadowville Technology Park. The zoning package that was approved for the property incorporated the concerns of the adjacent property owners, county residents, and the stakeholders in Meadowville. The utility and road infrastructure studies and designs have helped the County budget for appropriate capital improvements, including the completed gravity sewer and the pump station that is under construction. The County has also studied the development needs and patterns of the industrial clients it wishes to attract. These users require large, dynamic sites that are not encumbered by technical, planning, or environmental constraints. The intent of this plan is to balance the substantial investment made by Chesterfield County with the resources of appropriate industrial clients to efficiently, productively, and responsibly develop this beautiful County resource into the Meadowville Technology Park.

Introduction

This Executive Summary provides a brief introduction to the full Preliminary Engineering, Environmental, and Master Planning Report. The summary includes a synopsis of the work that has been completed by Chesterfield County, TIMMONS, and various sub-consultants that have been hired to complete specific studies for this property. The full report includes a discussion of various master plan alternatives and typical semiconductor manufacturing layouts. The appendices of this report are contained in a separate document that includes the detailed Stormwater Management, Geotechnical, Air Quality, Traffic, and Vibration analyses that have been completed for the site.

Chesterfield County has hired TIMMONS to complete the Preliminary Engineering, Environmental, and Master Planning Report. TIMMONS utilized their recent experience in industrial park development and site development for the semiconductor industry to complete this report. This experience is demonstrated by recent completion of site design for the Motorola site at West Creek Industrial Park in Goochland County, Virginia, and the site work for the WhiteOak Semiconductor facility in Henrico County. The Chesterfield County Administrator's staff, and Departments of Economic Development, Transportation, Utilities, Planning and Environmental Engineering also contributed significantly to the completion of this study.


MEADOWVILLE TECHNOLOGY PARK
LOCATION MAP
TIMMONS
TO WASHINGTON D.C.
95
295
64
HENRICO COUNTY
TO CHARLOTTESVILLE
64
295
HANOVER COUNTY
CHICKAHOMINY RIVER
N
W
E
S
288
ROUTE
WEST CREEK MOTOROLA SITE
PROPOSED
RICHMOND INTERNATIONAL AIRPORT
TO WILLIAMSBURG
CITY OF RICHMOND
64
PARKWAY
CHIPPENHAM PARKWAY
CSX RAILROAD
POWHITE
PROPOSED I-895
WHITE OAK SEMICONDUCTOR
MEADOWVILLE TECHNOLOGY PARK
288
295
JAMES RIVER
I-95
HENRICO COUNTY
288
CHESTERFIELD COUNTY
10
CSX RAILROAD
95
COLONIAL HEIGHTS
TO PETERSBURG
HOPEWELL
FIGURE 1

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SITE CONDITIONS

Site Description

The Meadowville Technology Park consists of 1,600 acres of industrial zoned property just southeast of the Interstate 295 Varina-Enon Bridge. The park is contained within one contiguous parcel bordering the James River for approximately 6,000 feet and I-295 for approximately 2.5 miles. The property is located within east/central Chesterfield County, 7 miles south of the City of Richmond, 3 miles north of the City of Hopewell, the City of Petersburg, and Fort Lee Military Reservation, and shares the James River shoreline with Henrico County on the east and north (See Figure 1 – Location Map).

Site Restraints

The site is mostly wooded with some agricultural and timbered areas. The topography is relatively flat except near the river where mild to steep grade changes occur. Adjacent land uses include residential and industrial. The residential communities are buffered by light industrial zoning. A summary of the site restraints, buffers, and adjacent land uses is presented in Figure 2 – Site Description Map.

Zoning

The property is currently zoned I-1 (light industrial) on the northern and eastern boundary, and I-2 (medium industrial) for the remainder of the property. The I-2 zoning permits manufacturing facilities with semiconductor manufacturing a permitted use. The zoning is structured to prohibit industry and any encroachment that is not compatible with the semiconductor industry.

TRANSPORTATION

The site will be accessed directly by the interchange proposed at Interstate 295 and Meadowville Road. Chesterfield County has completed the federal, state, and local approval process for this interchange, and the construction plans for the interchange have been approved by the Virginia Department of Transportation (VDOT). The existing interchange between I-295 and State Route 10 provides a second interstate access point convenient to the south end of the park. The existing Enon Church Road will be developed into a four lane divided roadway that will provide excellent connection with the interstate, minimize local impacts, link the industrial property with the eastern seaboard, and afford a unique identity and public exposure for the Meadowville Technology Park.

UTILITIES

Water and Sanitary Sewer Infrastructure

Chesterfield County has undertaken a number of alignment studies, conceptual plans, final designs, and construction of phase I to provide water and sewer service to the entire Meadowville Area. The intention of progressing the utility infrastructure design and construction is to assure that any of the sites within the Meadowville Technology Park can be

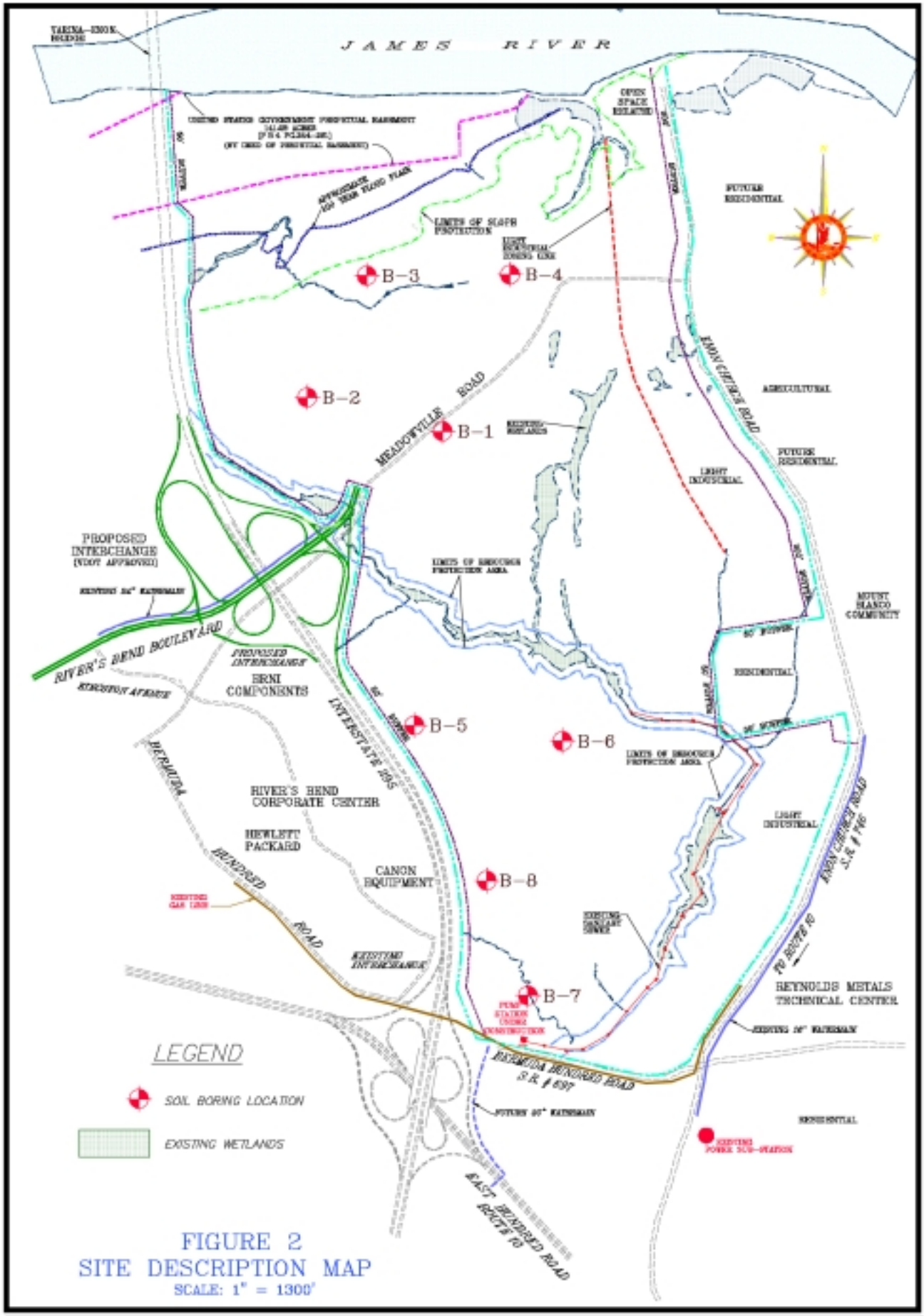

FIGURE 2
SITE DESCRIPTION MAP
SCALE: 1" = 1300'

Meadowville Technology Park

Chesterfield County, Virginia

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served by water and sewer within 12 months of beginning construction. Four separate projects have been completed, or are currently under construction, by Chesterfield Utilities to accomplish this goal:

- Dual 24" sanitary sewer force main to serve the Meadowville Area
- 24" water main along Meadowville Road and Enon Church Road to serve this entire area
- 42" gravity sewer infrastructure for the Meadowville Tract
- Pump station adjacent to Route 10 that will utilize the dual force mains.

This utility infrastructure can accommodate an average of 3.0 million gallons per day (MGD) immediately, and will accommodate an average of 10.0 MGD upon completion of Phase II. The overall utility infrastructure plan is included within the Site Description Map shown in Figure 2.

Gas, Fiber Optic, and Electrical Service

A high-pressure 8" natural gas line is located immediately south of the site along Bermuda Hundred Road. Columbia Gas Services owns this line that has sufficient capacity and pressure to support industrial growth in this area. If additional construction is required to serve any specific project, then the cost to extend service can be offset by the anticipated revenue from the proposed service. A detailed evaluation of gas service will be completed for each potential industrial user.

Fiber optic service is available in the immediate area. Bell Atlantic provides service to the adjacent River's Bend development that can easily be extended across I-295 to the Meadowville Technology Park. A detailed evaluation of fiber optic service will be completed for each potential industrial user.

There is a Virginia Power substation located just south of the park (see Figure 2) that provides 230 KV service to the Meadowville Area. This substation is located on one of the major east-west transmission lines that provide power between the Chesterfield Power Station and Tidewater, Virginia. It is anticipated that a new substation would be constructed within the Meadowville Technology Park. A detailed evaluation of electrical service will be completed for each potential industrial user.

ENVIRONMENTAL

Development of a major industrial site requires maximum utilization of property. Environmental encumbrances such as wetlands, endangered species, or cultural resources that may affect development need to be addressed as part of the site selection process. Chesterfield County has invested significant resources towards studying these issues to assure that development can efficiently progress within the Meadowville Technology Park. The master planning efforts have incorporated this preliminary research into the alternatives presented within this report. The County has also initiated discussions with the regulatory agencies responsible for these resources to assure that all permitting issues are being addressed. A summary of the environmental issues is presented below.

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Wetlands

Chesterfield County has retained TIMMONS to coordinate all aspects of the environmental permitting for the Meadowville Technology Park. A wetland delineation for the Meadowville Tract was confirmed by the U.S. Army Corps of Engineers (COE) on June 27, 1996. This delineation is valid until June 27, 2001 and will be used as the basis for all environmental permitting that will be completed for the Meadowville Technology Park. The delineation confirms that the only wetlands within the park are generally adjacent to the stream channels. There are no wetlands within the 283+ acre site that has been identified as the primary location for a semiconductor manufacturing facility. The COE confirmed wetland locations are shown on Figure 2.

Threatened and Endangered Species

The Virginia Department of Conservation and Recreation's (DCR) Biological and Conservation Data System has been consulted regarding the presence of natural heritage resources. Their response, dated November 6, 1996, summarizes that no reported instances of threatened or endangered species within or adjacent to the Meadowville Tract are contained in their database. Once specific jurisdictional impacts from future infrastructure are identified, then detailed field investigations to confirm these findings may be necessary.

Historical and Archaeological Resources

The Virginia Department of Historic Resources (DHR) was contacted regarding archaeological and architectural resources within the project limits. Their response, dated January 24, 1997, indicated a probability of finding historic and/or pre-historic sites within the limits of the tract. A detailed Archaeological Resource Inventory of the entire Meadowville Tract was completed to determine any areas with potential for containing historically significant sites. The report identifies areas with probability that additional field studies may be needed to satisfy the National Historic Resources Preservation Act. No historical structures or known historic/prehistoric sites that require preservation were identified in this study. The only anticipated action is proper documentation of findings within the wetland areas that will require federal Clean Water Act permits.

The National Historic Preservation Act requires that certain actions comply with the provisions laid out in Section 106 of the act to preserve historically significant resources. Two such actions will be required for the Meadowville Technology Park. One is to obtain a Section 404 Permit from the U.S. Army Corps of Engineers to impact wetlands or Waters of the U.S. The Archaeological Resource Inventory will help expedite this federal process by streamlining and/or eliminating the need for additional field studies to satisfy Section 106 provisions. The second is to utilize Industrial Access Funds for the transportation infrastructure. A Phase I Archaeological Study for the roadway corridor will be completed in July, 1999.

Environmental Permitting Strategy

The overall utility plan is shown on the Site Description Map shown in Figure 2. A Nationwide Permit 12 for

the pump station, force main, waterline, and Phase I of the gravity sewer system has been issued by the U.S. Army Corps of Engineers (COE). Various meetings with the COE have outlined environmental permitting strategies for future phases of development. The remaining gravity sewer, the stormwater management facilities, the road crossings, and any identified permanent site development impacts are included within one Individual Permit application that has already been submitted by Chesterfield County for the remainder of the Meadowville Technology Park infrastructure. This application included a detailed wetland mitigation plan that considers all future wetland impacts anticipated within the project. A schedule of the tasks remaining to complete this permitting process is included below:

Task	**Proposed Date**
Final Submittal with mitigation	6/1/99
COE Public Notice	June/July, 99
Revise Permit and re-submit	August, 99
Negotiate Permit Conditions	September, 99
DEQ Public Notice	October, 99
Permit Issuance	11/1/99

The only permits that an individual site may require as they develop within the Meadowville Technology Park are related to isolated wetlands, air emissions, erosion control, and Virginia Pollution Discharge Elimination System (VPDES).

STORMWATER MANAGEMENT

Chesterfield County has initiated a regional stormwater management program to address: groundwater quality, surface runoff water quality, and water quantity control associated with flooding, erosion control, and increased runoff from future development within and around the Meadowville Tract. The County will utilize the regional stormwater management facilities to help solve flooding problems downstream of the Meadowville Technology Park along Johnson Creek. Traditional hydrology, hydraulics, erosion protection, and water quality requirements are a part of the comprehensive planning effort. The comprehensive stormwater study that has been conducted for the Meadowville Technology Park has addressed these traditional and environmental regulations, downstream flooding problems, while maintaining as its highest priority the short and long-term goals of the ultimate development project.

The stormwater management plan proposes a series of lakes located within the Meadowville Technology Park. These lakes have been located to address the technical criteria outlined above and to serve as amenities to the site developments proposed within the park. It will not be necessary for individual sites to construct detention facilities or Best Management Practices (BMPs) within the park. The development criteria regarding water quality and quantity control for the entire tract, including BMP maintenance, have been incorporated into the regional stormwater management plan. These facilities will be designed, constructed, and maintained as part of the park infrastructure.

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MASTER PLAN

Chesterfield County has selected economic development as a top priority for the Meadowville area. The County is seeking to position the Meadowville Technology Park as the most attractive site for a new semiconductor and/or other major manufacturing facility. This goal provided the direction for the master planning study. Each proposed alternative that was evaluated included at least two 250± acre parcels that can satisfy the basic criteria of a semiconductor manufacturing facility. These criteria include:

1. Appropriate size and shape of parcel
2. Proper zoning, buffers, and adjacent land use and zoning
3. Excellent access and traffic circulation
4. Manageable topographic features such as steep slopes, creeks, and existing woods
5. Minimum environmental encumbrances such as wetlands and historic resources
6. Minimum encumbrances from stormwater management facilities
7. Availability of sewer, water, power, telephone, and gas service

Three master plan alternatives were developed that each had at least two 250+ acre sites. The master plan presented within this Executive Summary was chosen as the best alternative. These large sites became the "anchors" for the adjoining developments within a wide range of light industrial and industrial land uses. The alternatives presented within the Master Plan demonstrate how the tract can progress in various development scenarios. These plans have been designed to provide maximum flexibility to meet evolving needs of Chesterfield County for industrial development.

The Master Plan presented in Figure 3 has been selected as the alternative that reflects the best siting opportunities for large parcel users. This alternative is a draft concept, which has maximum flexibility to adjust to specific user needs. Two large parcels anchor this alternative: the southern 283 acre site that is the top priority site for a semiconductor manufacturing facility, and the middle 243 acre site. These two parcels are also outlined on the aerial photograph showing the natural ground cover of the site in Figure 4.

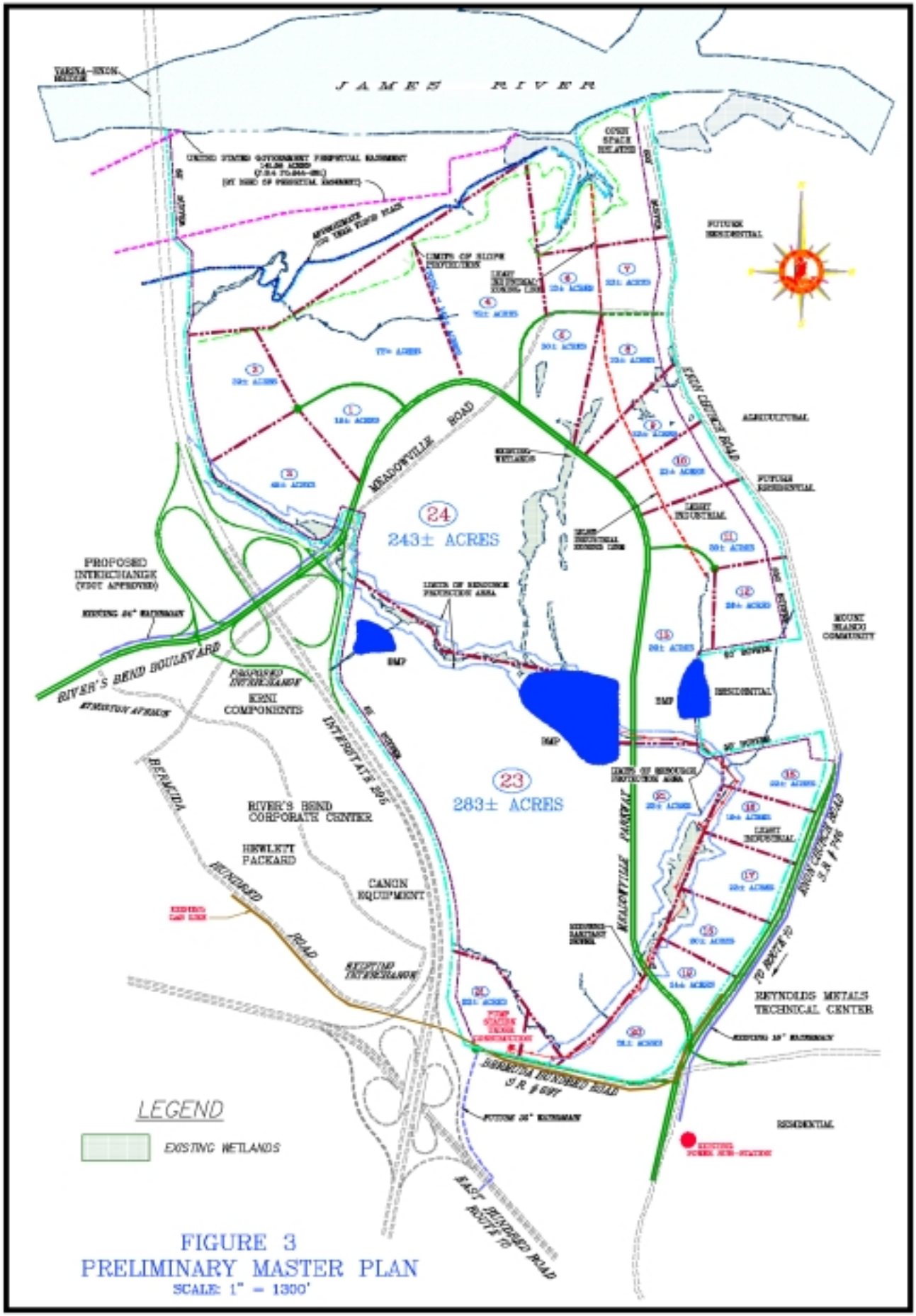

FIGURE 3
PRELIMINARY MASTER PLAN
SCALE: 1" = 1300'

Meadowville Technology Park

Chesterfield County, Virginia

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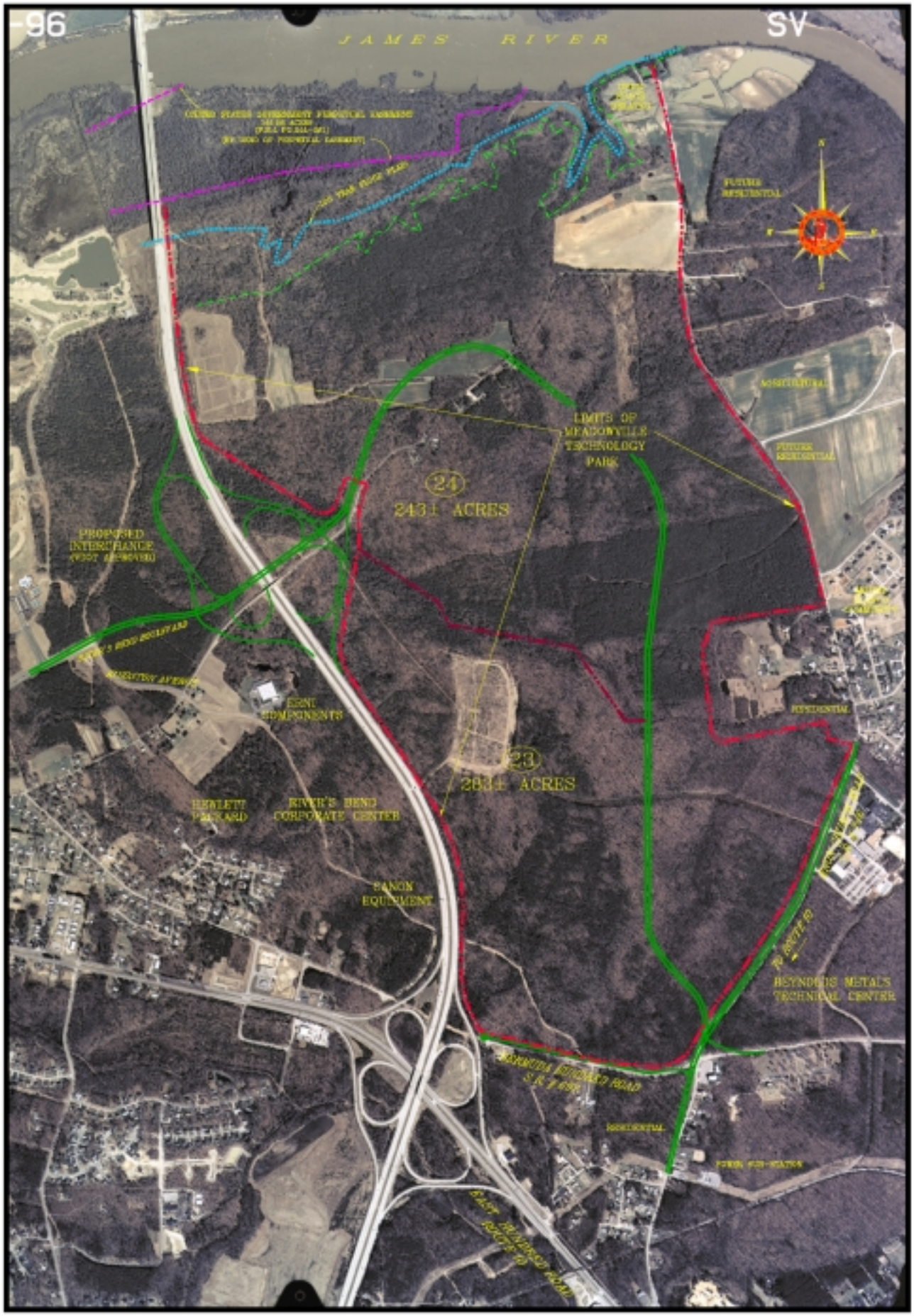

Meadowville Technology Park

Chesterfield County, Virginia

Figure 4-Aerial Photograph

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SEMICONDUCTOR DEVELOPMENT CONSIDERATIONS

Site Layout

The Meadowville Technology Park contains two parcels that meet the criteria for development as semiconductor manufacturing sites. These sites were laid out and evaluated using typical road networks, building configuration, parking lots, and other site utilization issues that allow individual semiconductor manufacturing corporations to adapt these parcels to their specific needs. A typical layout for the recommended site is shown in Figure 5 using the basic four FAB complex layout utilized by White Oak Semiconductor in their facility in Henrico County, Virginia. An overall site development plan that considers the effect of two such plants within the Meadowville Technology Park is shown in Figure 6.

Air Quality Analysis

Chesterfield County has completed a study to measure the ambient air particulate matter concentrations within and surrounding the Meadowville Technology Park. The study utilized three adjacent DEQ monitoring stations and concludes that there are no major sources of particulate matter due north or south of the site which is the prevailing wind directions for this area. The major sources of particulate in this vicinity are located in the Hopewell and Bellwood areas that are located southeast and northwest of the site respectively. These sources are within the wind directions that occur only 8 - 10 percent of the year. The mean total suspended particulate concentration measured at the site was 37 micrograms per cubic meter; the 1996 average particulate matter with an aerodynamic diameter less than or equal to 10 micrometers concentration (PM 10) was 24 micrograms per cubic meter. The National Ambient Air Quality Standards (NAAQS) for these measurements are 75 micrograms per cubic meter, and 50 micrograms perm cubic meter respectively. The draft report was completed by Rust Environment & Infrastructure in October, 1997 and is included within the appendices of this report.

Vibration Analysis

The extremely small geometry of the state-of-the-art semiconductors requires strict dimensional stability for the associated test and production tools. Floor vibration transmitted to these tools can be a significant factor in the quality of micro-processing products. Floor vibration at a given tool site can be separated into two categories: background vibration and local source vibration. Background vibration is related to such things as soil properties, geology, and proximity to highways or other manufacturing facilities. Local source vibration is the effect of an activity within the particular site and depends mainly on building structure, layout, and plant machinery.

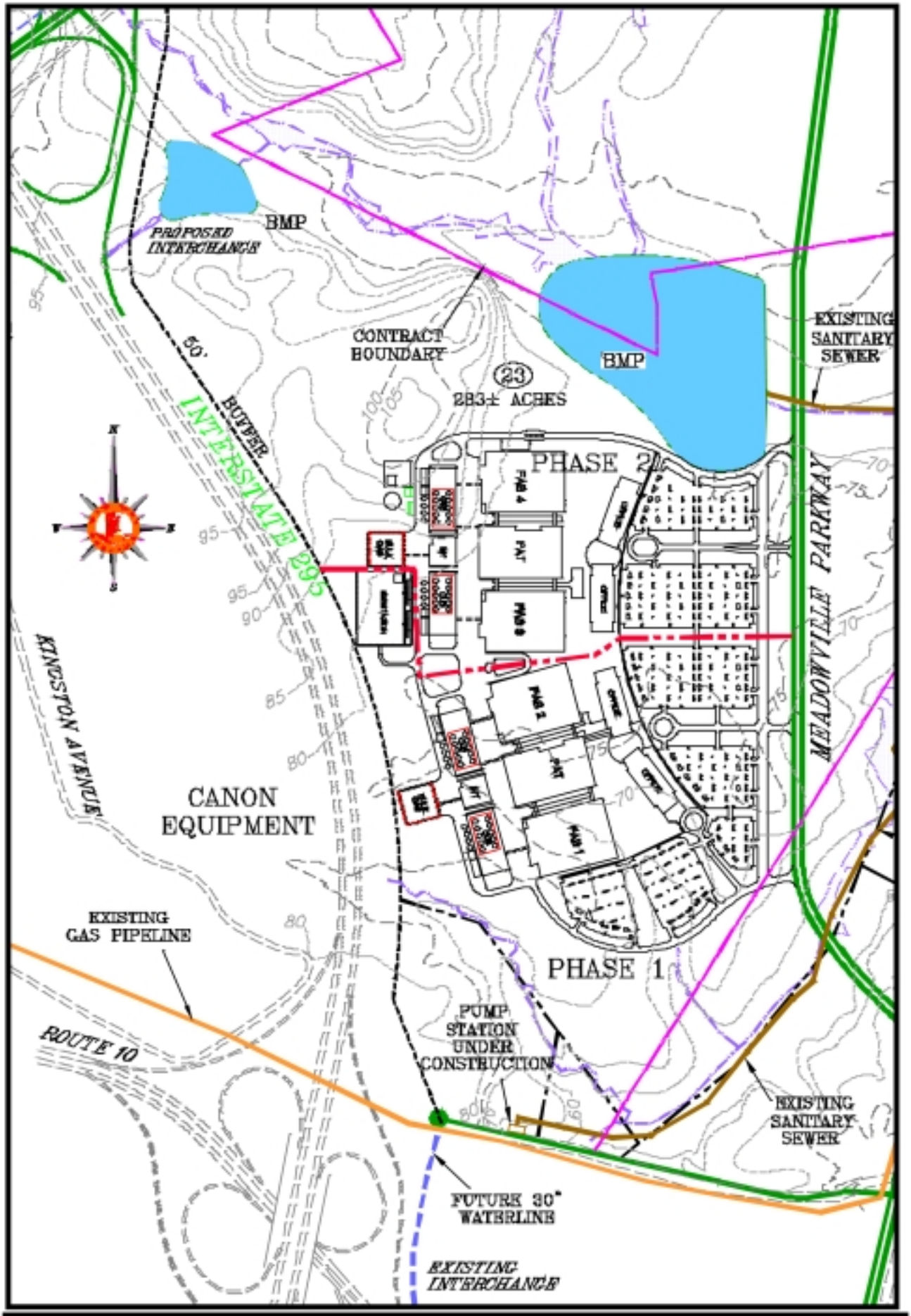
Chesterfield County interviewed a number of industrial resources that prioritized the need to complete a vibration analysis for the Meadowville Technology Park. Vibration Engineering Consultants (VEC) was hired to complete this detailed investigation. Their engineers were on-site on October 23rd and 24th, 1997 to measure and record the background vibration levels at approximately 13 locations on the boundary and within the Meadowville Tract. They also completed a qualitative assessment of the site to evaluate the relevant conditions, i.e. proximity to rail lines and existing roads. The existing ground vibrations at the site ranged from 7 to 144 micro inches per second, which should not impact a typical semiconductor manufacturing plant. Ground vibration was found to be highest

at points near I-295 as expected, therefore it is beneficial to maintain an appropriate distance between the highway and all vibration sensitive tooling. A copy of the detailed report from VEC is included within the appendices of this report.

Geotechnical Analysis

Heavy industrial buildings that house vibration sensitive processes typically require deep foundations to support the manufacturing structures. Detailed sub-surface geotechnical studies are typically required to design these type of foundations. Site selection for these facilities also requires a preliminary indication of the earthwork, foundation designs, and groundwater impacts that may be encountered.

TIMMONS was hired to conduct the preliminary evaluation. Eight test borings were drilled at the location shown on Figure 1 to investigate the proposed semiconductor sites as completely as possible. All of the borings were extended to depths of 40 feet and four of the locations were developed into groundwater monitoring wells. The geotechnical evaluation summarizes that traditional foundation designs are appropriate on the major parcels within the Meadowville Technology Park. The material samples and initial groundwater measurements present no significant problems for construction; the groundwater will continue to be measured throughout the wet-dry seasons to document annual changes. The results and specific recommendations of the evaluation are included within the appendices to this report.



Meadowville Technology Park

Chesterfield County, Virginia

Figure 5

Possible Site Layout A

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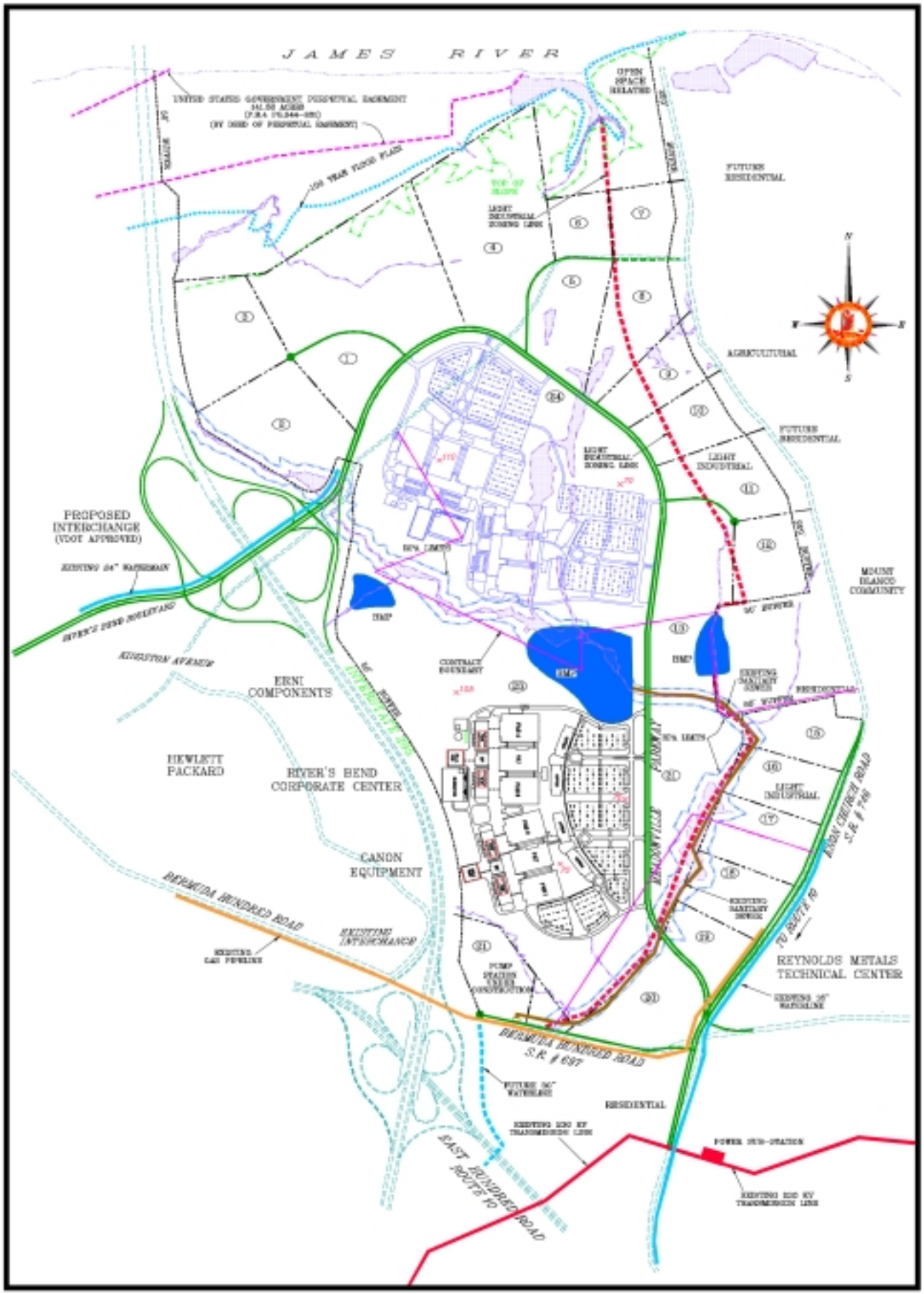

Meadowville Technology Park

Chesterfield County, Virginia

Figure 6-Overall Site Layout

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