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C.3 North Meridian
Aquifer protection
plan

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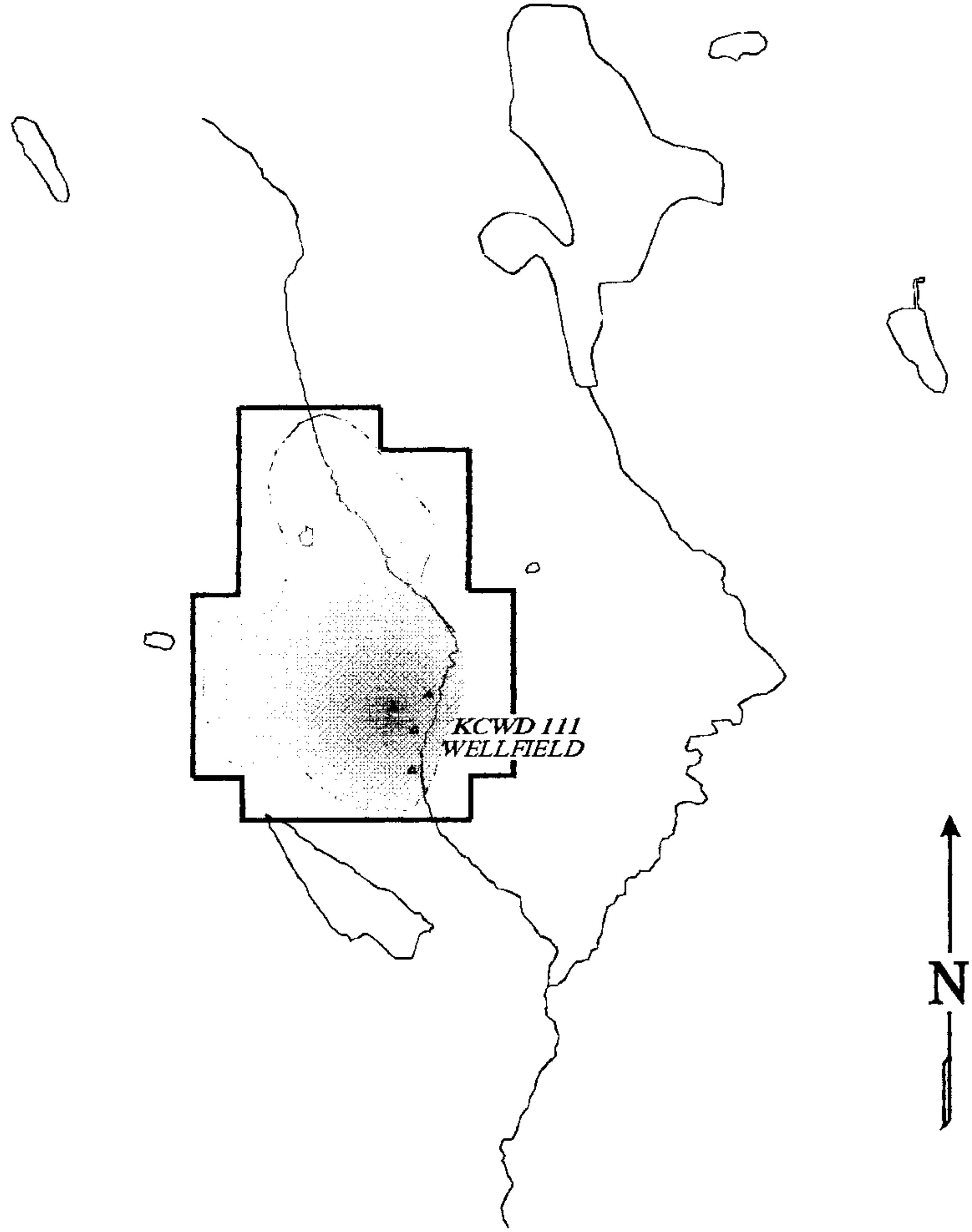
KING COUNTY WATER DISTRICT 111
NORTH MERIDIAN AQUIFER PROTECTION PLAN

MARCH 1996



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Funded in part by Washington State Department of Ecology Centennial Clean Water Fund
Grant #G93-00319

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NORTH MERIDIAN AQUIFER PROTECTION PLAN

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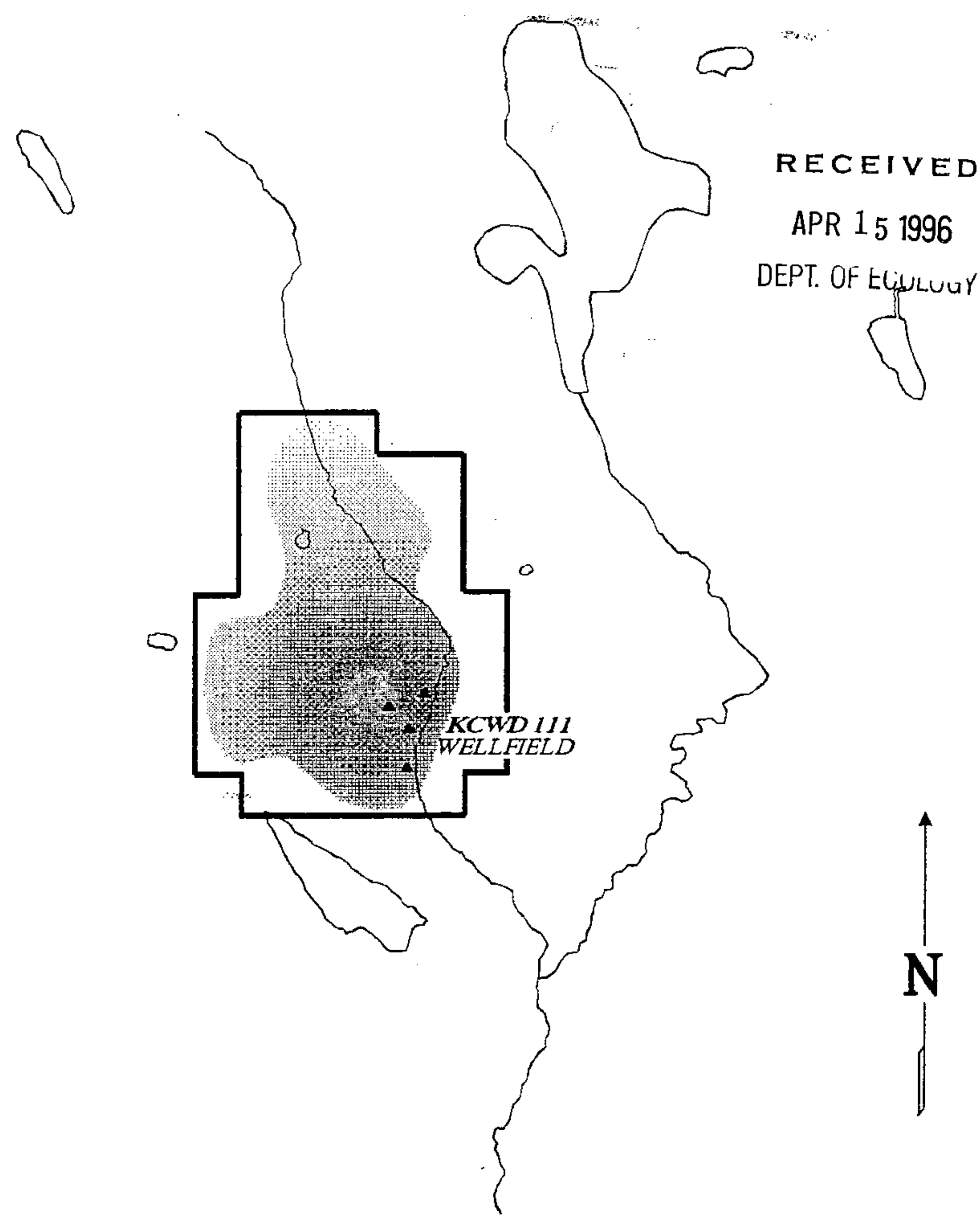

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LIST OF ACRONYMS

APA	Aquifer Protection Area
APP	Aquifer Protection Plan
ASR	Aquifer Storage & Recovery
BMP	Best Management Practices
CAD	Computer-Aided Drafting
CARA	Critical Aquifer Recharge Area
CCWF	Centennial Clean Water Funds Grant
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CTED	Department of Community, Trade, & Economic Development
CWD	Covington Water District
CWSP	Coordinated Water Supply Plan
DA	Deep Aquifer System
DDES	Department Of Development & Environmental Services
DFW	Department of Fish & Wildlife
DNR	Department of Natural Resources
DNS	Determination of Non-Significance
DOE	Department of Ecology
DOH	Department of Health
DOT	Department of Transportation
EMD	Washington State Emergency Management Division
EOC	State Emergency Operations Center
EPA	Environmental Protection Agency
EPCRA	Emergency Planning & Community Right-To-Know Act (Sara Title III)
ERT	Environmental Response Team
FIFRA	Federal Insecticide, Fungicide, & Rodentcide Act
GIS	Geographical Information System
GWAC	Ground Water Advisory Committee
GWMP	Ground Water Management Plan
HAZMAT	Hazardous Materials
IC	Incident Commander
ICS	Incident Command System
IRAP	Independent Remedial Action Program
LEPC	Local Emergency Planning Committee

LEPD	Local Emergency Planning District
LRT	Local Response Team
LUST	Leaking Underground Storage Tank
MOU	Memorandum of Understanding
MSL	Mean Sea Level
MTCA	Model Toxics Control Act
NCDC	National Climatic Data Center
NCP	National Contingency Plan
NIIMS	National Interagency Incident Management System
NMA	North Meridian Aquifer
NOAA	National Oceanographic & Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRDA	Natural Resource Damage Assessment
NRT	National Response Team
NWRO	Department Of Ecology's Northwest Regional Office
OSC	On-Site Coordinator
PA	Perched Aquifer System
PCB	Polychlorinated Biphenyl
PIO	Public Information Officer
PRP	Potentially Responsible Parties
PRV	Pressure-Reducing Values
PSCOG	Puget Sound Council of Governments
Qc	Quaternary Coarse
Qf	Quaternary Fine
RI/FS	Remedial Investigation & Feasibility Study
RCRA	Federal Resource Conservation & Recovery Act
RCP	Regional Contingency Plan
RP	Responsible Party
RRT	Regional Response Team
RWA	Regional Water Association
RCW	Revised Code of Washington
SA	Shallow Aquifer System
SARA	Superfund Amendments & Reauthorization Act
SARA Title III	Emergency Planning & Community Right-To-Know Act (EPCRA)
SDWA	Safe Drinking Water Act
SEPA	Washington State Environmental Policy Act
SHA	Site Hazard Assessment
SKCGWM	South King County Ground Water Management
SKCGWMP	South King County Ground Water Management Plan
SKCHD	Seattle King County Health Department
SOC	Synthetic Organic Compounds
SWFL	Solid Waste Facility List
SWM	King County Surface Water Management
SWPP	Storm Water Pollution Prevention Plan

TAT	Technical Assistance Team
TC	Till and Clay Confining Unit
TOC	Total Organic Carbon
TOT	Time of Travel
TRIS	Toxics Release Inventory System
UC	Unclassified
UFC	Uniform Fire Code
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compounds
WAC	Washington Administrative Code
WHP	Wellhead Protection
WHPP	Wellhead Protection Plan
WHPA	Wellhead Protection Area
WSP	Water System Plan
WSU	Washington State University

1. EXECUTIVE SUMMARY

SECTION 1
NORTH MERIDIAN AQUIFER PROTECTION PLAN
EXECUTIVE SUMMARY

The King County Water District 111 has developed an aquifer protection plan to identify and protect the ground water resources which supply several of the District's wells. Although the plan is designed as an aquifer protection plan, it also meets the requirements of the federal Safe Drinking Water Act and conforms to the wellhead protection measures directed by Washington Department of Health. The plan was developed under the auspices of the Washington Department of Ecology Centennial Clean Water Funds Grant program and has been coordinated with similar, nearby protection projects developed concurrently by the City of Kent and Covington Water District. The study was divided into three primary areas of interest: 1) aquifer protection area delineation, 2) existing and potential contamination hazard identification, and 3) protection strategies and implementation tasks.

1.1 Aquifer Protection Area Definition

In order to develop explicit protection plans that focus upon the appropriate area, the North Meridian Aquifer had to be identified and described hydrogeologically. Additionally, the area surrounding the aquifer had to be assessed to determine ground water flow directions and the recharge area which contributes water to the aquifer. Data collected to evaluate the local and regional hydrogeology included information concerning 407 wells over a 15-square-mile area, surface topography, climate, geologic history, stratigraphy, and surficial geology. A conceptual model was developed of both the North Meridian Aquifer System and the over- and underlying geologic units. Based upon this model and the other data collected, the aquifer boundaries were delineated.

1.2 Existing and Potential Contamination Hazard Identification

Once the aquifer boundaries were delineated, potential contamination sources found in and about the aquifer area were documented and risks to the aquifer determined. The review and identification of potential and known contamination threats consisted of an extensive parcel-level field survey of the area and the evaluation of contaminant site databases developed by the EPA and Washington State Department of Ecology. Current and historic land use in the area was also examined. Although potential contamination sources were found, there is no indication that contamination has migrated to the aquifer at this time. Potential contamination sources were correlated to specific land use applications.

Additionally, a ground water monitoring network was established consisting of 15 wells located throughout the aquifer protection area. This network will serve to generate basic information regarding the hydrogeology of the aquifer and also serve as a sentinel well network to alert the District of potential future contamination.

1.3 Protection Strategies and Implementation Tasks

The protection plan includes 18 aquifer protection strategies, 34 implementation tasks, and a spill response plan. The success of the plan is based upon monitoring the existing system, active data collection and management by the District, and cooperation with those state and local agencies which regulate potential contaminants. The critical piece of this plan is the development of an **aquifer protection steering committee**. This group is designed to oversee the management of the aquifer protection area and ensure that the long-term commitment to maintaining the existing water quality and quantity parameters of the aquifer is maintained.

2. INTRODUCTION

SECTION 2
NORTH MERIDIAN AQUIFER PROTECTION PLAN
INTRODUCTION

2.1 Scope of North Meridian Aquifer Protection Plan

King County Water District 111 is located in south King County, immediately east of the City of Kent. It is an active member of the South King County Regional Water Association and is located within the South King County Critical Water Supply Service Area. The District serves in excess of 4,000 connections over an area of approximately seven square miles. The 1990 population was approximately 12,000; population projections estimate that, by the year 2000, the population will reach 17,500.

The District is totally dependant upon ground water supplies, derived from six wells scattered throughout the District's service area. The focus of this study is the North Meridian Aquifer, which contains three of the District's production wells and one observation well. The aquifer was preliminarily identified in the early 1990's when a correlation of water level responses was noted in District Wells 1 through 4. The aquifer is located primarily north and east of Lake Meridian.

The wells are completed in a sand and gravel aquifer at a depth ranging from approximately 50 to more than 300 feet below land surface. Due to the shallow nature of this geologic unit, the District proposed the development of an aquifer protection plan which would define the aquifer boundaries and allow the District to affect management strategies to protect the integrity of the existing water quality and quantity parameters of this valuable resource.

In 1993, the District received a Centennial Clean Water Funds (CCWF) Grant to develop an aquifer protection plan for the North Meridian Aquifer. The grant (G93-00319) was issued in the amount of $122,156, of which 50% was granted from the Department of Ecology and 50% would be funded by the District. This study resulted from that grant. The study describes the hydrogeology in and about the North Meridian Aquifer, delineates an appropriate aquifer protection area (APA), identifies potential hazards to the ground water quality within the APA, and assesses the risks to the aquifer. It also includes tasks and management strategies to protect the ground water integrity of the North Meridian Aquifer. While this work is not explicitly defined as a wellhead protection program (WHPP) in that no particular well or wellfield capture zone is identified, the resulting management strategies of this aquifer protection plan are similar to those which would be used in a WHPP. In this instance, the District has chosen to protect the entire aquifer, as opposed to that portion of the geologic unit which contributes water to its wells.

2.2 Coordination of Aquifer Protection Plan Development and Implementation

When the Department of Ecology issued the CCWF grant to the District, a similar grant was being processed for the City of Kent WHPP (Grant G94-00034), and a grant was also issued to Covington

Water District for a WHPP of the Lake Sawyer Wellfield (Grant G93-00320). In an effort to assure a similar set of protection and management strategies, Ecology directed these three water purveyors, as a condition of their grants, to work cooperatively. Cooperation was achieved in the identification of the protection areas, the hazard inventories, and in the development of protection and management strategy and implementation plans.

The critical piece of this cooperative process was the establishment of a "Review Committee" consisting of the three purveyors, as well as representatives from local, county and state agencies, local businesses, and the public. This committee oversaw the technical development of the plans, assisted in the development of the management strategies, and performed the primary review of the study documents.

The result of this cooperative effort has been a uniform set of basic management strategies and protection tasks which have been tailored to fit the explicit needs of each of the three study areas. A uniform set of policies was determined to be the best scenario for gaining acceptance of the protection plans and strategies by those agencies with the statutory authority required to implement the plans. Where applicable, the protection areas for water sources in close proximity to each other were combined into mutual zones of capture, and the hazard inventory was performed for the entire WHP/APP area as a single process.

3. HYDROGEOLOGY

SECTION 3
NORTH MERIDIAN AQUIFER PROTECTION PLAN
HYDROGEOLOGIC ASSESSMENT

3.1 Introduction

3.1.1 Purpose and Scope

Wells completed in the North Meridian Aquifer form a major production source for King County Water District 111 (KCWD 111). The District maintains four wells completed in the aquifer, three of which are currently used for production. The aquifer also serves as an irrigation water source for the Meridian Valley Country Club and as the potable source for many domestic wells in the area.

The aquifer is relatively shallow and, therefore, is more vulnerable to contamination than the deeper systems of the area which lie below a thick silt and clay unit. To help prevent possible degradation of the water within the aquifer, KCWD 111 applied for and received a grant from the Department of Ecology to develop an aquifer protection plan (APP) for the aquifer. Robinson & Noble, Inc. contracted with KCWD 111 to assist in the development of the APP.

Prior to this study, the lateral extent of the North Meridian Aquifer (NMA) was undefined. Therefore, before the APP could be developed, the hydrogeology of the area had to be investigated and the practical boundaries of the aquifer determined. Several steps were involved in the hydrogeologic investigation of the study area. First, geologic and hydrogeologic data for the region was collected and analyzed. Then, a conceptual model of the hydrogeologic system was developed. Finally, the aquifer boundaries and the zone of contribution for the KCWD 111 wellfield were delineated.

To complete the hydrogeologic investigation, a computerized database of available well data in the area was designed. Because the extent of the aquifer was not known at the beginning of the project, the database included well data from an area extending one mile south of the KCWD 111 wellfield, two miles east and west of the wellfield, and two and a half miles north of the wellfield (Figure 3.1). The data was analyzed by constructing cross sections, potentiometric maps, hydrographs, and a potential yield map. This information was used to study the general flow system, develop the conceptual model, and define the aquifer boundaries.

3.1.2. Previous Studies

The hydrogeology of the North Meridian area has been studied as part of several regional studies. The ground water resources of the area were generally described by Luzier (1969) as part of a study of southwestern King County. The Pleistocene geology of the area was discussed by both Luzier and by Mullineaux (1970). More recently, the area was included in the *South King County Ground Water Management Plan* (EES, 1991).

Work specifically concerning the aquifer has dealt primarily with the drilling of the KCWD 111 wells in the early 1980's (Robinson & Noble, 1981; Anderson & Kelly, 1981), studies of the hydraulic relationship between the wells and Big Soos Creek (Anderson & Kelly, 1983), and more recent studies concerning well performance and aquifer water level trends (Robinson & Noble, 1991a, 1991b).

It was recognized during well drilling that the wells were completed in the same aquifer. However, the aquifer was not assigned the name North Meridian Aquifer until 1991 (Robinson & Noble, 1991b). This study also documented a significant decline in water levels between the early 1980's and the early 1990's, although water levels have risen since that time. When the wells were first drilled, the Department of Ecology (DOE) questioned whether there was hydraulic continuity between the wells and Big Soos Creek. Based on head relationships and pumping tests, Anderson & Kelly (1983) concluded there was no continuity between the wells and the creek.

3.2 Database

The first step in the current study was to construct an extensive water well database of the study area. The database is presented as Appendix 1. The database includes every known well of record in the study area for which a quarter-quarter section location, or finer, was available.[1] In total, the database includes 407 well records collected from various sources. The major information source was the South King County Groundwater Management (SKCGWM) database which resides at, and is maintained by, the Seattle-King County Department of Public Health. This was the source for 232 records. Water well reports from the DOE were the information source for 158 records. Fifteen records are from Luzier (1969), one additional record which was not already part of the SKCGWM data set was added from Robinson & Noble files, and one well was discovered during field checking. Many records in the database used information from more than one of the above sources.

Information in the database is considered to be generally accurate. However, errors may exist for individual wells because field verification for each well was not practical or feasible. Additionally, the SKCGWM database was supplied from the Health Department with the understanding that the information within it is incomplete and contains errors. For wells with multiple information sources, data accuracy was improved by cross-referencing data between sources. For wells with a single data source, particularly DOE well reports, the data is less reliable.

While many wells in the database have not been field-checked, approximately 240 wells were verified through two rounds of field checking. The first round was completed early in the project to check the general veracity of the data. The second round was completed during the creation of the monitoring network.

The database structure is a simplification of the SKCGWM database. The structure was simplified by eliminating the seldom-used or more esoteric fields and files that exist in the SKCGWM database

[1] Not included are wells with suspect locations, some wells with incomplete abandonment records, or wells of record reported to the DOE later than April 1993, the date the database was first compiled.

structure and by writing data entry, sorting, and editing programming that is easier to use than those supplied with the SKCGWM database. Programming was written in FOXPRO language; the database itself is in a DBF format.

Database well coverage throughout the area is highly variable (Figure 3.2). Database well densities in the study area range from 9 to 77 wells per square mile. The average density is 29 wells per square mile. This is an appreciable data density for this type of study.

Geologic and geophysical logs were collected for all wells in the database that had such logs available. Geologic logs were found for 280 wells, or 69 percent of the total. Geophysical logs were only available for three wells.

Each well was plotted onto a USGS quadrangle and its position digitized into UTM coordinates, which were then added to the database and used for plotting. Well positions were plotted based upon, in decreasing order of confidence, the locations given in Luzier (1969), latitude-longitude coordinates from the SKCGWM database, addresses listed on DOE well reports or in the phone book, or the subsection designated on the DOE well report. Field-checked wells whose actual locations were significantly different from the originally plotted locations were re-plotted and re-digitized. Elevations were assigned based upon map elevations, unless a well's elevation had already been determined by more accurate means. The maps used for elevation determination were the 1983 USGS Auburn and Renton 7.5 x 15-minute quadrangles.

To confirm the general reliability of well locations and elevations assigned in this manner, the first round of field checking was performed. Field checks were made for eleven wells scattered across the study area. Nine of these wells were originally plotted based on addresses; two were plotted based on SKCGWM database latitude-longitude coordinates. On average, the field-checked locations were within 250 feet of the originally plotted locations, and the map elevations were within 9 feet of the originally plotted map elevations (Table 3.1).

Later in the project, a second round of field checking was performed. The primary function of this field-checking program was to locate wells that were suitable for use in the monitoring network. However, this round of checking also found that well locations were generally accurate, typically within several hundred feet.

Table 3.1: Well Location and Elevation Veracity Check Results

Well Reference No.	Original Location Method	Distance Checked to Original Location (ft)	Original Map Elevation [1] (ft, MSL)	Checked Map Elevation [1] (ft, MSL)	Elevation Difference (ft)
63	SKCGWM Lat-Long	50	485	482	-3
147	SKCGWM Lat-Long	420	475	486	11
269	Address	100	361	367	6
270	Address	260	380	394	14
295	Address	490	564	561	-3
324	Address	260	492	492	0
345	Address	260	450	459	9
355	Address	290	430	459	29
369	Address	100	492	499	7
371	Address	310	350	361	11
373	Address	210	508	518	10
	Means:	250			8.3

[1] Elevation estimated in meters off map, then converted to nearest foot

3.3 Study Area Physiography

3.3.1 Topography and Drainage

The study area is located in the southeastern portion of the Puget Sound lowland. The Puget lowland is formed by a generally level drift plain surface broken by river valleys and deep embayments. The study area occupies the central portion of the Covington drift plain, separated from the Coalfield drift plain to the north by the Cedar River, and the Osceola Mudflow plain to the south by the Green River (Luzier, 1969).

The surface of the study area is characterized by topography formed during the last major glaciation and subsequently modified by stream drainages. The glaciation formed northerly to northwesterly trending hills and depressions. Where underlain by till, the surface can be poorly drained, with lakes and bogs filling the depressions. These lakes include Lake Meridian, Clark Lake, and Ham Lake.

Two streams, Big Soos Creek and Little Soos Creek, help drain this framework of glacially derived hills and depressions. Both streams are generally aligned the same direction as the hills, flowing southeasterly until they intersect the southwesterly trending Covington Channel in the southeast corner of the study area. The Covington Channel is a glacial melt-water channel extending from Maple Valley to Auburn (Mullineaux, 1970).

The highest altitude in the area is a hilltop between Lake Youngs and Big Soos Creek where the elevation is approximately 675 feet MSL. The lowest altitude is in the southern portion of the Big Soos Creek valley at approximately 325 feet MSL. The Big Soos valley has relatively steep walls, typically rising 100 to 150 feet above the valley floor. The valley is approximately a half mile wide in the northern portion of the study area, narrows in the central portion, then broadens with gentler walls in the south. The Little Soos Creek valley, which starts at Lake Youngs, is shallow and broad throughout.

3.3.2 Climate

The climate in the study area is typical of the Puget Lowland, dry, mild summers and wet, cloudy winters. Precipitation isohyetals drawn through the study area indicate the area receives approximately 45 inches of precipitation per year (EES, 1991). The area is approximately midway between the NOAA SeaTac and Landsburg climatological stations. These stations average approximately 37 and 57 inches of precipitation per year (Table 3.2). It is estimated that the study area receives approximately the average of the two stations, or 47 inches per year.

Table 3.2: Average Annual Precipitation

	Period of Record	
	1961 - 1990	1945 - 1995
SeaTac Station	37.19	38.03
Landsburg Station	57.45	57.28
Average	47.32	47.66

Precipitation records have been kept at the Landsburg station since 1919 and at the SeaTac station since 1945. To better reveal trends and remove variability due to individual seasons, the two data sets were analyzed as the 11-month running average[2] of the cumulative departure from the average monthly precipitation at the stations. Cumulative departure is a statistical method used to show general trends above and below an average. The method, when applied to precipitation, can be compared with the water level in a tank that has a constant amount draining (the average) and a variable amount entering each month. Months with entry amounts above average cause a water level increase while below-average months cause a decrease. Thus, the slope of the graph changes to

[2] Running average is a statistical method to average data over a specific time period and, thereby, smoothing the data set. The longer the averaging period, the greater the smoothing of the data set. By design, the averaging time period is always an odd number because equal time periods on either side of a value are used in the averaging. In this case, each data point was averaged with the values for the five previous and five following months, making each graphed point an average of an eleven-month period.

show above-average periods as upward slopes, average periods as flat slopes, and below-average periods as downward slopes (Figure 3.3).

Figure 3.4 shows the precipitation trends over the period 1945 to 1995. The graph shows that precipitation is rarely average, with long periods of above-average and below-average precipitation. The graph indicates the area has experienced relative drought conditions since 1984. Figure 3.5 shows the same data, but for the period 1984 through 1995. For this period, there was a long period of drought starting in late 1984 and extending through 1989. 1990 and early 1991 had above-average precipitation, after which another drought started. The drought period can also be seen by examining water year[3] precipitation totals (Table 3.3).

Table 3.3: Water Year Precipitation Totals Since 1984

	SeaTac		Landsburg		Average	
Water Year	Inches	Surplus/ Deficit	Inches	Surplus/ Deficit	Inches	Surplus/ Deficit
1984	36.14	-1.89	56.55	-0.73	46.35	-1.32
1985	28.53	-9.50	45.14	-12.14	36.84	-10.83
1986	34.26	-3.77	52.50	-4.78	43.38	-4.28
1987	36.16	-1.87	48.54	-8.74	42.35	-5.31
1988	28.46	-9.57	45.41	-11.87	36.94	-10.73
1989	34.94	-3.09	54.07	-3.21	44.51	-3.16
1990	38.52	+0.49	58.43	+1.15	48.48	+0.82
1991	45.60	+7.57	66.97	+9.69	56.29	+8.63
1992	30.62	-7.41	46.23	-11.05	38.43	-9.24
1993	32.69	-5.34	49.86	-7.42	41.28	-6.39
1994	30.34	-7.69	46.20	-11.08	38.27	-9.39
Total Deficit		-42.07		-60.18		-51.20

3.3.3 Geologic History and Stratigraphy

Geologic formations in the study area can be broadly divided into two groups: consolidated Tertiary bedrock and unconsolidated Quaternary sediments. The Tertiary bedrock in the area generally belongs to members of the Puget Group, and intrusive and volcanic rocks intruded into and extruded upon the Puget Group. A discussion of Tertiary history and stratigraphy is beyond the scope of this report, except to say that, by the time of deposition of the Quarternary sediments in the area, Tertiary

[3] A water year lasts from October to September. For example, water year 1994 started in October 1993 and extended through September 1994.

rock had been uplifted and provided a solid base for the deposition of the more permeable, unconsolidated sediments. In the area, the bedrock surface slopes downward from northeast to southwest.

The Quarternary sediments deposited upon the Tertiary bedrock resulted from repeated cycles of glacial and interglacial episodes. The thickness of the unconsolidated sediments is variable, ranging from less than 100 feet thick north of the study area to more than 1,000 feet thick in the southwest portion of the area (Hall and Othberg, 1974). Only one well in the study area encountered bedrock, KCWD 111 Well 5A, at a depth of 1,030 feet (520 feet below sea level).

It is generally accepted that four or more glaciations have occurred in the Puget Lowland during the Pleistocene. Nearby the study area, Noble (1990) cites compelling evidence of at least five glaciations in Pierce County. Each of the glacial episodes and the intervening non-glacial periods left unconsolidated sediments in the area. The idealized upward sequence for a single, non-glacial/glacial cycle is fine-grained fluvial sediments, coarse-grained sand and gravel glacial advance outwash, glacial till, and coarse-grained recessional outwash deposits. The sequence can be complicated by potential pro- and post-glacial lake deposits. The ideal sequence is rarely seen, particularly for sediments older than the most recent glaciation, because each glacial and non-glacial event potentially caused significant erosion of previous deposits. Consequently, the Pleistocene geologic history and stratigraphy of the area is extremely complex.

Because of the complexity, the most recent regional study that encompassed the area, the *South King County Groundwater Management Plan* (SKCGWMP), did not use glacial stratigraphy for units other than the Vashon Drift, the most recent glaciation in the area. Instead, it used litho-stratigraphic units based on gross grain size. Deposits were assigned alternating designations of Quarternary coarse (Qc) and Quaternary fine (Qf) with relative age designators such that Qc(2) is younger than Qc(3). This nomenclature is inappropriate for the present hydrogeologic study because the permeability of the units is not accounted for in the unit definition. For example, a relatively impermeable till could be in the same unit as a highly permeable gravel. For this study, glacial stratigraphy is also not used; rather, deposits have been divided into hydrostratigraphic units. These units are described later in this report.

3.3.4 Surficial Geology

The surficial geology of the study area was mapped by Mullineaux (1965). Mullineaux's map was incorporated into a larger geologic map encompassing southwest King County by Luzier (1969). A portion of Luzier's map is summarized here as Figure 3.6. Surficial deposits can be divided into six general units: recent peat deposits, Vashon recessional outwash, Vashon lacustrine deposits, Vashon till, undifferentiated Vashon deposits, and undifferentiated pre-Vashon deposits.

The vast majority of the surface is Vashon till, which covers most of the upland areas above the stream valleys. Vashon recessional outwash is found in portions of the Big Soos Creek valley and in the southeastern portion of the study area that is within the Covington Channel. Peat deposits are found in depressions on the upland areas and in the stream valleys. The other three units are confined to small areas in the stream valleys. Luzier (1969) describes the peat deposits as chiefly peat and muck with silt and clay, the recessional outwash as well-sorted sand and pebble-cobble, and the till as a compact mixture of gravel in a gray clayey, silty sand matrix.

3.4 Conceptual Model

A hydrogeologic conceptual model is a pictorial representation of a ground water flow system used to simplify and organize field data so that the system can more readily be analyzed (Anderson and Woessner, 1992). Ideally, a conceptual model should be as simple as possible, yet contain every important hydrologic component necessary to recreate system behavior. Essentially, the conceptual model synthesizes information from geologic logs, cross sections, potentiometric maps, hydrographs, and other geologic and hydrologic information into a generalized representation of the geology as it affects the ground water flow system. Once constructed, the conceptual model guides the scientific analysis of the ground water system of an area.

Figure 3.7 presents the conceptual model of the study area drawn as a schematic cross section. The cross section illustrates the three major components of a conceptual model: boundaries, hydrostratigraphic units, and a general flow system. The model shows two basic recharge components in the area, the largest being recharge from precipitation, the other being leakage of imported Cedar River water through the bottom of Lake Youngs. Once in the system, the water generally flows southerly and/or toward the Big Soos valley. Major discharge points are wells, springs, leakage to Soos Creek, leakage to deeper aquifers, and underflow out of the area.

3.4.1 Boundary Identification

Identifying the model boundaries is typically the first step in constructing a conceptual model. Ideally, model boundaries should be natural hydrologic boundaries such as ground water divides and large bodies of water. Two general types of hydrologic boundaries exist: physical boundaries, formed by a physical presence (or lack of presence) such as a large body of water or the aquifer being nonexistent due to erosion, and hydraulic boundaries, such as ground water divides.

The generalized potentiometric map of the study area shows that most of the area is within a portion of a local ground water basin along Big Soos Creek. Larger scale potentiometric maps show this localized basin is a portion of a larger ground water basin that encompasses most of the Covington Upland (EES, 1991). This is the same ground water basin that contains Covington Water District's Lake Sawyer Wellfield (Becker, 1995).

Within the study area, the local ground water basin is defined by two ground water divide boundaries that generally trend north-south (Figure 3.8). The eastern ground water divide extends from underneath Lake Youngs southward to the Covington Channel. This divide separates water flowing west to southwestward toward the Big Soos valley from water flowing southerly toward the Covington Channel. The western ground water divide takes a sinuous path from the middle of Section 9 (T22N/R5E) to Lake Meridian. It separates water flowing southeasterly toward the Big Soos valley from water flowing westerly and southwesterly.

The northern boundary to the basin is not within the study area. It is probably formed by a ground water divide separating flow toward the basin from flow toward the Cedar River. It may be, in part, controlled by a buried bedrock ridge that extends from the Lake Youngs area toward Renton. Southward, there is also no boundary present in the study area. Water exits the study area in this direction as underflow, spring discharge, or leakage.

3.4.2 Hydrostratigraphic Units

Following boundary identification, the next step in conceptual model formation is definition of hydrostratigraphic units. Hydrostratigraphic units are groupings of sediments that exhibit similar hydrogeologic properties. The units may or may not conform with stratigraphic units. Typically, hydrostratigraphic units divide sediments into aquifers and confining units.

The hydrostratigraphic units used herein do not readily conform with established stratigraphic units. Sediments have been divided into five units: the till and clay confining unit, the perched aquifer system, the shallow aquifer system, the deep confining materials, and the deep aquifer system. The units are briefly described below.

Table 3.4: Descriptions of Hydrostratigraphic Units

Hydrostratigraphic Unit	Unit Description
Till and Clay Unit	Includes all confining materials above the shallow aquifer system. These materials are Vashon till, which is widespread at the surface; a sporadic clay unit, which may be Lawton Clay; and another till-like deposit above the shallow aquifer.
Perched Aquifer System	Contains isolated, hydraulically separated perched aquifers within the till and clay confining unit. These aquifers appear to consist of Vashon advance outwash.
Shallow Aquifer System	The North Meridian Aquifer and other, less permeable but water-bearing sediments, make up the unit. The unit is regionally extensive. Stratigraphic correlation is uncertain, probably correlative with Qc(2) in the SKCGWMP.
Deep Confining Materials	Includes all low permeability sediments below the shallow aquifer system. Appears to be regionally extensive, laps onto the bedrock north of the study area.
Deep Aquifer System	Includes permeable sediments within the deep confining materials; hydraulic connectivity and areal range is unknown.

3.4.3 General Flow System

Defining the general flow system is the final element of constructing a conceptual model. The flow system is defined by analysis of precipitation and recharge data, head and hydrograph data, well production data, and other hydrologic information. Recharge enters the system mainly as direct precipitation on the area. A minor contribution arises from leakage out of lakes, which (except for Lake Youngs) is indirectly from precipitation on the area. Several recharge sources exist that "import" water into the area. These are return flows from septic systems where water is imported from the City of Seattle water system by the Soos Creek Water District; leakage out of Lake Youngs, with water imported from the Cedar River by the City of Seattle; and leakage out of Big Soos Creek, with water imported from the upper portion of the creek's drainage area.

Once in the ground, water percolates downward to the perched aquifers or directly into the shallow system. Water in the perched system either leaks downward to the shallow aquifer system or is discharged through wells or as evapotranspiration and spring discharge along the stream valley walls. Once in the shallow system, significant lateral movement of water can occur either within the shallow system or as leakage to the deeper aquifer system. Ground water in the shallow system that does not leak downward to the deep system is discharged through wells, upward leakage to Big Soos Creek,[4] or underflow out of the area. A complete set of potential flow components is listed below.

Table 3.5: Conceptual Model Flow System Components

Unit	Inflow	Outflow
Till and Clay Confining Unit	--from direct precipitation --from Cedar River via Lake Youngs --from other lakes --from streams --from septic drainfields	--leakage to perched system --leakage to shallow system --to evapotranspiration --to streams --to lakes
Perched Aquifer System	--leakage from till and clay unit --from direct precipitation	--leakage to till and clay unit --to wells --to springs --to evapotranspiration
Shallow Aquifer System	--leakage from till and clay unit --from underflow	--leakage to deep confining materials --leakage to till and clay unit --to wells --to underflow
Deep Confining Materials	--leakage from shallow aquifer system --leakage from deep aquifer system	--leakage to deep aquifer system
Deep Aquifer System	--leakage from deep confining materials --from underflow	--leakage to deep confining materials --to wells --to underflow

3.5 Hydrostratigraphic Unit Descriptions

As described earlier, the materials beneath the study area have been divided into five hydrostratigraphic units based upon their hydrologic characteristics. The thickness and distribution of the units are largely based upon a cross-sectional analysis of the study area. Seven cross sections were constructed from geologic logs. The cross sections are presented as Figures 3.9-3.15. Each unit is described below. The descriptions of the deep confining materials and the deep aquifer system are

[4] The shallow aquifer system does not appear to be in direct continuity with Big Soos Creek within the study area. Therefore, discharge to the creek must occur through a leakage relationship.

brief because they are relatively unimportant to the current study. The other units are described in greater detail.

3.5.1 Till and Clay Confining Unit

The till and clay confining unit (TC) includes all confining materials above the shallow aquifer system (SA). It includes the Vashon till, a clay unit, and another till-like deposit (Figure 3.16). It surrounds a sporadic sand and gravel unit which, where saturated, forms the perched aquifer system (PA).

Overall, the unit ranges in thickness from 10 to 20 feet in the Big Soos valley to more than 150 feet thick underneath some of the hills in the area. It appears to be present everywhere in the study area and forms an effective capping aquitard for the SA.

At most locations, the top of the TC is Vashon till, typically 30 to 80 feet thick. In the Covington Channel area, the till is covered by recessional outwash, but elsewhere it is at the surface or, occasionally, under a thin veneer of peat deposits. Well logs indicate the till is typical of most Vashon till in southern King County, a mix of sand and gravel in a silt and clay matrix.

At many locations below the till, a sand and gravel unit exists. Where saturated, this unit forms the PA and is described below. Either directly below the till or below the PA sediments, there is often a clay unit which is probably correlative with the Lawton Clay of Vashon time. Where present, it is typically 10 to 50 feet thick. Well logs describe it as a gray or blue clay, that sometimes is sandy or gravelly.

Below the clay, there is yet another possible till(?) in most locations. This till(?) is undoubtedly pre-Vashon in age. At the KCWD 111 wells, the till(?) is described as a dark bluish gray gravel, sand and clay admixture; drillers' logs typically describe it as gray or brown "hardpan." Where present, it is typically 20 to 60 feet thick.

3.5.2 Perched Aquifer System

The perched aquifer system is formed by discontinuous, hydraulically separated perched aquifers within the TC. It is mostly found in sand and gravel lenses below the Vashon till. These deposits probably correspond to Vashon advance outwash. Other perched zones with the Vashon till or the lower till(?) may also form small aquifers, although these zones are less common than those in the advance outwash. Locally, there may be more than one perched aquifer.

Water levels in the perched aquifer wells generally fall into two groups; those with water levels that are 30 to 50 feet above the SA potentiometric surface, and those with water levels 100+ feet above the SA potentiometric surface. Approximately 24 percent of the wells in the database (97 out of 407) are believed to be completed in perched aquifers. Most perched wells are scattered southwest of Lake Youngs or are north and west of Lake Meridian (Figure 3.17). These wells typically have low yields with specific capacities ranging from 0.2 to 15 gpm per foot of drawdown (gpm/ft) and potential yields[5] ranging from 6 to 169 gpm (Table 3.6).

Table 3.6: Aquifer System Characteristics

	PA	SA	DA
Percent of Database Wells[1]	24%	65%	4%
Tested Rates (gpm)	6 - 100	3 - 483	2 - 1,000
median (gpm)	15	20	11
Specific Capacity (gpm/ft)	0.2 - 15	0.1 - 16	0.1 - 8
median (gpm/ft)	1.4	1.3	0.5
Potential Yield (gpm)	6 - 169	1 - 590	1 - 794
median (gpm)	25	25	15
Transmissivity (gpd/ft)	?	3,700 - 70,000	2,000 - 19,000

[1] Total does not add to 100% because 27 wells (7%) have uncertain completion units.

3.5.3 Shallow Aquifer System

Well completion zones for database wells can generally be divided into three categories: perched, shallow, and deep. The differences between the three are quite evident, when looking at relative completion zone and water level elevations, but less evident when looking at average specific capacity and potential yield (Table 3.6). Approximately two-thirds of the wells in the area are completed in the shallow aquifer system (265 wells, 65 percent).

The unit appears to be a sand and gravel outwash related to a pre-Vashon glacial event. It is probably correlated with the Qc(2) unit of the SKCGWMP (EES, 1991). While typically sand and gravel, at some locations, the unit is wholly sand. The thickness of the unit is variable, ranging from absent to more than 50 feet thick. However, since many wells did not bottom the unit, no estimate can accurately be made for its average thickness. In a general sense, the top of the unit rises toward the northeast.

Wells completed in the shallow system vary widely in their production characteristics (Table 3.6). For wells for which test data was available, tested rates range from 3 to 483 gpm and specific capacities range from 0.1 to 16 gpm/ft. Most of the wells in the data set are domestic wells with relatively limited production characteristics. Consequently, the median tested rate, 20 gpm, and the

[5] Potential yield is defined as the specific capacity multiplied by two-thirds the available drawdown (or 100 feet, whichever is less). It is a measure of relative well and aquifer performance and does not imply that the stated potential yield could actually be sustained from a well.

median specific capacity, 1.3 gpm/ft, are both relatively low. The calculated potential yields have a similar statistical variation, ranging from 1 to 590 gpm with a median value of 25 gpm. The wide range variation in this production data reflects the varied nature of the aquifer system. In some areas, the system is prolific, in most areas it is not. The best portion of the aquifer system is located in the middle of the study area and forms the North Meridian Aquifer (Figures 3.18 and 3.19).

Few transmissivity and storage coefficient values have been measured in the unit. Specifically, transmissivities have only been calculated at the KCWD 111 wells and the Meridian Country Club wells, both within the NMA. At these wells, the transmissivity ranges from 3,700 to 70,000 gpd/ft. A storage coefficient of 0.00015 was measured at one of the KCWD 111 wells. This indicates a confined aquifer condition.

Outside the NMA, the aquifer system probably has a lower transmissivity than within the NMA as indicated by a comparison of characteristics inside and outside the aquifer (Table 3.7). Inside the NMA, specific capacities are approximately three times higher than outside the NMA. Potential yields average more than five times higher.

Table 3.7: Well Characteristics Inside and Outside the North Meridian Aquifer

	Inside NMA	Outside NMA
Number of database wells	37	228
Tested rates (gpm)	10 - 483	3 - 160
median(gpm)	75	18
Specific Capacity (gpm/ft)	0.3 - 16	0.1 - 7.3
median (gpm/ft)	3.0	1.0
Potential Yield (gpm)	10 - 590	1 - 134
median (gpm)	125	23
Transmissivity (gpd/ft)	3,700 - 70,000	?

The boundary separating the NMA from the rest of the shallow aquifer system is indistinct and gradual. The boundary, as drawn on Figure 3.19, was defined as the 100 gpm potential yield contour (modified slightly to remove irregularities arising from the contour generation method). The boundary was derived from a contour map generated by the computer mapping system SURFER[6] using a Kriging geostatistical gridding method. The method works well, placing 16 of 21 data points with potential yields above 100 gpm inside the boundary, including all data points with potential yields above 150 gpm.

[6] by Golden Software, Inc., Golden, Colorado

Very few wells in the database have more than one recorded water level. The major exceptions are KCWD 111 Wells 1, 3, and 4. The hydrograph from Well 3 is presented as Figure 3.20. The hydrograph shows a large seasonal variation in water levels in the NMA. This variation ranges from 10 to 20 feet. Most of this variation is probably due to increases in production during the summer. However, production was relatively steady during the second half of 1985 and first half of 1986. During this period, the static water level declined approximately five feet from winter to summer. This decline indicates that seasonal variations in water levels may occur within the shallow aquifer system, even away from pumping centers.

The extreme seasonal changes make determining long-term trends in the hydrograph difficult. However, it seems apparent that the water level in Well 3 more readily responds to production than to changes in rainfall. In aquifers that respond readily to changes in recharge, hydrographs often resemble the cumulative deviation in precipitation (Figures 3.4 and 3.5). In this case, there is no apparent correlation between the hydrograph and Figure 3.5, especially over the last several years where water levels have generally risen. The correlation with production is much more striking. After the well first went on-line in 1984, the static water level fell more than twenty feet. Since 1986, production has generally decreased. Over the same time span, water levels generally rose, so that presently during winter recharge/low production periods, the static water level is approximately within five feet of its high points in 1984.

Potentiometric Surface Definition: The potential seasonal variations and the long-term trends in water levels made the task of defining the shallow system potentiometric surface difficult. It was further complicated by poor elevation control for most wells in the database. Most elevations were determined from the USGS topographic quadrangles of the area as described earlier. With these problems in mind, a generalized potentiometric surface was generated (Figure 3.21). To better show trends expressed in the data, twelve assumed water levels were added to the data set in areas lacking real data. These areas included the Big Soos valley, the Meridian Country Club area, and the extreme southeast corner of the study area. With the addition of these points, the data was contoured with SURFER software using a Kriging geostatistical gridding method. Because of the large number of wells in the data set, elevational errors and seasonal and long-term variations tend to compensate for each other so that the resultant contours should represent an approximate potentiometric condition.

The ground water divides discussed earlier were delineated by the construction of the generalized potentiometric map. The map also shows the general flow directions within the aquifer system. From the Lake Youngs area, flow is either westward or southwestward toward the Big Soos valley or southeasterly toward the Covington Channel. In the western half of the area, flow is easterly toward the Big Soos valley or westerly out of the area. As expected, the potentiometric gradients in the system are gentle in the NMA area, the portion of the aquifer system with the highest hydraulic conductivity values. The steepness of the gradient east of the NMA suggests the hydraulic conductivity of the formation sharply declines at the eastern edge of the NMA.

Zone of Contribution: As part of the aquifer definition, the zone of contribution, also called the steady-state capture zone, for the KCWD 111 wellfield was approximated. Steady-state capture zones can be estimated solely on knowledge of the ground water flow directions and ground water divides. Travel time within the zone is not considered. The main tool used for estimating the zone is the potentiometric map.

The zone of contribution was estimated by starting at the furthest downgradient well in the wellfield, Well 1, and drawing flow paths upgradient until they reached the local ground water divides. These divides define the edge of the capture zone, flow inside them is toward the wellfield, outside them it is away from the wellfield. To finish the zone delineation, the divides should be traced upgradient until they meet, forming a closed zone or "basin." However, in this case, the divides extend through the northern end of the study area, so the northern boundary of the steady-state capture zone could not be defined.

The estimated zone of contribution is presented on Figure 3.22. The zone includes most of the NMA area. The eastern boundary extends underneath Lake Youngs. The western boundary extends west of the Meridian Valley County Club, passes beneath Kohr Pond, then extends near the hilltop in Section 9. The regional potentiometric map prepared for the SKCGWMP suggest that a northern boundary for the zone exists approximately a mile to the north of the study area.

At this point, the boundary of the aquifer protection area was drawn (Figure 3.23). The APA follows quarter section lines and encloses the entire North Meridian Aquifer. The entire area is approximately three square miles, including all of Section 22 (T22N, R5E), most of Section 15, and portions of Sections 14, 21, 23, 26, and 27.

3.5.4 Deep Confining Materials

Beneath the shallow aquifer system, a thick sequence of low permeability materials exists. Few wells penetrate through these sediments to the deep aquifer system. Below the deep aquifer system, or where it is absent, these low permeability materials apparently extend to the bedrock basement. At KCWD 111 Well 5A, the deep confining materials were found to exist, except for 20 feet containing the deep aquifer system, from approximately 255 feet above to 520 feet below sea level, where bedrock was encountered. At KCWD 111 Well 1, the deep aquifer system is absent and the low permeability sediments extend from the base of the NMA at 275 feet MSL to approximately 620 feet below MSL.

3.5.5 Deep Aquifer System

The deep aquifer system is poorly defined in its areal extent because most wells are not drilled deep enough to reach it. It is not a single aquifer, and may not represent a single aquifer system, but rather several aquifers which are classified together for the purposes of this study. It is probably the equivalent of the Qc(3) and/or Qc(4) aquifer units in the SKCGWMP (EES, 1991).

The aquifer system below the shallow system has variable depth. At some locations, such as KCWD 111 Well 1, the deep system is missing. Elsewhere, it is typically 30 to 50 feet below the shallow system. At the City of Kent Soos Creek Well, it is several hundred feet below the shallow system. Where found, the head in the deep system is always below the head of the shallow system and typically below the base of the shallow system.

The database contains records on 18 wells completed in the deep aquifer system. This is approximately 4 percent of all wells in the database. These wells have specific capacities ranging from 0.1 to more than 8 gpm/ft, with a median value of 0.5 gpm/ft. Transmissivity values have been measured in several wells and range from 2,000 to 19,000 gpd/ft. Measured storage coefficient values range from 0.0001 to 0.00026. Again, as would be expected, these values indicate a confined aquifer system.

3.6 Summary and Conclusions

The primary purpose of this project is to develop an aquifer protection plan for the North Meridian Aquifer. Prior to the beginning of this study, the extent of NMA was unknown. Consequently, one of the major tasks for the project was to define the hydrogeology of the NMA so that the APP could be developed.

The hydrogeologic study was largely based upon a well database of the study area. The database includes every known well of record within the area. There are a total of 407 wells in the database, averaging 29 wells per square mile in the study area. Geologic logs were located for approximately 70 percent of the wells. Approximately 240 wells were field-checked, and their mapped locations were generally found to be accurate to within a few hundred feet.

In addition to well records, climatic records from the NOAA SeaTac and Landsburg stations were examined and analyzed. These records indicate that the study area receives an average of 47 inches of precipitation per year. Except for the water years of 1990 and 1991, the area has received lower than average precipitation every water year since 1984.

The study area topography and surface geology are largely resultant from the last major glaciation of the area, the Vashon. This glacial episode helped form the linear, northwest trending hills and valleys of the area. Glacial till from the Vashon is the most common geologic unit at the surface, covering all upland areas except for scattered peat deposits in some depressions. The Big Soos valley and the Covington Channel, itself a meltwater feature from the Vashon glaciation, are mantled with recessional outwash rather than till.

Beneath the surface, a thick sequence of unconsolidated glacial and non-glacial sediments rests upon bedrock. Bedrock depths are believed to range from approximately 100 feet near the northern boundary of the area, to approximately 1,000 feet in the southwest. The hydrogeology of the area is largely a function of the unconsolidated sediments which contain three aquifer systems, described herein as perched, shallow, and deep.

A conceptual model was developed as part of the study. The conceptual model shows several sources of recharge to the area. The primary recharge source results from precipitation. Recharge is also imported into the area from the Cedar River, by leakage out the bottom of the Lake Youngs, and from the Seattle Water system in general, by septic drainfield return flow of Soos Creek Water District customers. Two northerly trending ground water divides trisect the area, directing ground water flow toward the Big Soos valley, toward the Covington Channel, or westerly out of the area.

The major discharge points are springs or evapotranspiration from the perched aquifer system, wells from both the perched and shallow aquifer systems, and underflow out of the area from all three aquifer systems.

As part of the conceptual model, five hydrostratigraphic units were defined. They are: the till and clay confining unit, the perched aquifer system, the shallow aquifer system, the deep confining materials, and the deep aquifer system. The main unit of concern to the project is the shallow aquifer system. The North Meridian Aquifer is defined to include the most productive portion of the shallow aquifer system. The shallow system is the most regionally extensive aquifer unit. Sixty-five percent of the wells in the database are completed in it, including KCWD 111 Wells 1, 2, 3, and 4.

Wells completed in the shallow aquifer system have average production characteristics similar to wells completed in the perched aquifers of the area; average specific capacities for wells in both units are between 1.0 and 1.5 gpm/ft; wells in both units have average potential yields of 25 gpm. However, wells completed in the North Meridian Aquifer are much more productive, having an average specific capacity of over 4 gpm/ft and an average potential yield of 146 gpm. The North Meridian Aquifer occupies approximately two square miles in the center of the study area. The APA was drawn around the NMA and contains about three square miles.

The shallow aquifer system is confined above by the till and clay confining unit. This 10-150 foot thick unit is the main surficial unit in the area. It consists of the Vashon till, a clay layer, and a pre-Vashon till(?). The perched aquifer system occurs within the till and clay unit. The perched system is a discontinuous series of perched aquifers with water levels 30 to 100 feet above the potentiometric surface of the shallow aquifer system. Twenty-four percent of the wells in the database are completed in perched aquifers.

The final two hydrostratigraphic units are of less importance to the present project. The deep confining materials serve as a base to the shallow aquifer system. They have low permeabilities, but do allow for a portion of the ground water in the shallow system to discharge as downward leakage to the deep system. The deep aquifer system consists of a discontinuous series of permeable zones within the deep confining materials. Four percent of the wells in the database are completed in deep aquifers. Water levels in these aquifers are typically below the bottom of the shallow system.

The zone of contribution for the KCWD 111 North Meridian Aquifer wellfield was delineated as the final portion of the hydrogeologic study. Travel times were not computed. The zone of contribution is defined by the ground water divides east and west of the Big Soos valley. The northern boundary is outside the field area, but is believed to be approximately one mile north of the area based on the regional description developed in the SKCGWMP analysis.

When the project began, the extent of the North Meridian Aquifer and knowledge of the ground water flow system were unknown. By studying well records and other information, the project successfully delineated the boundaries of the North Meridian Aquifer, characterized the hydrogeologic framework and setting in which the aquifer exists, described the general ground water flow system including recharge sources and discharge points, and defined the zone of contribution to the KCWD 111 wellfield.

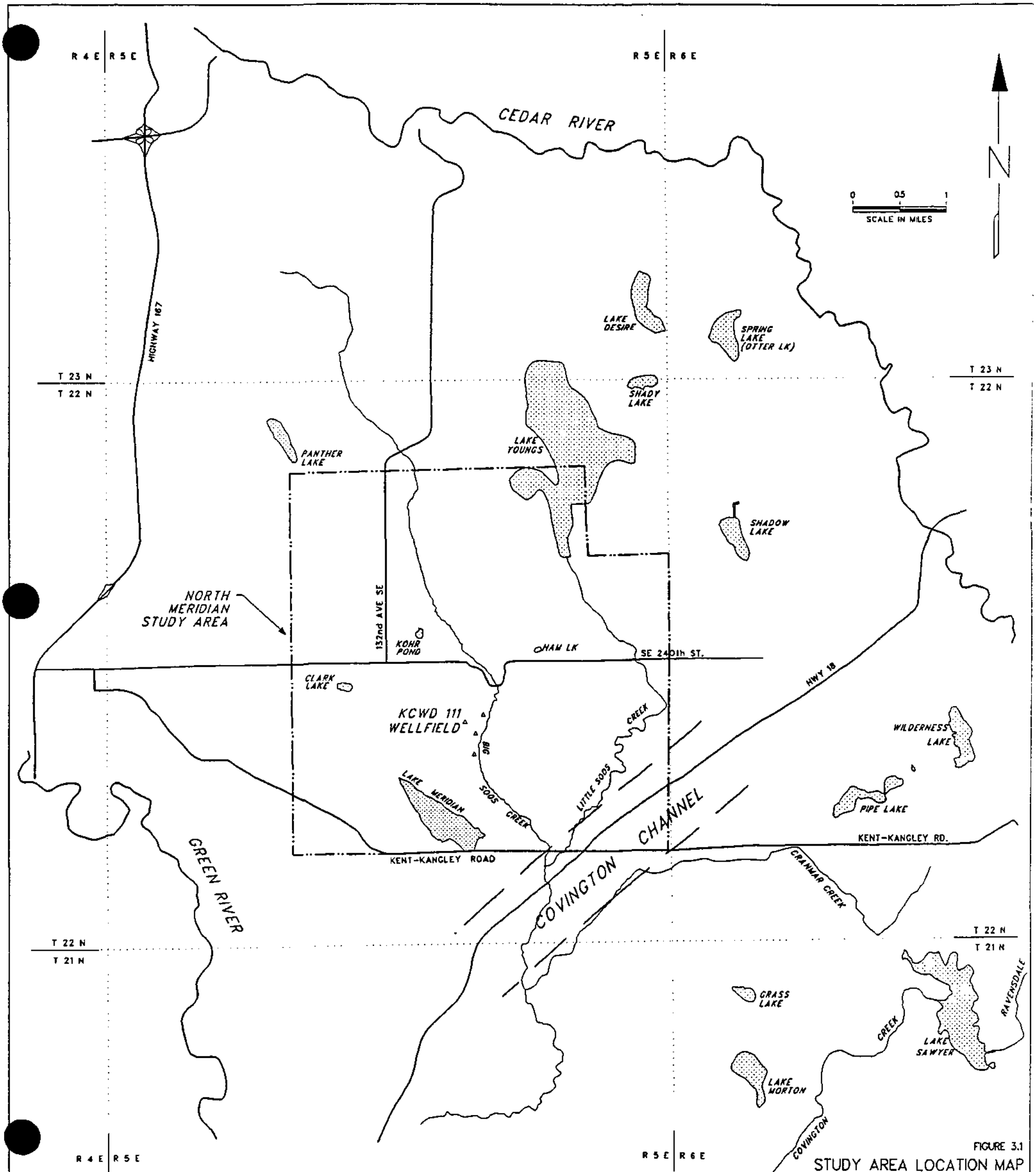

FIGURE 3.1
STUDY AREA LOCATION MAP
NORTH MERIDIAN AQUIFER PROTECTION STUDY
ROBINSON & NOBLE, INC.

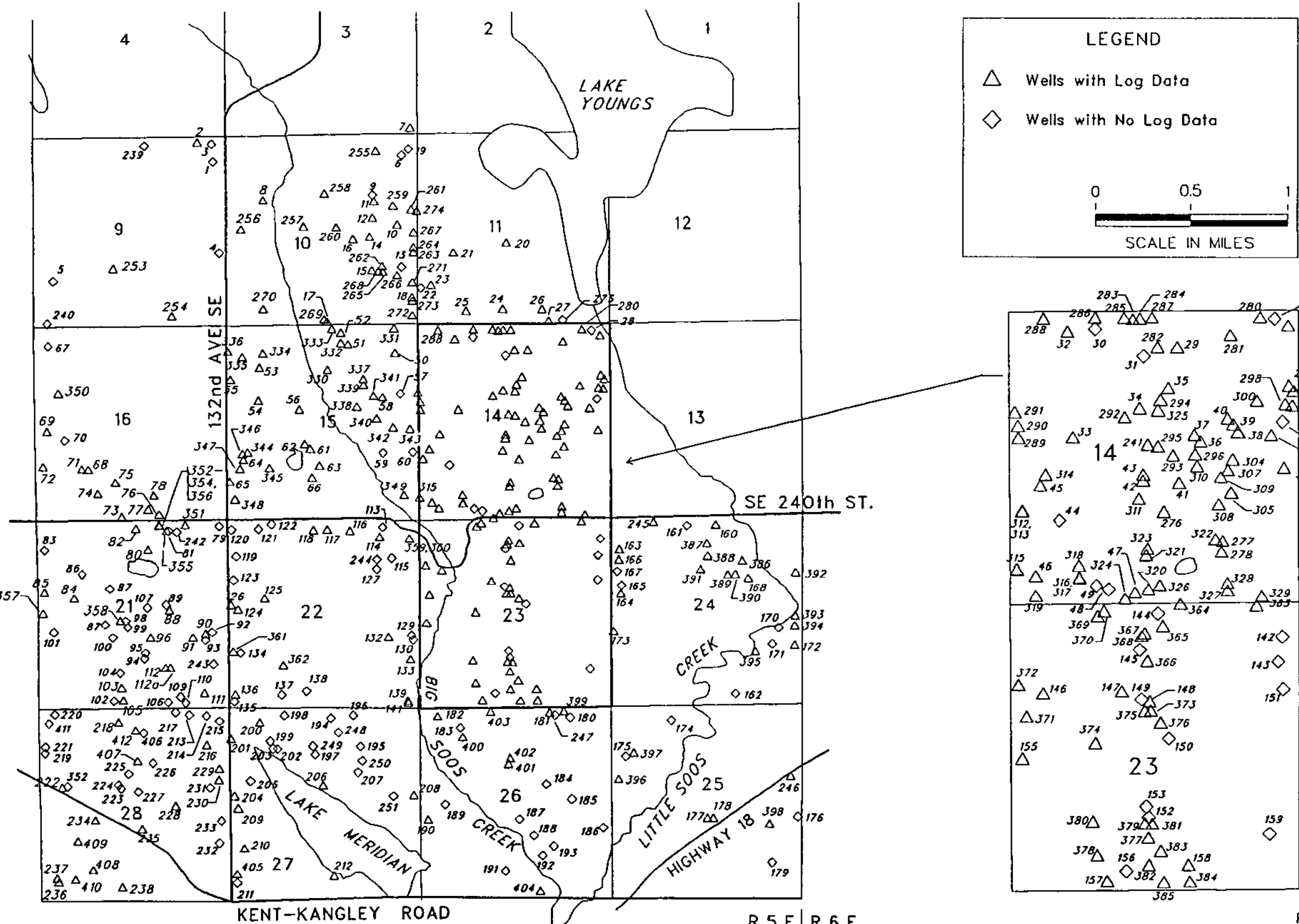

FIGURE 3.2a
WELL LOCATION MAP
NORTH MERIDIAN AQUIFER PROTECTION STUDY

ROBINSON & NOBLE, INC.

P:\USERS\LN\DRAWINGS\MERIDIAN\FIG_3.2a

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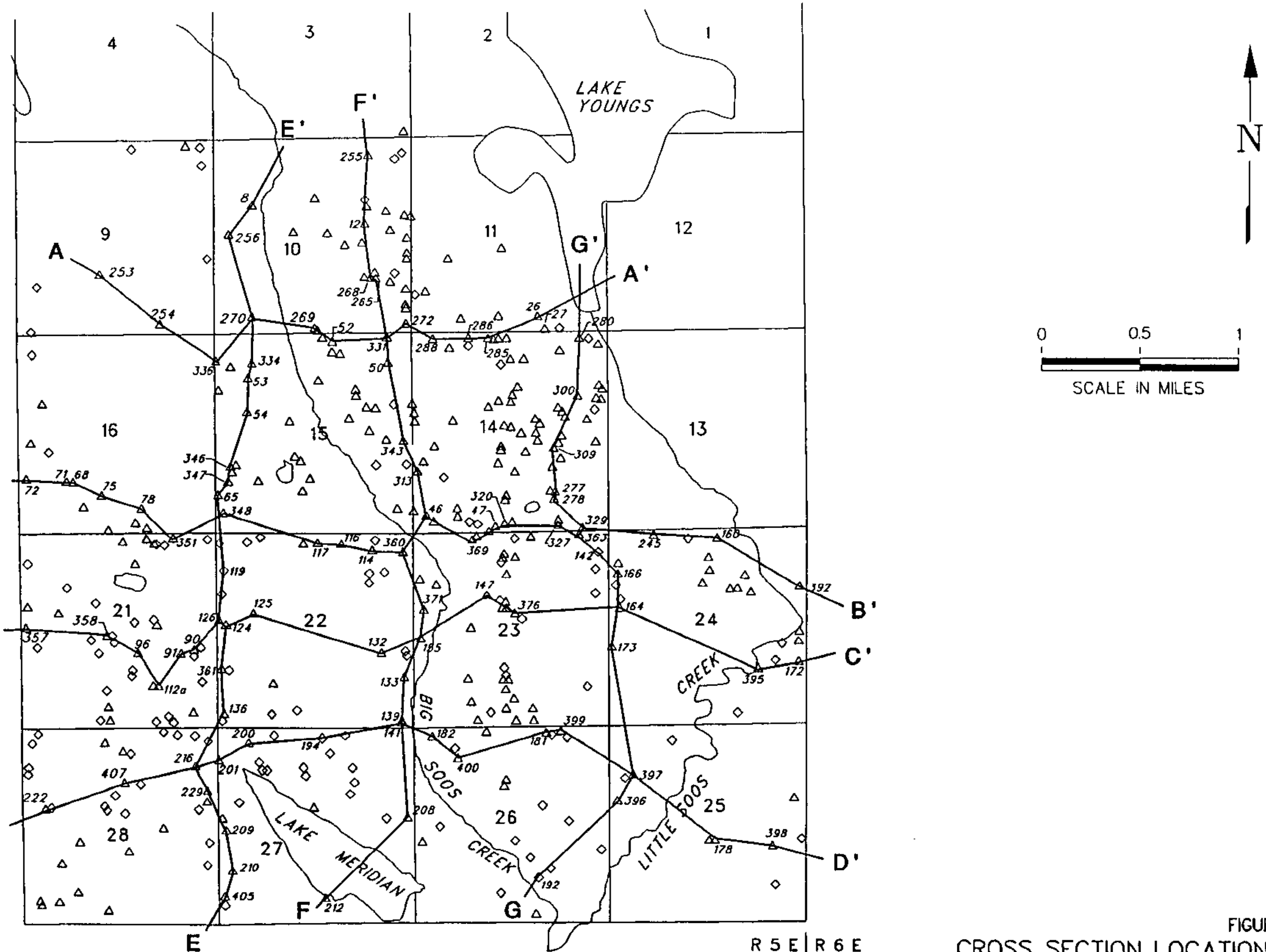

FIGURE 3.2b
CROSS SECTION LOCATION MAP
NORTH MERIDIAN AQUIFER PROTECTION STUDY

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P:\USERS\LN\DRAWINGS\MERIDIAN\FIG_3.2b

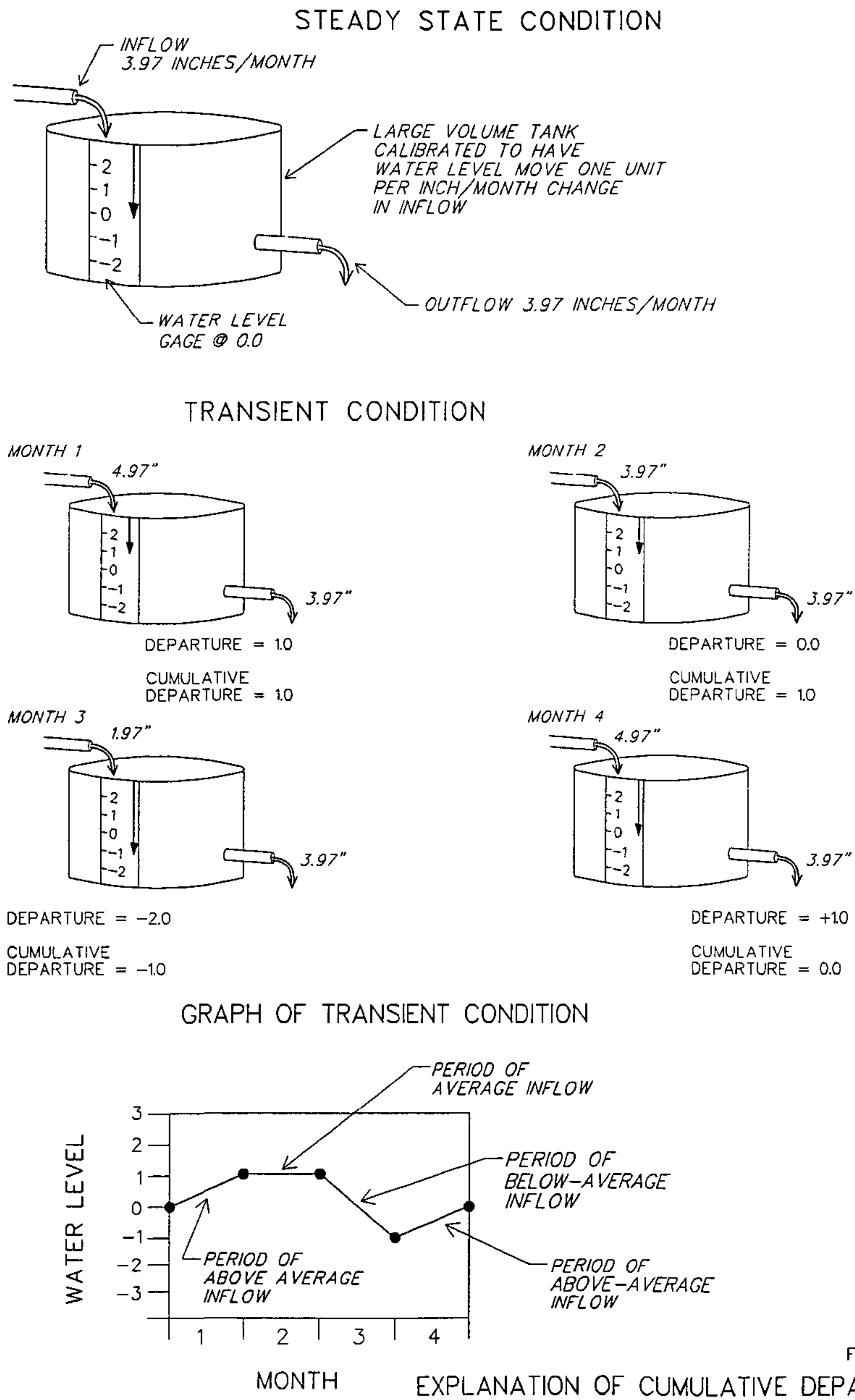

FIGURE 3.3

EXPLANATION OF CUMULATIVE DEPARTURE

NORTH MERIDIAN AQUIFER PROTECTION STUDY

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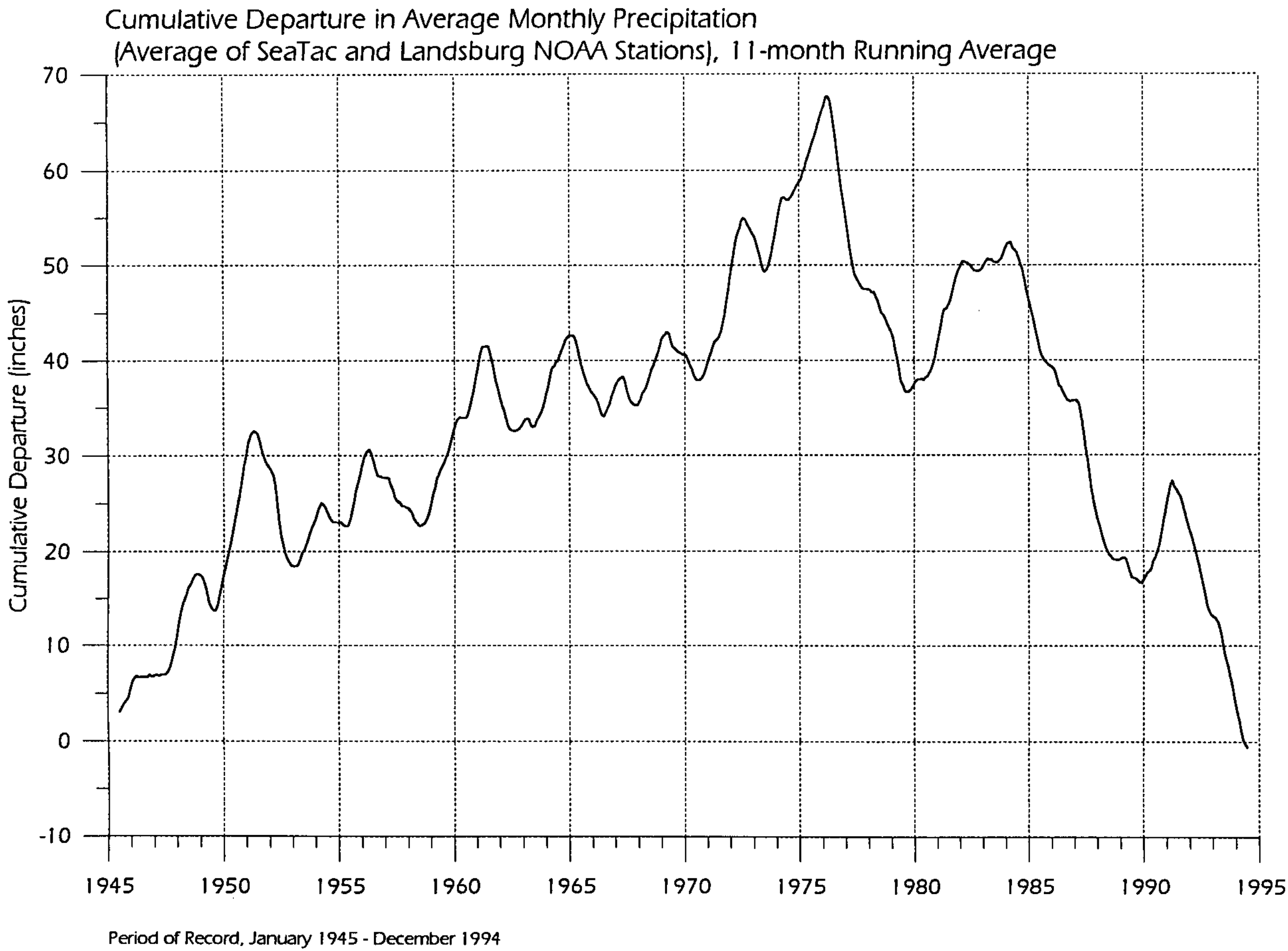
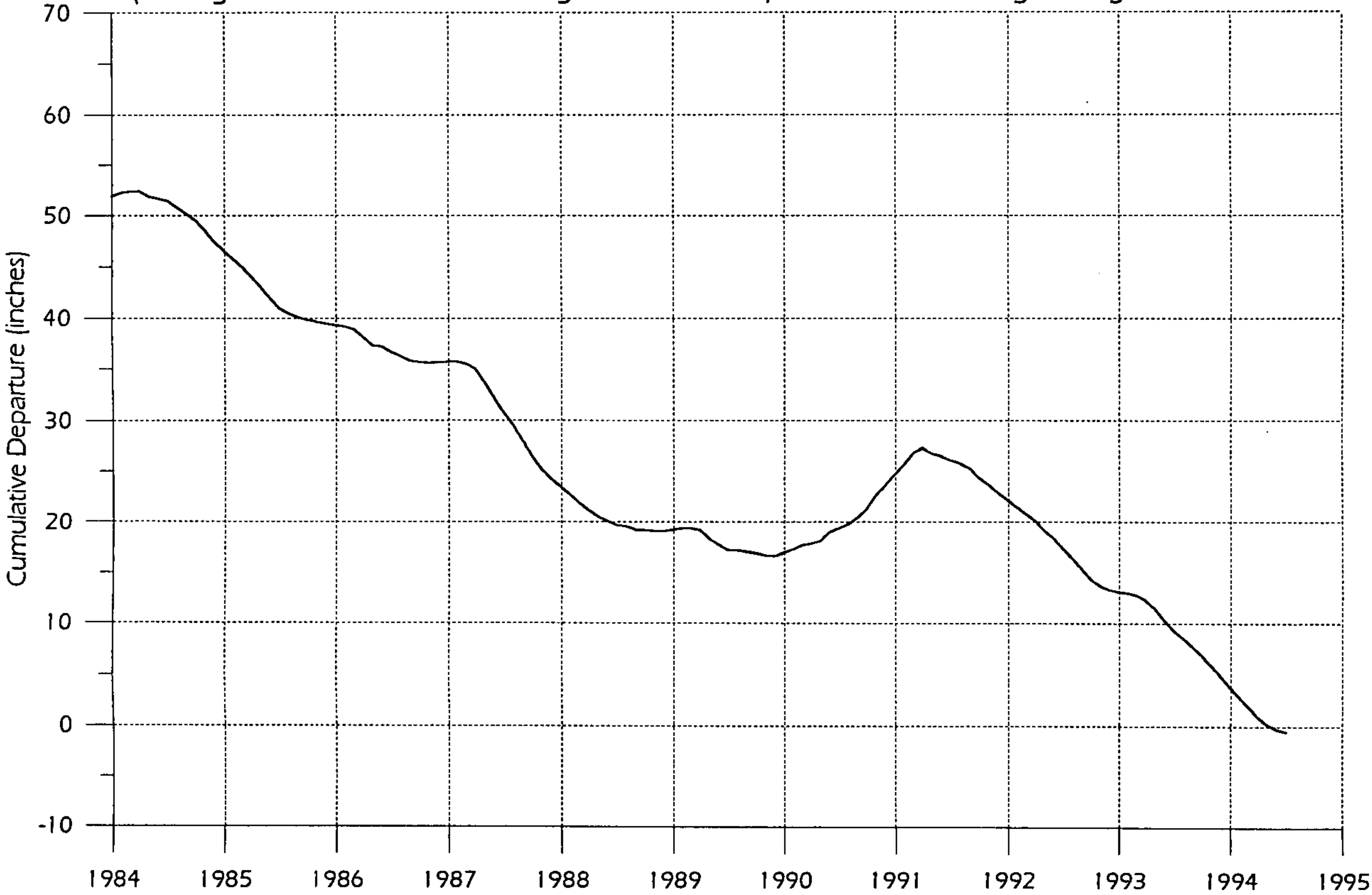

Cumulative Departure in Average Monthly Precipitation
(Average of SeaTac and Landsburg NOAA Stations), 11-month Running Average
Cumulative Departure (inches)
70
60
50
40
30
20
10
0
-10
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
Period of Record, January 1945 - December 1994

Figure 3.4

Cumulative Departure in Average Monthly Precipitation, 1984 - 1995,
(Average of SeaTac and Landsburg NOAA Stations), 11-month Running Average



Period of Record, January 1945 - December 1994

Figure 3.5

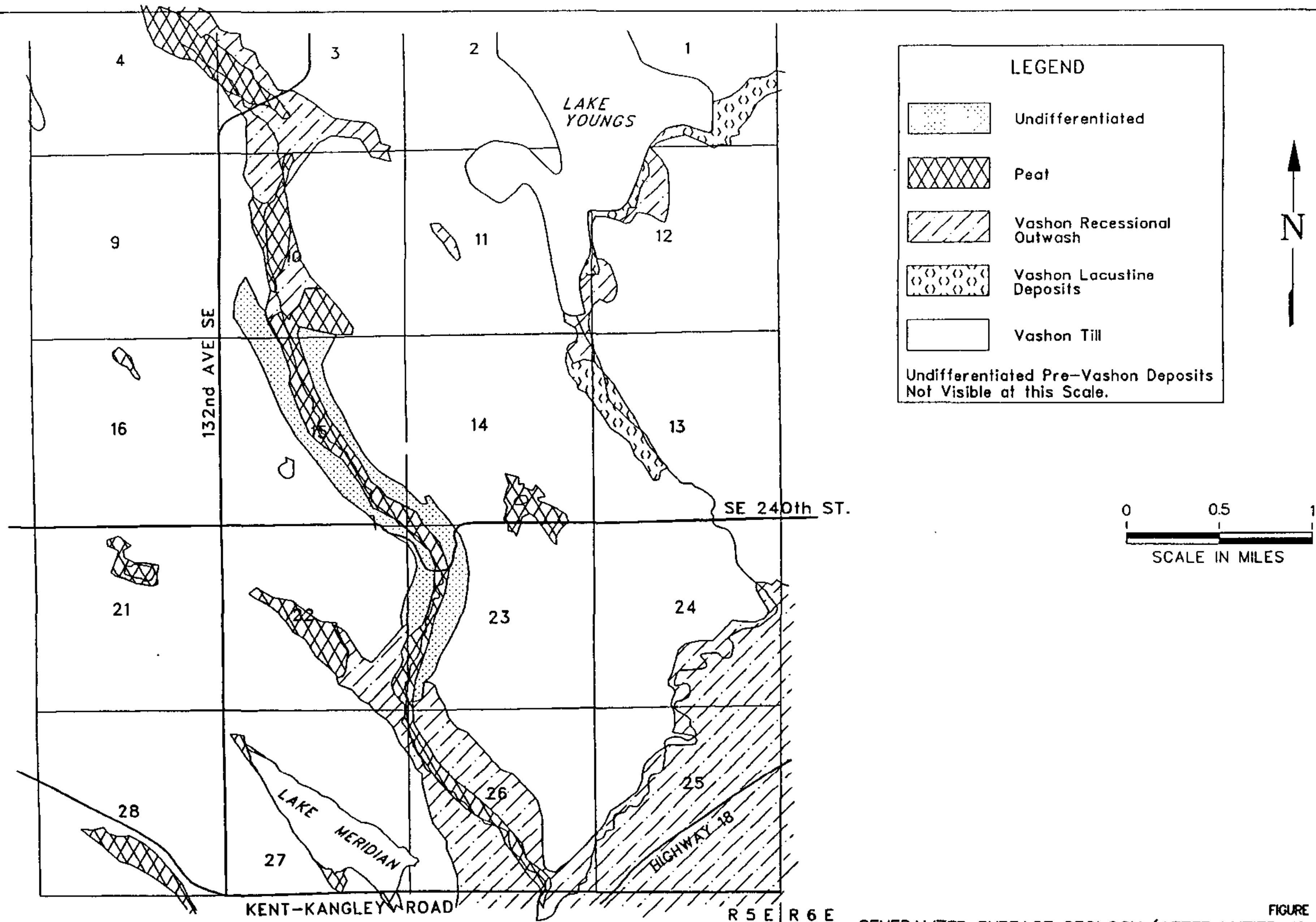


FIGURE 3.6
GENERALIZED SURFACE GEOLOGY (AFTER LUZIER, 1969)
NORTH MERIDIAN AQUIFER PROTECTION STUDY
ROBINSON & NOBLE, INC.
SEPTEMBER 1995. JOB NO. WHP13
P:\USERS\LN\DRAWINGS\MERIDIAN\FIG_3.6

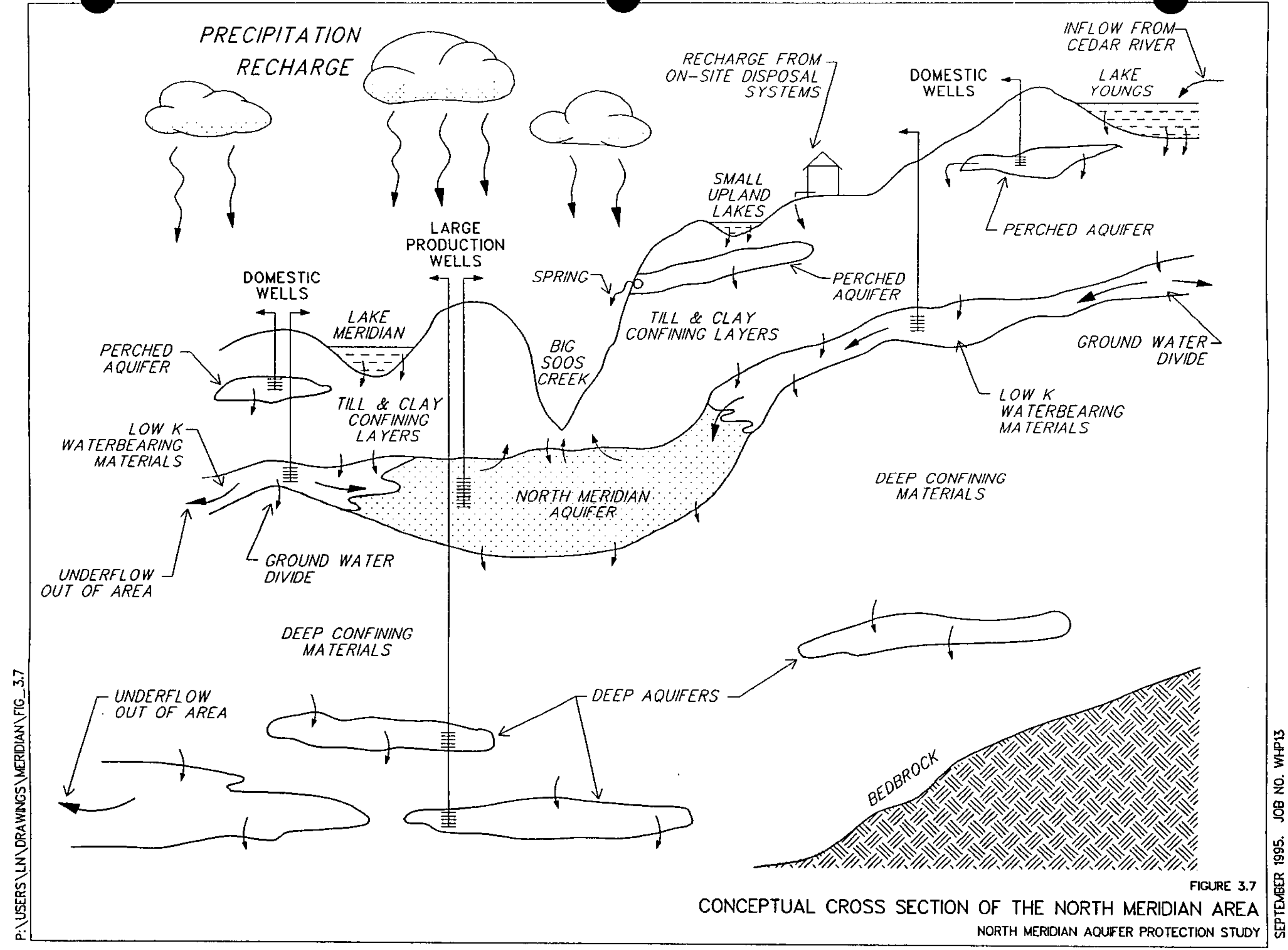


FIGURE 3.7
CONCEPTUAL CROSS SECTION OF THE NORTH MERIDIAN AREA
NORTH MERIDIAN AQUIFER PROTECTION STUDY

ROBINSON & NOBLE, INC.

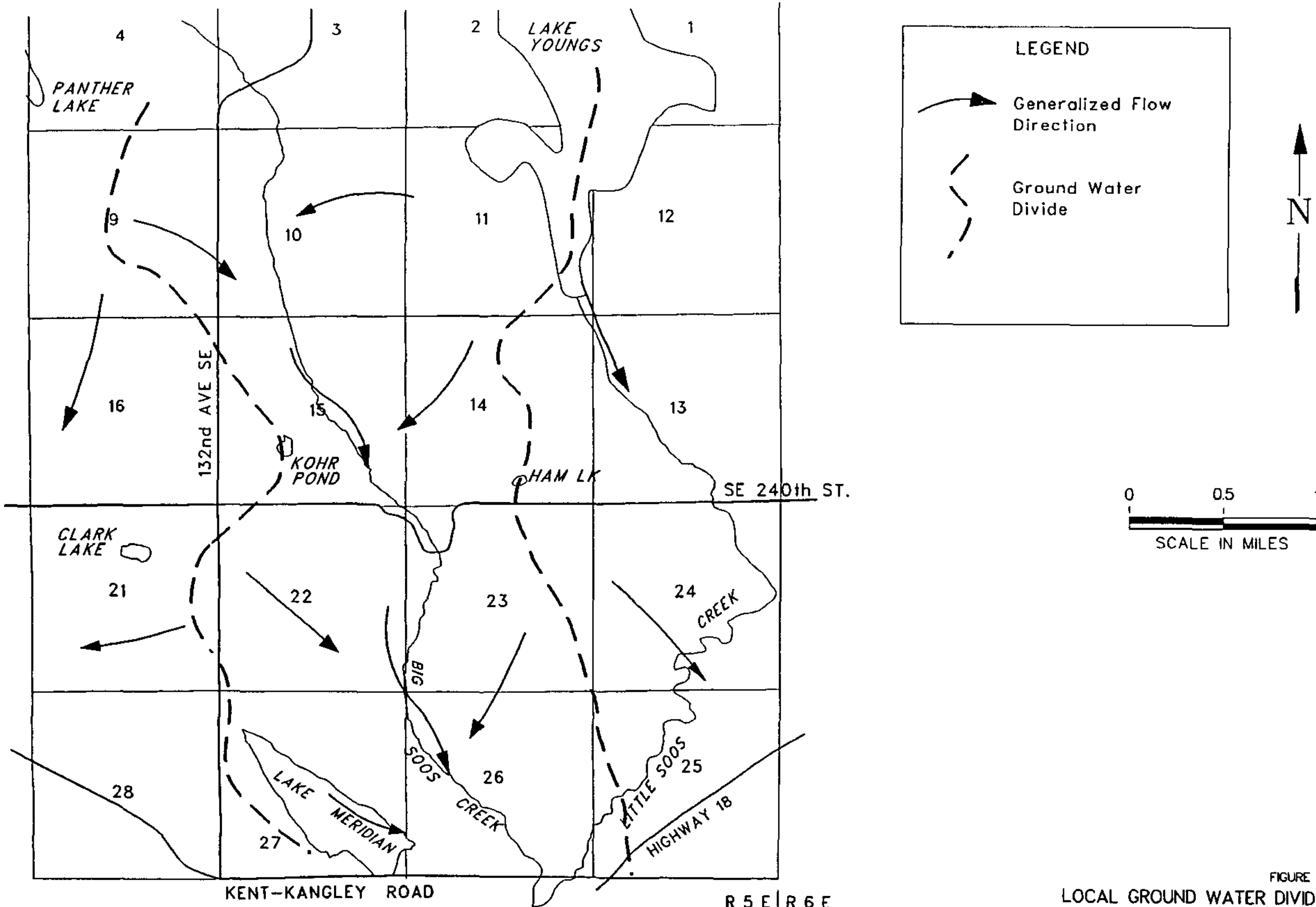


FIGURE 3.8
LOCAL GROUND WATER DIVIDES
AND GENERALIZED FLOW DIRECTIONS
NORTH MERIDIAN AQUIFER PROTECTION STUDY

P:\USERS\LH\DRAWINGS\MERIDIAN\FIG_3.8

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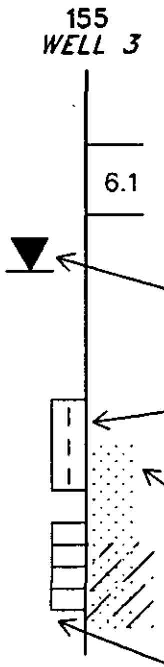
CROSS SECTION LEGEND

SYMBOLS



REFERENCE NUMBER
WELL NAME

LITHOLOGY INTERVAL
AND IDENTIFIER

STATIC WATER LEVEL
AT TIME OF DRILLING

PERFORATED INTERVAL

WATERBEARING ZONE

NORTH MERIDIAN AQUIFER

SCREENED INTERVAL

LITHOLOGY

1 GRAVEL

2 SAND AND GRAVEL

3 SAND
- f – fine
- m – medium
- c – coarse

4 SAND, GRAVEL, CLAY MIX; TILL

5 SILT

6 CLAY

EXAMPLE

2.5 SILTY SAND AND GRAVEL

3.1 SAND WITH GRAVEL

6.3 SANDY CLAY

UNITS

TC TILL AND CLAY CONFINING LAYER

SA SHALLOW AQUIFER SYSTEM

DC DEEP CONFINING MATERIALS

DA DEEP AQUIFER SYSTEM

SCALE

VERTICAL SCALE: 1:1200

HORIZONTAL SCALE: 1: 25,000

VERTICAL EXAGGERATION: 20.8

P:\USERS\LN...NGS\MERIDIAN\LEGND

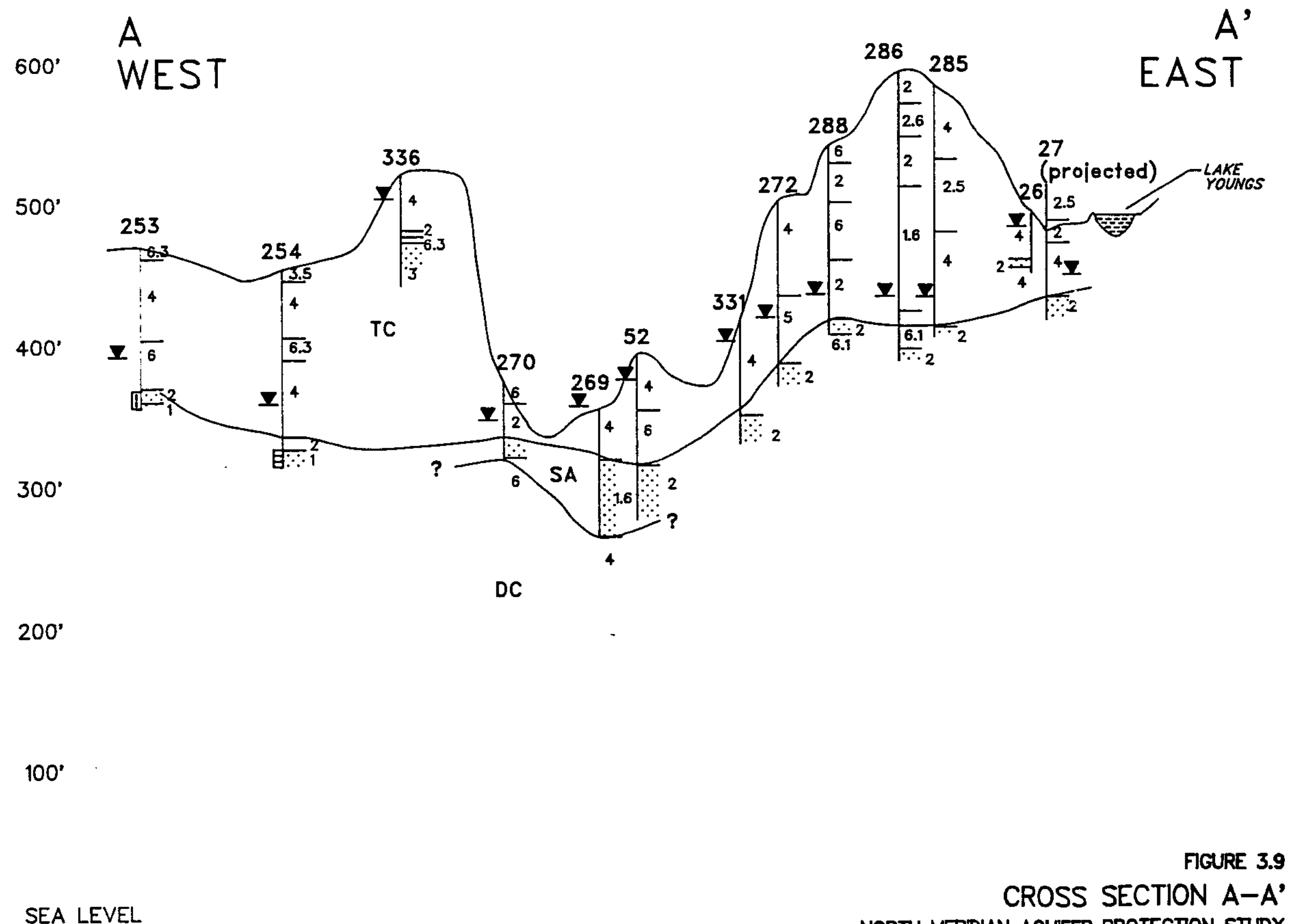


FIGURE 3.9
CROSS SECTION A–A'
NORTH MERIDIAN AQUIFER PROTECTION STUDY
ROBINSON & NOBLE, INC.

GC6\USERS\LN\DRAWINGS\MERIDIAN\SECT_AA

SEPTEMBER 1995, JOB NO. WHP13

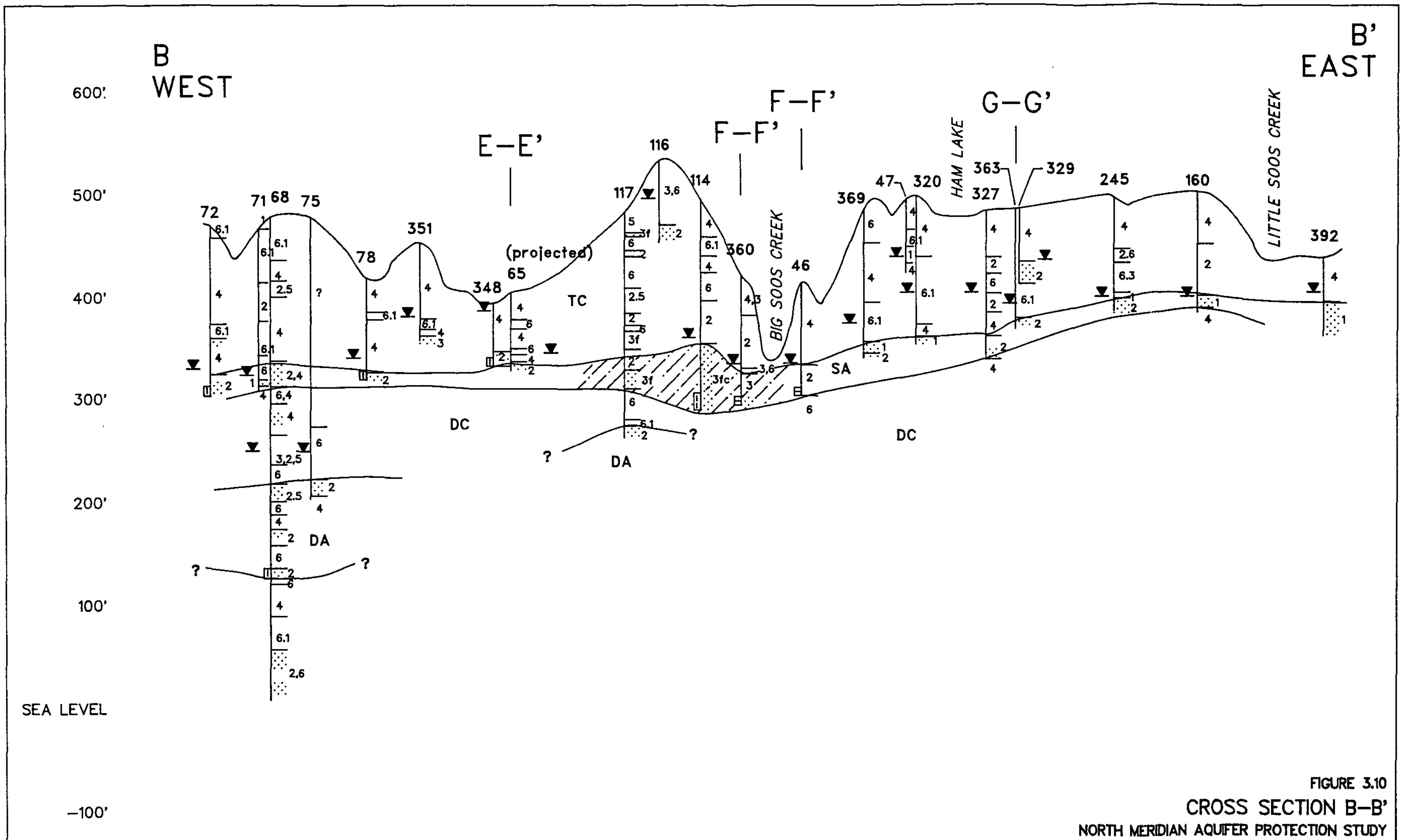


FIGURE 3.10

CROSS SECTION B-B'

NORTH MERIDIAN AQUIFER PROTECTION STUDY

ROBINSON & NOBLE, INC.

GC6\USERS\LN\DRAWINGS\MERIDIAN\SECT_BB

SEPTEMBER 1995, JOB NO. WHP13

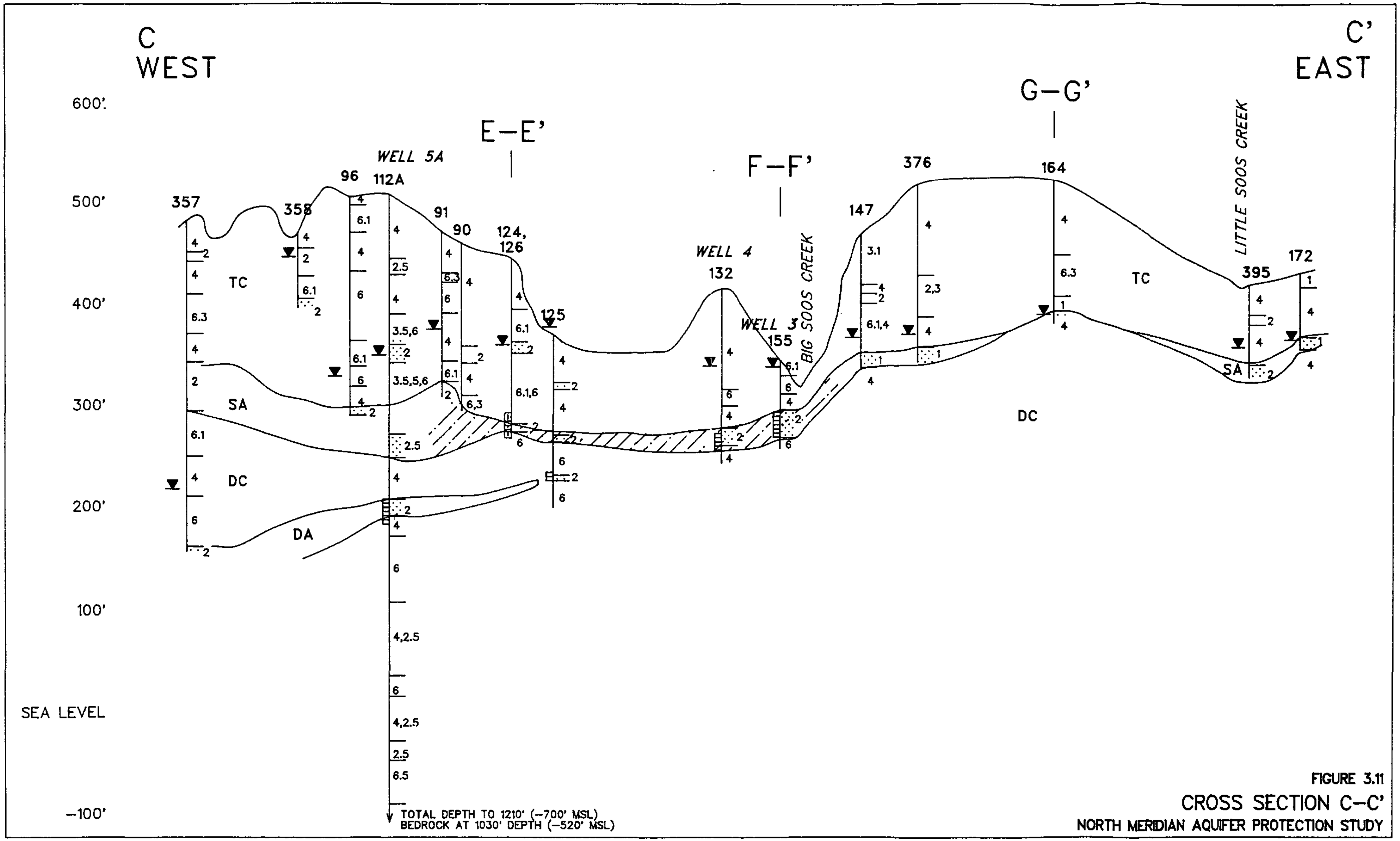


FIGURE 3.11
CROSS SECTION C–C'
NORTH MERIDIAN AQUIFER PROTECTION STUDY

ROBINSON & NOBLE, INC.

SEPTEMBER 1995, JOB NO. WHP13

GC6\USERS\LN\DRAWINGS\MERIDIAN\SECT_CC

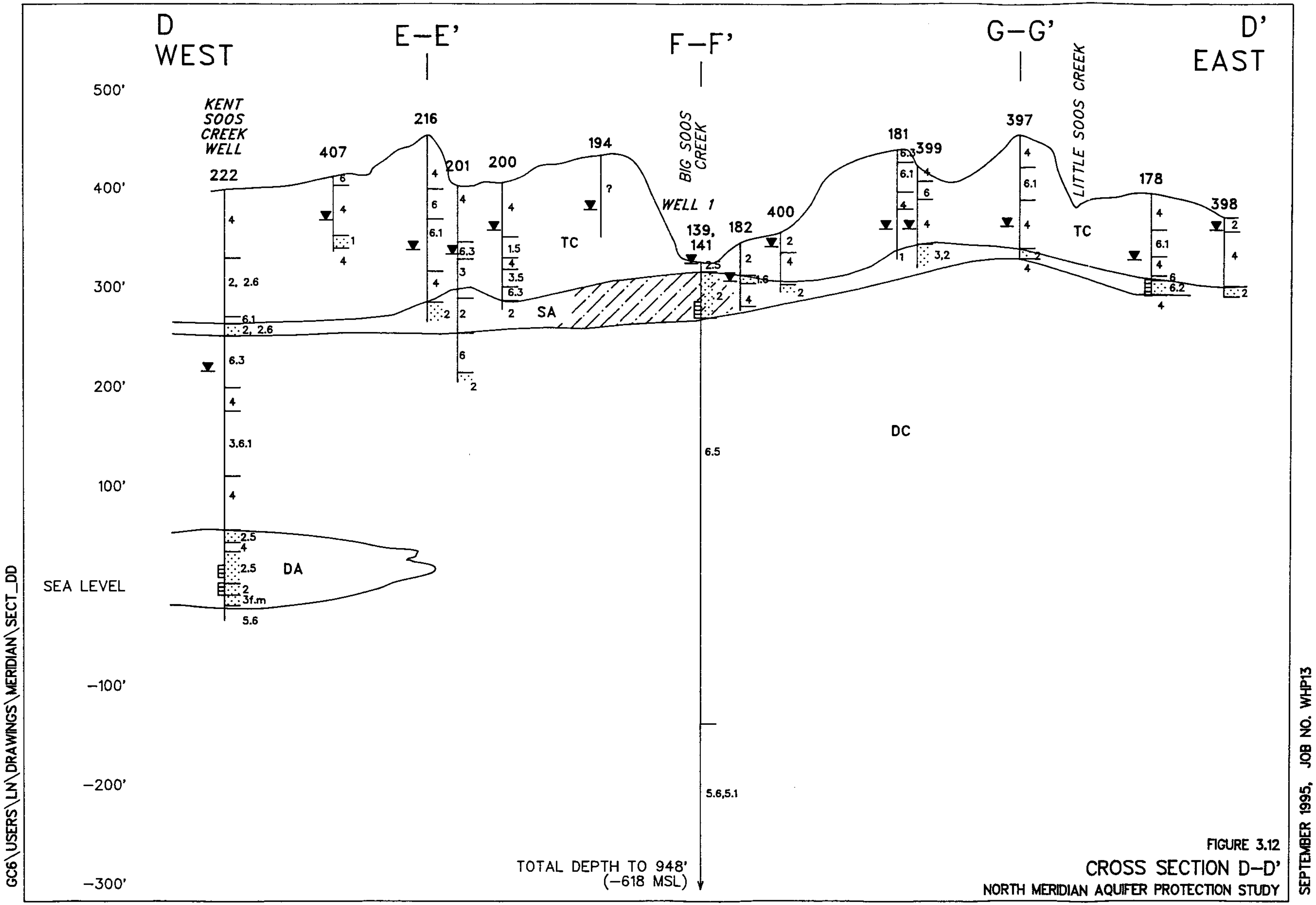


FIGURE 3.12
CROSS SECTION D–D'
NORTH MERIDIAN AQUIFER PROTECTION STUDY

SEPTEMBER 1995, JOB NO. WHP13

ROBINSON & NOBLE, INC.

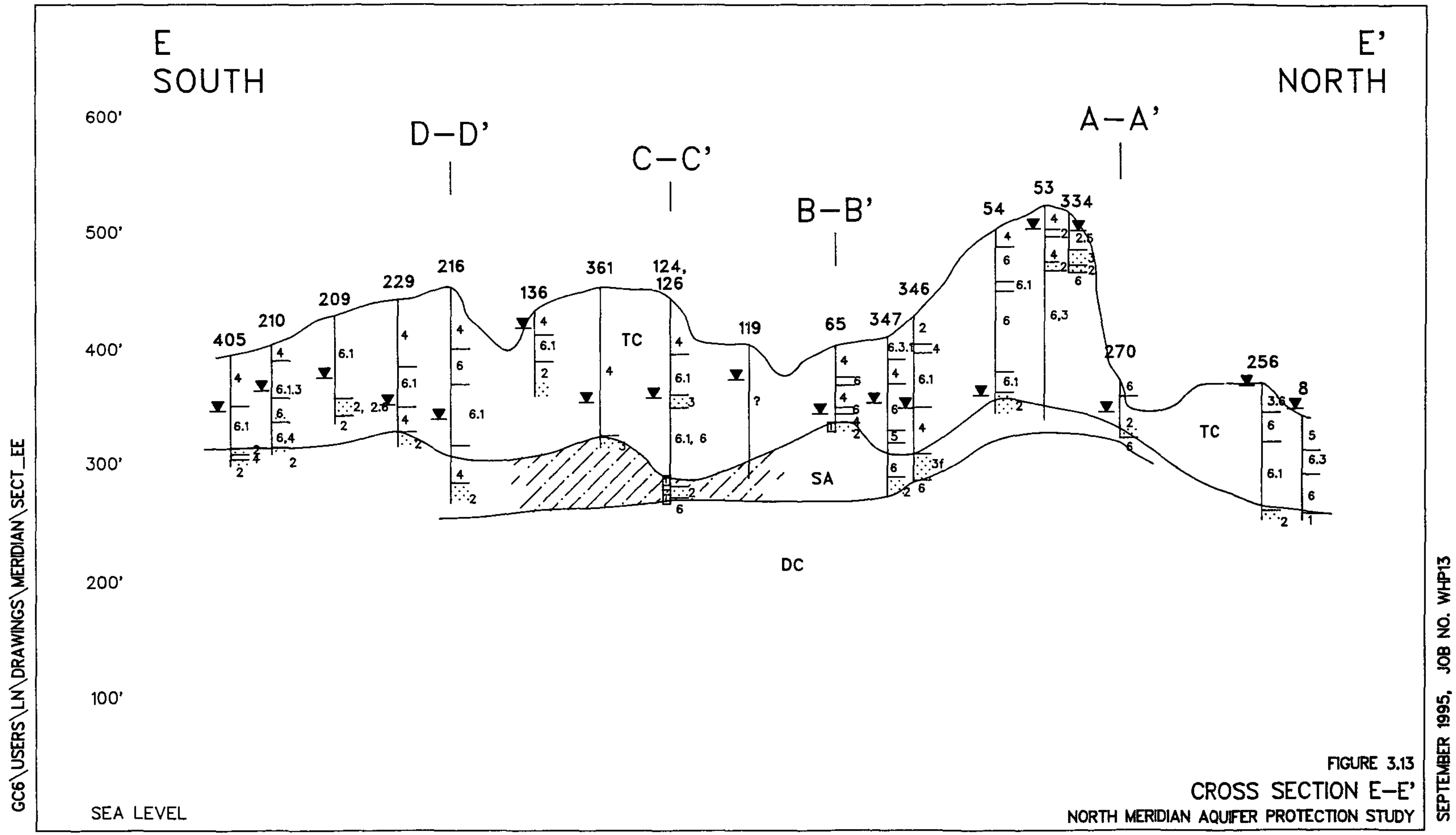


FIGURE 3.13

CROSS SECTION E–E'

NORTH MERIDIAN AQUIFER PROTECTION STUDY

SEPTEMBER 1995, JOB NO. WHP13

ROBINSON & NOBLE, INC.

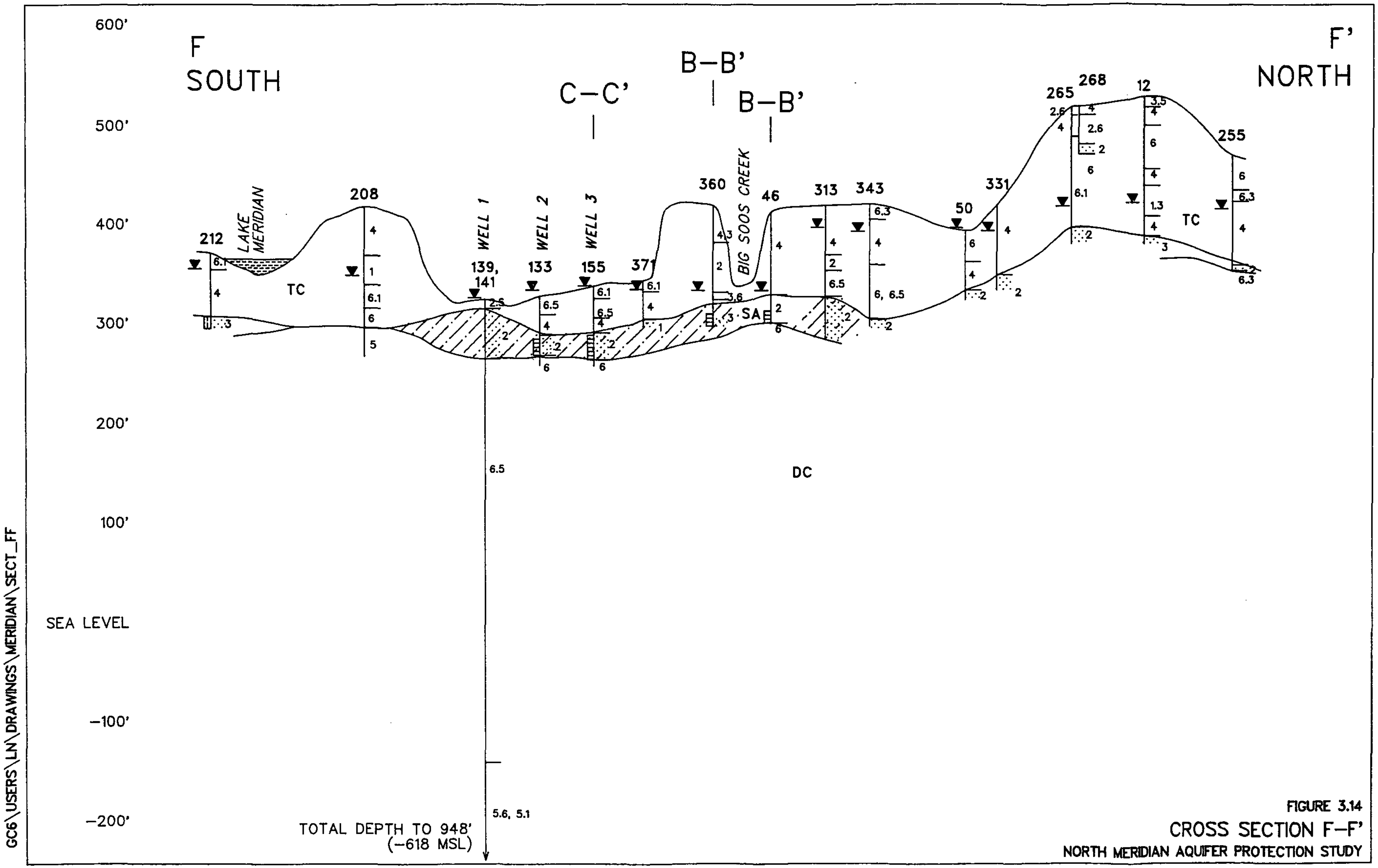


FIGURE 3.14

CROSS SECTION F–F'

NORTH MERIDIAN AQUIFER PROTECTION STUDY

SEPTEMBER 1995, JOB NO. WHP13

ROBINSON & NOBLE, INC.

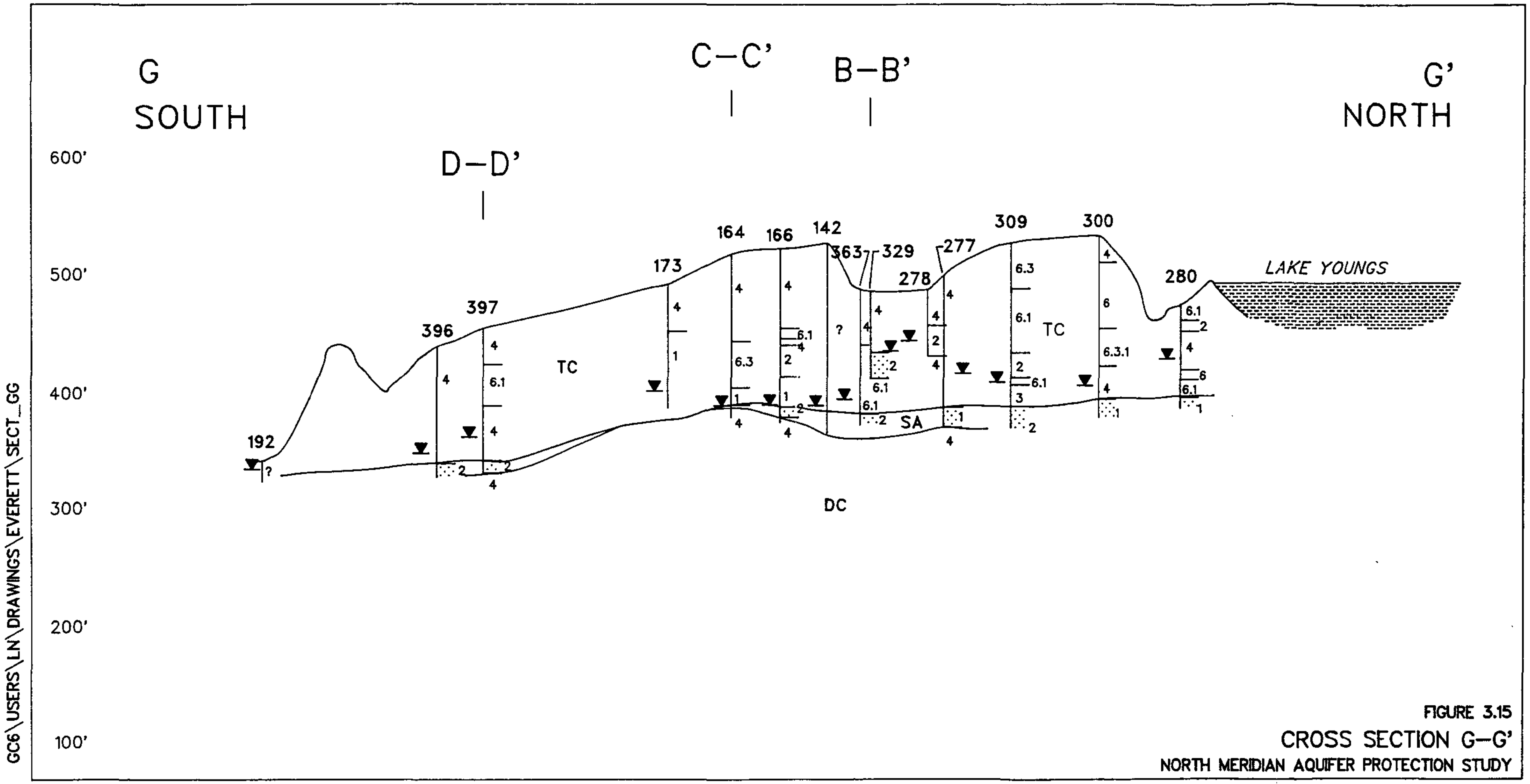


FIGURE 3.15

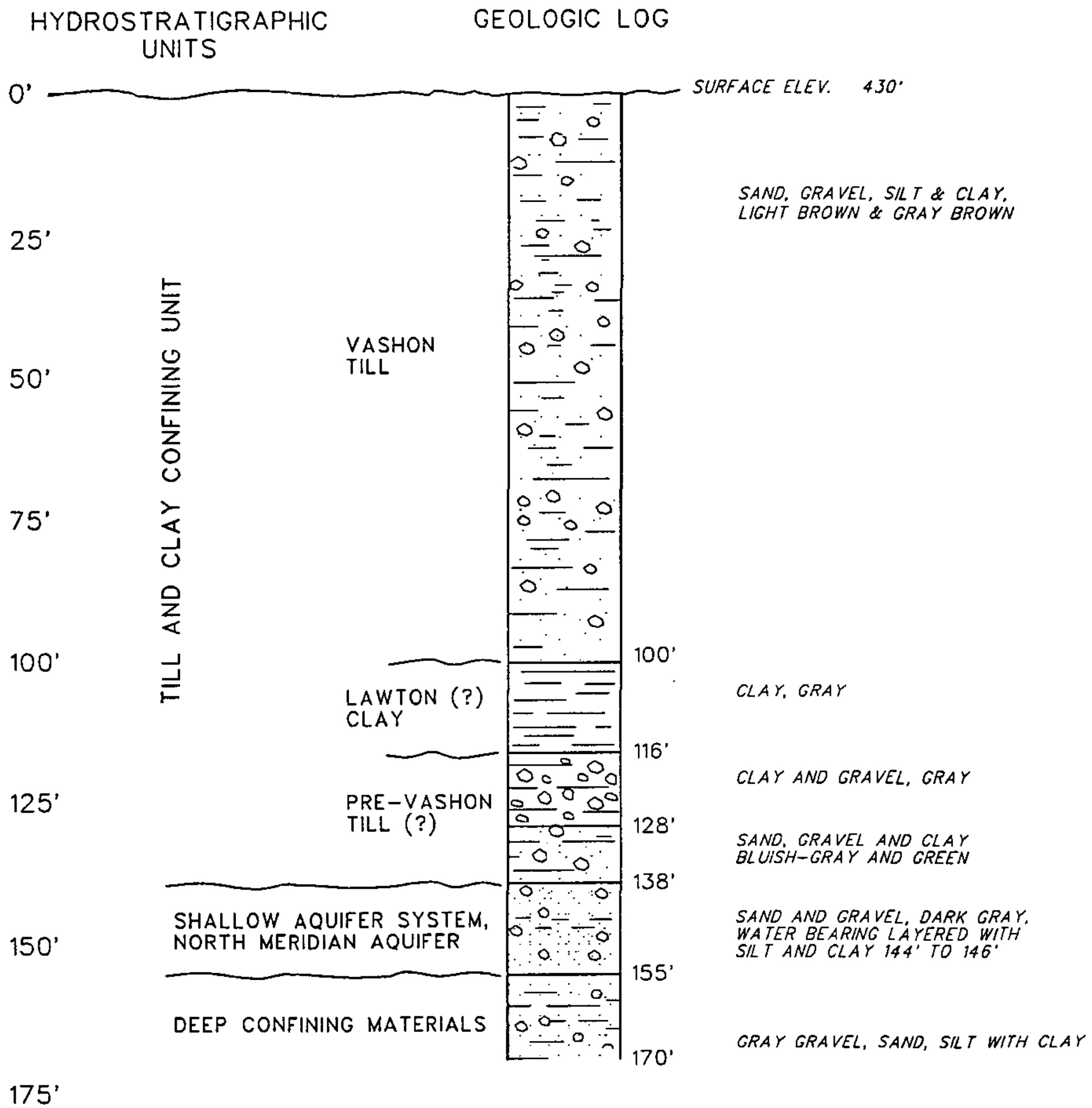
CROSS SECTION G—G'

NORTH MERIDIAN AQUIFER PROTECTION STUDY

ROBINSON & NOBLE, INC.

SEPTEMBER 1995, JOB NO. WHP13

KING COUNTY WATER DISTRICT 111
WELL 4



P:\USERS\ RAWINGS\MERIDIAN\FIG_3.16

SEPTEMBER 1995, JOB NO. WHP13

FIGURE 3.16
COMPARISON OF LITHOLOGY WITH HYDROSTRATIGRAPHIC UNITS AT KCWD 111 WELL 4
NORTH MERIDIAN AQUIFER PROTECTION STUDY

ROBINSON & NOBLE, INC.

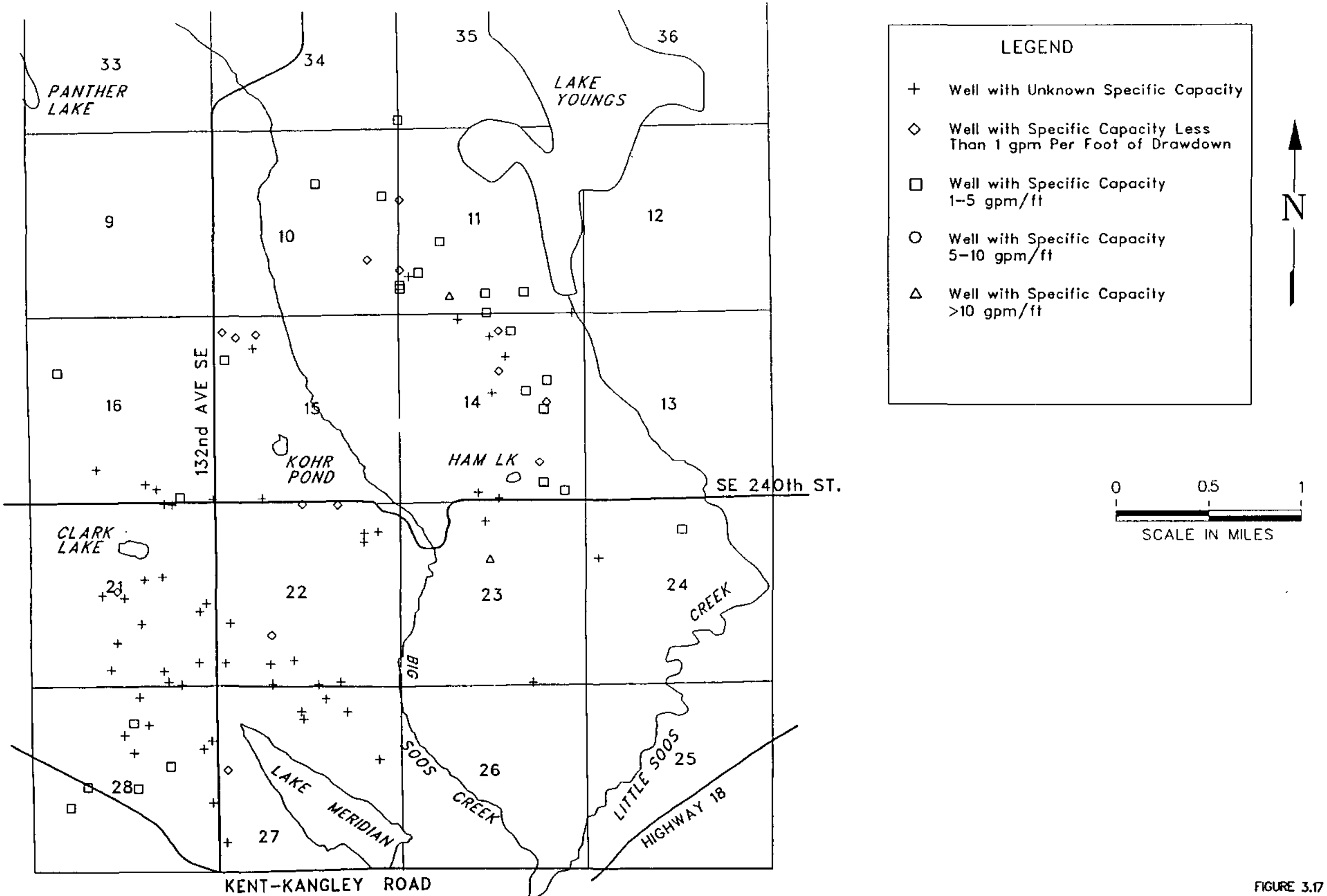


FIGURE 3.17
WELLS COMPLETED IN PERCHED AQUIFERS
NORTH MERIDIAN AQUIFER PROTECTION STUDY

ROBINSON & NOBLE, INC.

P:\USERS\LN\DRAWINGS\MERIDIAN\FIG_3.17

SEPTEMBER 1995. JOB NO. WHP13

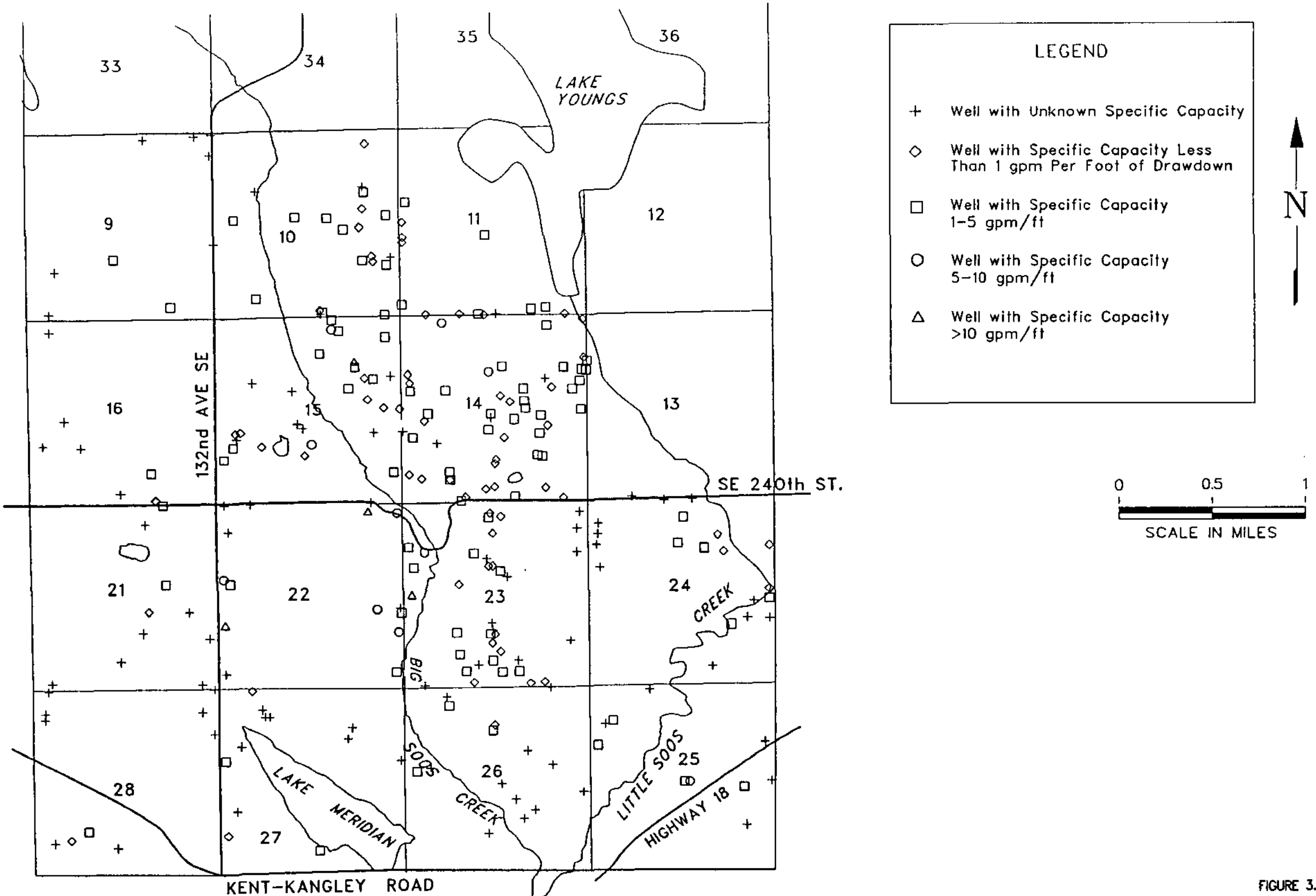


FIGURE 3.18
WELLS COMPLETED IN THE SHALLOW AQUIFER SYSTEM
NORTH MERIDIAN AQUIFER PROTECTION STUDY

ROBINSON & NOBLE, INC.

P:\USERS\LN\DRAWINGS\MERIDIAN\FIG_3.18

SEPTEMBER 1995. JOB NO. WHP13

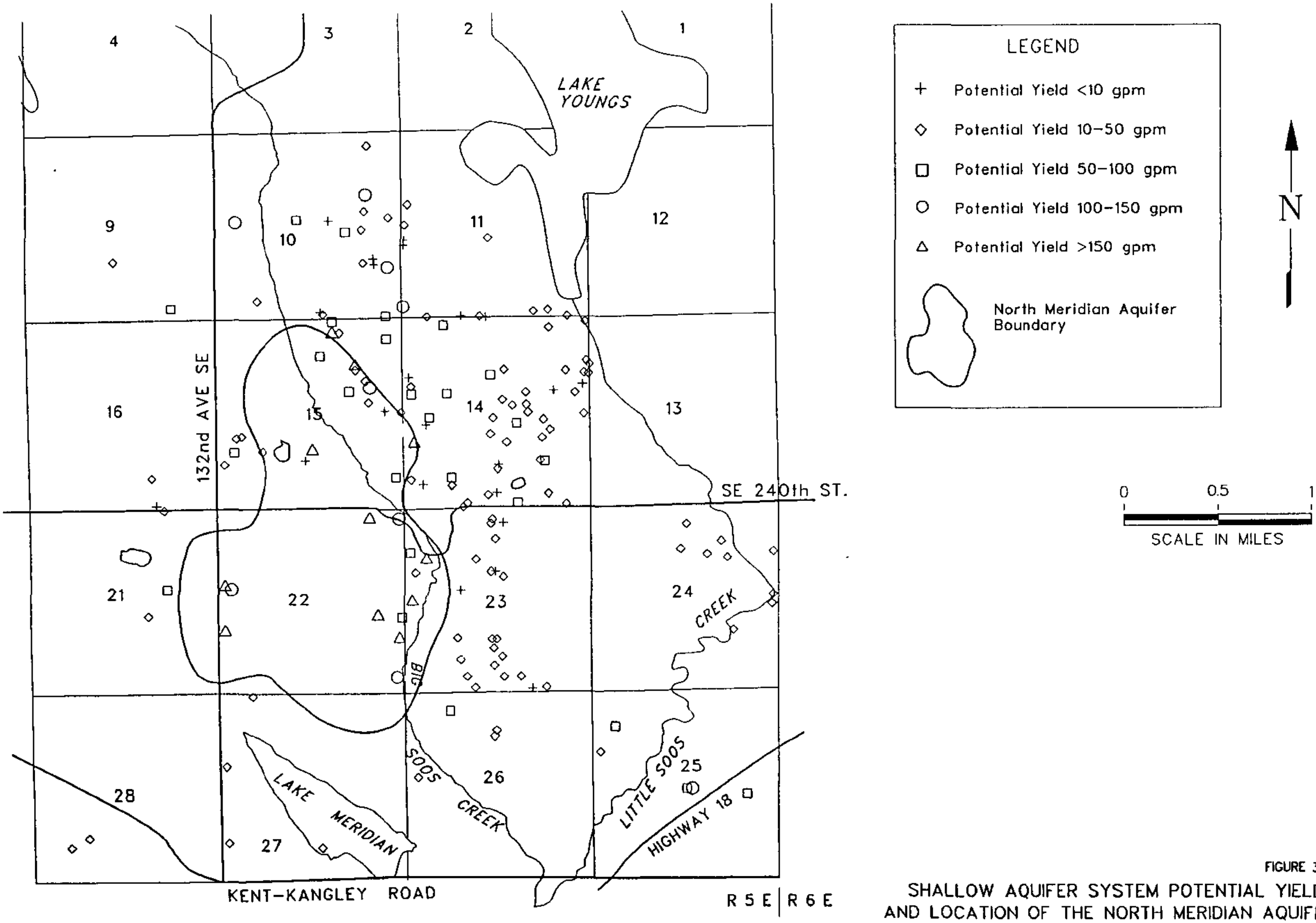


FIGURE 3.19

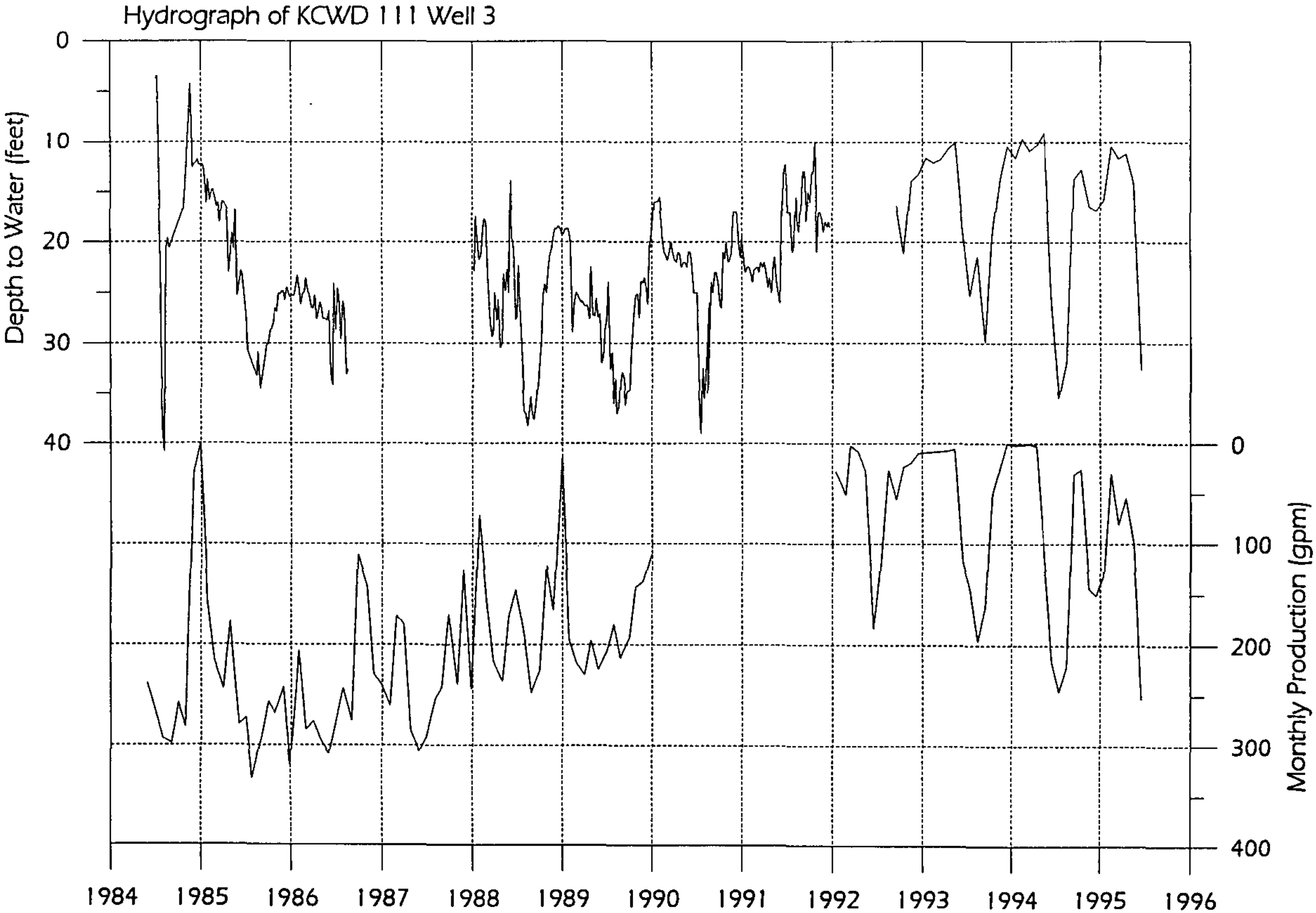
SHALLOW AQUIFER SYSTEM POTENTIAL YIELDS AND LOCATION OF THE NORTH MERIDIAN AQUIFER

NORTH MERIDIAN AQUIFER PROTECTION STUDY

ROBINSON & NOBLE, INC.

SEPTEMBER 1995. JOB NO. WHP13

P:\USERS\LIN\DRAWINGS\MERIDIAN\FIG_3.19



Hydrograph of KCWD 111 Well 3
Depth to Water (feet)
0
10
20
30
40
Monthly Production (gpm)
0
100
200
300
400
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996

Figure 3.20

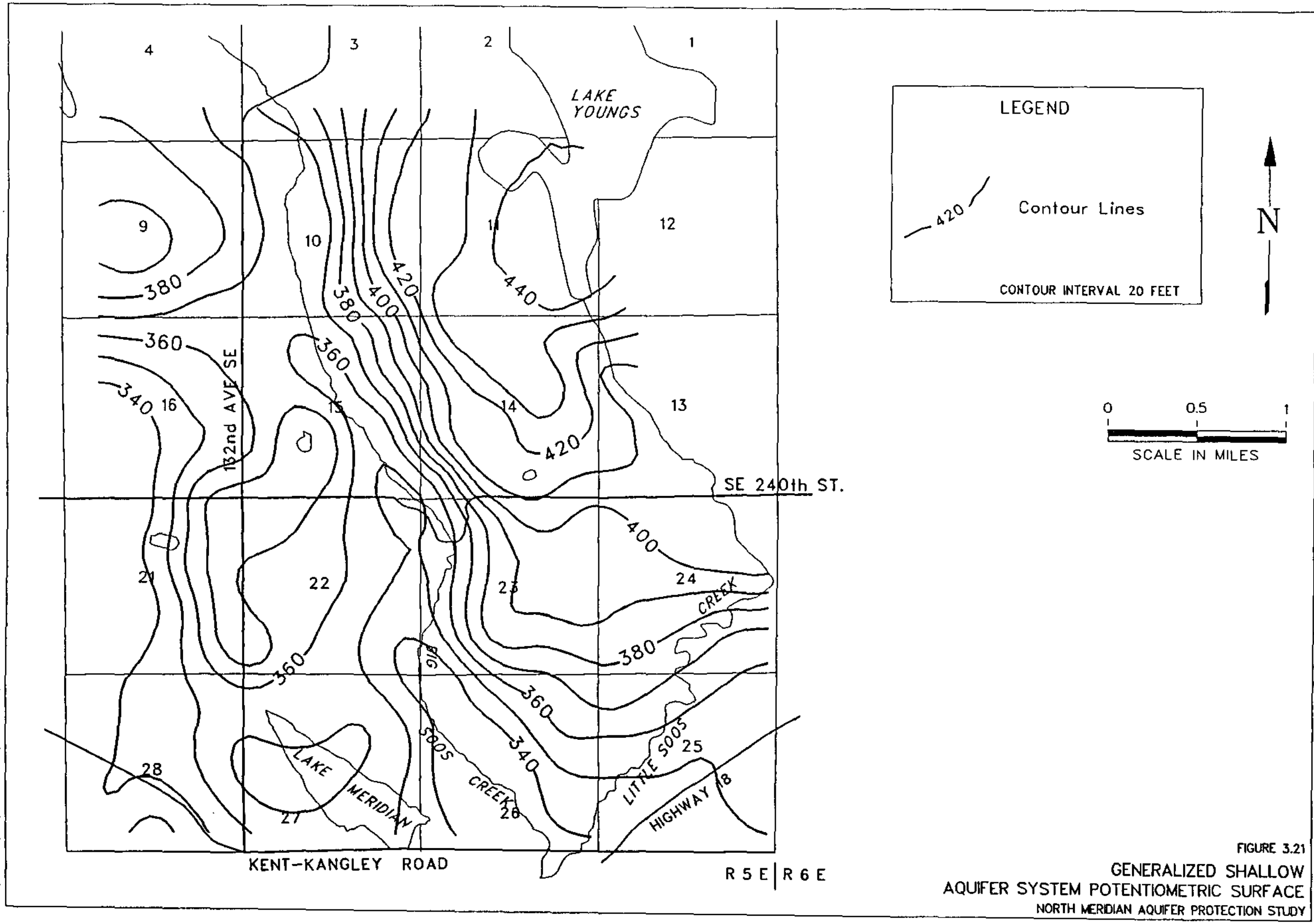
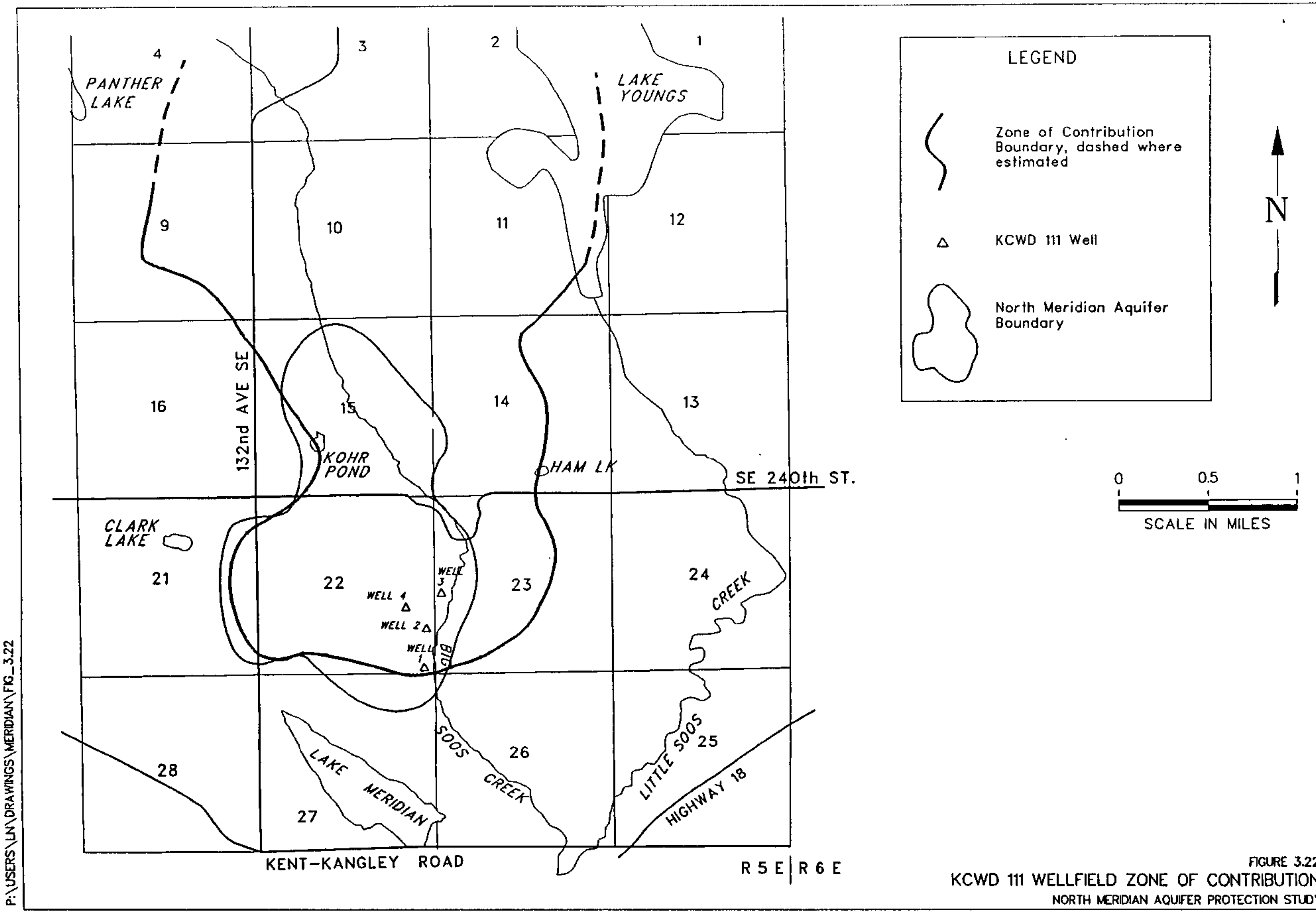


FIGURE 3.21
GENERALIZED SHALLOW
AQUIFER SYSTEM POTENTIOMETRIC SURFACE
NORTH MERIDIAN AQUIFER PROTECTION STUDY

ROBINSON & NOBLE, INC.

SEPTEMBER 1995. JOB NO. WHP13

P:\USERS\LN\DRAWINGS\MERIDIAN\FIG_3.21



P:\USERS\LN\DRAWINGS\MERIDIAN\FIG_3.22

FIGURE 3.22
KCWD 111 WELLFIELD ZONE OF CONTRIBUTION
NORTH MERIDIAN AQUIFER PROTECTION STUDY

SEPTEMBER 1995. JOB NO. WHP13

ROBINSON & NOBLE, INC.

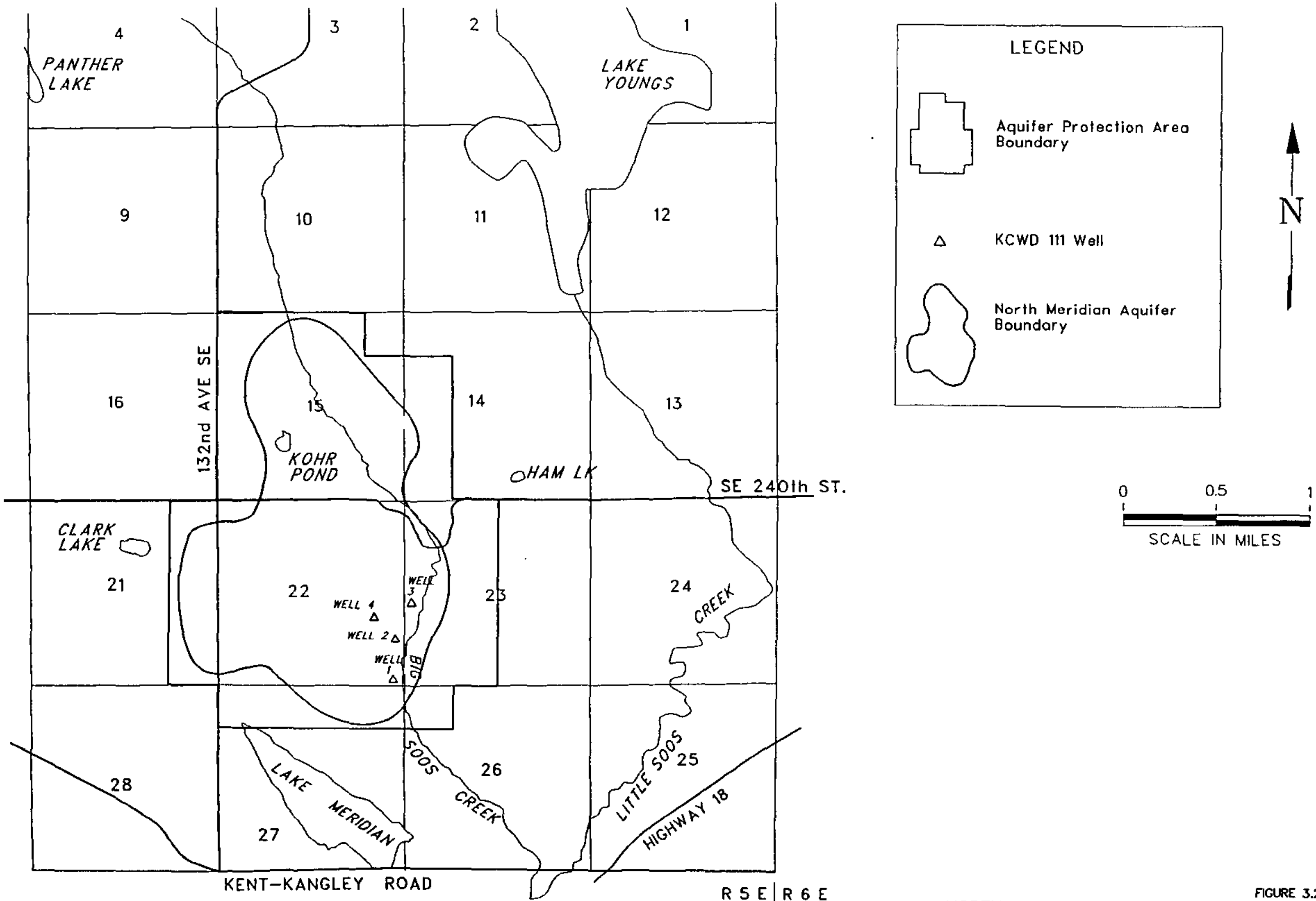


FIGURE 3.23

NORTH MERIDIAN AQUIFER PROTECTION AREA

NORTH MERIDIAN AQUIFER PROTECTION STUDY

ROBINSON & NOBLE, INC.

SEPTEMBER 1995. JOB NO. WHP13

P:\USERS\LN\DRAWINGS\MERIDIAN\FIG_3.23

4. HAZARD INVENTORY

SECTION 4
NORTH MERIDIAN AQUIFER PROTECTION PLAN
HAZARD INVENTORY AND RISK ASSESSMENT

4.1 Contaminant Source Inventory Methodology

4.1.1 Introduction

The inventory of potential contaminant sources within the APA was conducted according to the December 1993 Washington Department of Health guidance document entitled "Inventory of Potential Contaminant Sources in Washington's Wellhead Protection Areas." This section summarizes the basic steps for conducting an inventory, including:

- Review and identification of potential and known contaminant sources
- Data management
- Prioritizing risks to the APA

A summary of potential contaminant sources is provided in Table 4.1. These potential sources were considered when performing the contaminant inventory for the North Meridian Aquifer Protection Area, the Kent WHPA, and the Lake Sawyer WHPA, all of which were evaluated concurrently.

4.1.2 Potential Impacts at the Wellhead Based on Land Use Practices

In order to assess potential impacts to the aquifer due to land use, historical and current land uses within the study area were reviewed. Historical land uses were evaluated by review of historical aerial photographs from 1965, 1970, 1974, 1981, and 1988, and historical maps dating back to the late 1960's and revised to the early 1990's. To understand current land use within the study area, a land use map was compiled based on current zoning (Figure 4.1). Section 4.2 summarizes findings of potential contaminants based on land use practices.

4.1.3 Known Soil and Ground Water Contaminant Sites

In order to identify sites of known soil and ground water contamination, databases from EPA and the Washington State Department of Ecology were reviewed. The databases included:

- Model Toxics Control Act (MTCA) Confirmed & Suspected Contaminated Sites list
- Underground Storage Tanks (UST) report
- Leaking Underground Storage Tanks (LUST) list
- Solid Waste Facility List (SWFL)
- Comprehensive Environmental Response Compensation & Liability Act list (CERCLA)

Table 4.1 - Potential Contaminant Sources Listed by Type

Category I

Sources Designed to Discharge Substances

Subsurface Percolation (e.g. septic tanks and cess-pools)
Injection Wells
- Hazardous waste
- Non-hazardous waste (e.g. brine disposal and drainage)
- Non-waste (e.g. enhanced recovery, artificial recharge solution mining, and *in situ* mining)

Land Application
- Wastewater (e.g. spray irrigation)
- Wastewater byproducts (e.g. sludge)
- Hazardous waster
- Non-hazardous waste

Category II

Sources Designed to Store, Treat, and/or Dispose of Substances; Discharge through Unplanned Release

Landfills
- Industrial hazardous waste
- Industrial non-hazardous waste
- Municipal sanitary

Open Dumps, Including Illegal Dumping (Waste)
Residential (or Local) Disposal (Waste)
Surface Impoundments
- Hazardous waste
- Non-hazardous waste

Waste Tailings
Waste Piles
- Hazardous waste
- Non-hazardous waste

Materials Stockpiles (Non-waste)
Graveyards
Animal Burial
Above-ground Storage Tanks
- Hazardous waste
- Non-hazardous waste
- Non-waste

Underground Storage Tanks
- Hazardous waste
- Non-hazardous waste
- Non-waste

Containers
- Hazardous waste
- Non-hazardous waste
- Non-waste

Open Burning Sites
Detonation Sites
Radioactive Disposal Sites

Category III

Sources Designed to Retain Substances during Transport or Transmission

Pipelines
- Hazardous waste
- Non-hazardous waste
- Non-waste

Materials Transport and Transfer Operations
- Hazardous waste
- Non-hazardous waste
- Non-waste

Category IV

Sources Discharging Substances as a Consequence of Other Planned Activities

Irrigation Practices (e.g. return flow)
Pesticide Applications
Fertilizer Applications
Animal Feeding Operations
De-Icing Salt Applications
Urban Runoff
Percolation of Atmospheric Pollutants
Mining and Mine Drainage
- Surface mine-related
- Underground mine-related

Category V

Sources Providing Conduit or Inducing Discharge through Altered Flow Patterns

Production Wells
- Oil (and gas) wells
- Geothermal and heat recovery wells
- Water supply wells

Other Wells (non-waste)
- Monitoring wells
- Exploration wells

Construction Excavation

Category VI

Naturally Occurring Sources whose Discharge is Created and/or Exacerbated by Human Activity

Ground Water - Surface Water Interactions
Natural Leaching
Saltwater Intrusion/Brackish Water
- Upconing (or intrusion of other poor-quality natural water)

- Toxics Release Inventory System list (TRIS)
- Resource Conservation and Recovery Act list (RCRA)

Section 4.3 summarizes our findings of known sites of contamination based on the regulatory database review.

4.1.4 Field Survey

In order to best identify potential contaminant sources, a field survey was completed of the APA and its surrounding area. The initial step in completing the field survey was determining the study area in which the survey was to be conducted. The first step in defining the study area included the identification of the area for which the aquifer receives its primary recharge. Early in the project, the boundaries of the area which are believed to provide the most impact to aquifer recharge were estimated. Upon identifying this primary recharge boundary, the field survey area boundary was amended so that the final survey area would follow quarter section lines and streets. This amendment of the study area was completed so that the final area boundary followed straight lines which completely encompassed the primary area of interest. The amendment was done in order to facilitate and streamline data collection for the properties within the study area. The final study area boundary for the field survey, and its relationship to the aquifer and APA boundaries, are shown on Figure 4.2.

Method of Source Contaminant Determination and Data Collection: The District initially evaluated recommended alternative methods of data collection, identification of land use, and identification of risk. Several unique characteristics of the study area were considered in the method evaluation. These factors included the size of the study area, current land use, existing density, and likely future density of the study area.

Another major aspect considered in this process was the District's interest in developing and maintaining a database of the District's service area. Approximately 60 percent of the study area is located within the District's corporate boundary. The District had also recently completed a conversion to electronic-based mapping for District facilities. This mapping included a parcel level detail of the current corporate and future service areas. These factors allowed the District to complete a detailed and comprehensive land use risk assessment and develop a database which will be able to be maintained to reflect changes in land use.

The methodology for data collection can best be understood by recognizing that the final repository of information was intended to be in a database which provided a graphic link to the District's base map. Each piece of property within the study area is a unique entity within the database, for which a multitude of data was collected by various means. Any attribute, or combination thereof, for each piece of property can be retrieved and represented graphically on the District's base map.

Upon completion of the CAD-based District map, the study area was encompassed with a polygon representing the final study area. The parcels within this polygon were then directly linked to the database which would ultimately become the repository for all data collected and managed during the inventory. This direct graphical link eliminated the need for manual data entry which normally is required to build a database. The study area is comprised of 2,380 individual parcels of property with over 7,400 acres of area. The development of a database with this extensive number of parcels would not have been economically feasible without the graphic link between the base map and database.

Essentially, each piece of property within the database utilizes its King County property tax account number as its unique identifier. This unique identifier is also a portion of the electronic data which comprises the District's base map. The District then compiled all available public information on each of the properties within the study area. This information included:

- site address to be used in field reconnaissance
- list of existing improvements on the site with valuation in order to determine if the site was occupied or vacant
- current owner with their phone number and mailing address in order to determine whether the site was owner or tenant occupied
- zoning code
- neighborhood code
- census block and tract
- Thomas Guide map reference
- King County plat information
- water and sewer service in order to determine whether the site was on public or private water and public sewer or septic

The District then conducted a parcel-by-parcel field reconnaissance of the entire study area. The intent of the field visit was to confirm suspected contaminants and identify the presence of possible contaminants within the study area. The field reconnaissance was conducted by District personnel under the direction of the District Engineer. District staff were utilized for this portion of the study in order to minimize the cost of the data collection. District staff attempted to visit each parcel within the study area on a drive-by and visual observation basis. District personnel did not enter the property, nor attempt to cross barriers which would have violated privacy and security of property occupants. Parcels that could not be viewed from public streets were not examined due to liability concerns. Additionally, random checking of the field data was completed.

Each property was assigned the appropriate hazard code (Table 4.2), followed by the observer's initials, and the date of visit. Discrepancies in the previously recorded data and actual field conditions were also noted at the time. This information was then entered into the database and conflicts between data and field conditions resolved.

Table 4.2 - Hazardous Materials Generators and Codes

Large Scale			
UC100	Fleet Vehicles - Onsite Fuel	354	Machine Shop or Works
Moderate Scale			
1	Agriculture, Commercial Gardening	7538	Auto Repair, Auto Parts
41	Transit, Park n Ride	UC901	Hydroseeding Companies
481	Transformers; Radio Towers	UC902	Landscaping
554	Service Stations	UC903	Animals - Anything But Cats & Dogs
UC700	New / Used Car Dealers	UC904	Nurseries
7216	Dry Cleaners		
Small Scale			
1711	Plumbing, HVAC	8071	Medical Clinics
1761	Roofing - Sheet Metal	821	Schools
600	Veterinary Services	950	Misc. Minor Repair Shops
7399	Swimming Pool Cleaning		
Minor Scale			
UC200	Illegal Dumps or Storage Tank	5941	Sports & Hobby Shops
UC300	Cemetery	6513	Apartments / Condos
UC400	Unidentified Above Ground Storage Tank	723	Beauty Shop
UC500	Storm Water Detention Ponds	724	Barber Shop
503	Active Wells	7997	Country Club
591	Pharmacies		

Potential Contaminant Source Classification: Potential contaminant sources were classified initially as either large scale, moderate scale, small scale, or minor scale generators. Potential sources were further broken down according to the appropriate Business Category Code or UC for unclassified sources. The initial list of potential contaminant sources was developed by selecting known or suspect sources from the inventory list found in the Inventory of Potential Contaminant Sources in Washington's Wellhead Protection Areas. Additional sources for potential contamination not found on the WHPA list were added as needed, and are identified by the UC900 series numbers shown in the District's list of known sources. The list of known possible contaminant sources, with the exception of right-of-ways and force sewer mains, is listed in Table 4.2.

Right-of-ways are also not included in the parcel database. The area has multiple Washington State Department of Transportation, King County and Bonneville Power Administration right-of-ways, but currently has no active railroad right-of-ways. Right-of-ways present a general hazard, from accidents and right-of-way maintenance with chemicals (see Section 4.3.1). Specific potential hazards, such as transformers, within right-of-ways are listed in the parcel database, but with the adjacent parcels rather than with the right-of-ways themselves.

4.1.5 Discussion with Aquifer Protection Committee

The contaminant source inventory methodology was reviewed with the Aquifer Protection Review Committee as it was developed. After completion of each phase of the inventory, the results were reviewed by committee members, and their input was solicited and incorporated into the project. In this way, there was local and county input into the inventory process.

4.2 Historic and Current Land Use

Hydrogeologic conditions indicate that the long-term quality of the relatively shallow ground water system is susceptible to contamination by historic and current land use activities throughout the APA. Knowledge of these land use practices is important in order to understand potential concerns related to the release of chemical constituents, such as pesticides, nitrates, or petroleum compounds associated with various land uses. A review of historic aerial photographs and maps indicated the historic land uses were primarily residential. A general review of historic and recent land use activities are described below.

4.2.1 Residential/Commercial/Industrial Land Use

Most of the aquifer area is dominated by residential land use with minor commercial/industrial land development. Map and aerial photo reviews indicate that the majority of residential developments were constructed in the 1970's and 1980's. During the 1960's, several commercial and industrial uses also appeared. These land uses are primarily gasoline stations and retail outlets. Most of these commercial and industrial land uses still exist today. Potential contaminants associated with these types of land use include petroleum hydrocarbons, solvents, and metals. Specific sites which are known or suspected to be contaminated are discussed in Section 4.3.

4.2.2 Current Zoning

Current land use in the APA ranges from rural residential to urban medium density and includes commercial and industrial uses. The APA is situated in a transitional location as King County's proposed Urban Growth Boundary falls in the northeastern portion of the APA (see Figure 4.1). Most of the area falls on the urban side of the boundary; however, significant portions of the eastern and northeastern parts of the APA are on the rural side.

4.3 Identified Contaminant Sources

4.3.1 Field Survey Results

During the field survey, District personnel identified a total of 870 potential hazards, not including right-of-ways. The frequency of occurrences per hazard code is listed on Table 4.3. Most parcels with potential hazards contained a single potential hazard. However, 102 parcels contained multiple potential hazards. These parcels are listed on Table 4.4 Parcels with multiple hazard occurrences tend to be large commercial tracts which contain more than one business. A complete report of the parcels that contain potential contaminant sources is given in Appendix 2.

The largest number of occurrences were for hazard code 481: transformers and radio towers. This category includes existing power, telephone, and cable television pedestals, vaults and transformers. These facilities are not considered to be particularly hazardous, especially if the facilities are not old.[1] Consequently, they were identified and inventoried as part of the field reconnaissance in order to provide for future reference in the event they would need to be considered at a later date. Therefore, Figure 4.2, which shows the location of documented hazard codes, does not reflect the occurrence of hazard code 481.

If hazard code 481 is not considered, the survey identified 289 potential hazards. The majority of these, 99 (34%), are hazard code 903. Hazard code 903 is designated as those properties which support animals for hobby or small businesses, such as horses, cattle, sheep or other agricultural stock. The next greatest occurrence of hazard codes is UC500 storm water detention ponds, with 37 occurrences, followed by hazard code 6513 apartments/condos with 26 occurrences. These hazards are typical of the character of the neighborhoods within the study area. The area is an interface between dense, new construction, single-family and multi-family dwellings, which explains the high number of storm detention ponds, and older rural hobby farms and large tract properties which support animals. Small retail and service centers have been developed to support the recent increase in density in the area. With the exception of small, cottage-type industries, nurseries, or greenhouses, there are no major industry or manufacturing facilities within the study area.

The single occurrence of hazard code 7997 is located at the Meridian Valley Golf and Country Club. Considering the size of the site, and location of the site relative to the aquifer, this site poses a large possible impact to the quality of recharge water. The Meridian Valley Golf and Country Club also has a buried fuel tank on site. The tank is reported to be approximately 1,100 gallons in capacity and equipped with current state of the art leak detection monitoring equipment.

Several large scale buried fuel tanks, belonging to retail gasoline service stations, are also located within the study area. The current holding capacities, condition, and leak detection or monitoring capabilities of these buries tanks have not been researched as part of this report. These facilities are typically reported in the public domain databases listing buried underground fuel tanks that were reviewed as part of this report.

---

[1] Old transformers may contain PCB, a potential contaminant. New transformers do not contain PCBs and are not typically considered hazardous.

Table 4.3 - Number of Hazard Occurrences

Hazard Code	Hazard Description	Number of Occurrences
481	Transformers; Radio Towers	581
903	Animals - Anything But Cats & Dogs	99
500	Storm Water Detention Ponds	37
6513	Apartments / Condos	26
503	Active Wells	18
950	Misc. Minor Repair Shops	14
100	Fleet Vehicles - Onsite Fuel	13
400	Unidentified Above Ground Storage Tank	10
904	Nurseries	8
8071	Medical Clinics	7
7538	Auto Repair, Auto Parts	7
354	Machine Shop or Works	6
7399	Swimming Pool Cleaning	6
7216	Dry Cleaners	4
200	Illegal Dumps or Storage Tank	4
554	Service Stations	4
821	Schools	3
5941	Sports & Hobby Shops	3
591	Pharmacies	3
902	Landscaping	2
300	Cemetery	2
700	New / Used Car Dealers	2
723	Beauty Shop	2
724	Barber Shop	2
901	Hydroseeding Companies	1
1761	Roofing - Sheet Metal	1
1711	Plumbing, HVAC	1
1	Agriculture, Commercial Gardening	1
7997	Country Club	1
600	Veterinary Services	1
41	Transit, Park n Ride	1
Total		870

Table 4.4 - Parcels with Multiple Hazard Occurrences

Parcel Number	Number of Occurrences	Parcel Number	Number of Occurrences	Parcel Number	Number of Occurrences
019350 0070	2	222205 9049	2	272205 9062	3
102205 9145	2	222205 9052	2	272205 9126	2
102205 9180	3	222205 9054	2	272205 9128	2
142205 9006	2	222205 9071	2	272205 9133	2
142205 9030	2	222205 9074	2	272205 9141	2
142205 9035	2	222205 9088	2	272205 9161	2
142205 9036	2	222205 9091	2	272205 9164	2
142205 9038	2	222205 9102	4	272205 9188	2
142205 9072	2	222205 9103	2	272205 9193	3
142205 9097	2	222205 9116	2	272205 9206	2
142205 9148	2	232205 9008	2	272205 9218	3
142205 9164	2	232205 9013	6	272205 9220	2
142205 9169	2	232205 9014	2	282205 9002	2
142205 9174	2	232205 9060	2	282205 9023	2
151590 0280	2	232205 9062	2	282205 9062	10
152205 9008	2	232205 9128	2	282205 9072	3
152205 9021	2	262205 9001	2	282205 9110	3
152205 9034	3	262205 9020	2	282205 9127	2
152205 9044	3	262205 9021	2	282205 9154	2
152205 9060	2	262205 9027	3	282205 9194	2
152205 9119	3	262205 9041	2	282205 9203	4
152205 9144	2	262205 9044	2	372880 0235	2
152205 9149	2	262205 9063	4	405120 0005	2
212205 9001	3	262205 9064	7	405130 0080	2
212205 9016	4	262205 9091	3	405170 0000	2
212205 9018	3	262205 9104	2	546630 0600	2
212205 9063	2	262205 9114	2	546631 0780	2
212205 9064	2	262205 9126	3	546720 0067	2
212205 9132	4	262205 9147	2	546720 0070	2
212205 9154	3	272205 9003	2	546720 0075	2
222205 9001	2	272205 9005	2	546950 3680	4
222205 9010	6	272205 9013	2	858640 0015	2
222205 9018	2	272205 9017	2	858640 0070	2
222205 9043	2	272205 9022	2	895580 0080	3

The Bonneville Power Administration right-of-way bisects the study area, and comprises a large portion of land within the area. While power lines can be considered potentially hazardous because line maintenance often includes herbicide and pesticide use, this is not the case within the study area. Bonneville Power Administration reports that they employ only mechanical vegetation control techniques and do not use herbicides or pesticides of any nature for right-of-way maintenance.

Washington State Department of Transportation and King County right-of-ways also bisect the study area in numerous places. These corridors present potential contamination sources from the extensive volume of traveling vehicles, potential spills from accidents, and chemical roadside maintenance. SR 516, which bounds the study area on the south, has recently been improved to a minimum of four lanes for increased traffic capability. The 132nd Avenue SE, SE 256th Street, and SE 240th Street corridors are each in the process of either being planned, designed or constructed to result in streets which will ultimately carry significantly higher volumes of traffic.

The businesses and residences within the study area are predominately served by public sanitary sewer facilities. The public sewer providers for the study area are City of Kent and Soos Creek Water and Sewer District. The single sewage pump station and pressurized force main within the study area are owned by Soos Creek Water and Sewer District. This site, which is identified as Lift Station No. 10, also has some limited on-site fuel storage for backup emergency generators which are used to operate the station during power outages.

4.3.2 Regulatory Database Search

In addition to the field survey, existing information from various environmental databases were obtained and mapped to help identify sources of ground water contamination. The following databases were reviewed and are discussed in order of descending importance relative to the potential risk to the APA.

Washington State Department of Ecology (Ecology) Confirmed and Suspected Contaminated Sites Report: This report contains a list of sites investigated under the Model Toxics Control Act (MTCA). Sites on this list have been reported to Ecology. Ecology then typically performs a site hazard assessment (SHA) and determines whether further investigation is necessary.

Other sites included on this list may be investigated and cleaned up under Ecology's Independent Remedial Action Program (IRAP). Owners or operators of these sites perform investigations and remedial actions independently of Ecology's review.

The inclusion of sites on these lists indicates that a release of chemical constituents has occurred, or is suspected to have occurred, at the facility. The database provides information on type of contaminants believed to have been released and the types of media which have been impacted. No such sites are located within the APA.

Ecology Leaking Underground Storage Tank (LUST) List: Releases from USTs to the soil and ground water which have been reported to Ecology's Northwest Regional Office (NWRO) are recorded on this list. The status of the investigation and cleanup is also recorded.

Owners and operators of registered USTs are required to report a confirmed release in accordance with WAC 173-360 (Washington State Department of Ecology's Underground Storage Tank Regulations) within twenty-four hours. Under the Model Toxics Control Act Cleanup Regulation, WAC 173-340, even UST owners that are exempt from registering their UST with the State of Washington (e.g., heating oil USTs) are required to report a release from their UST which may pose a threat to human health and the environment. The LUST sites identified in the region are all located to the south and east of the North Meridian APA except for one site at the western edge of the APA, a 7-Eleven at the corner of SE 240th Street and 182nd Avenue SE. At this site, the release was noted in January 1992. The status of the site investigation and cleanup is listed as "in-progress."

Ecology Underground Storage Tank Registration: This report contains a list of regulated USTs, as defined in WAC 173-360, which are registered with Ecology's NWRO. State UST regulations have been in effect since 1986. New USTs are required to meet all of the leak detection requirements as defined under WAC 173-360 by December 1993. Existing UST systems have until December 1998 to be in compliance with the corrosion protection and spill/overfill prevention requirements as defined in WAC 173-360. Since all newly installed and registered USTs are likely to be in compliance with the leak detection requirements, leaks from them should be detected in time and corrective action can be taken immediately. Five sites within the APA are included on this list. They are identified on Figure 4.2 and listed on Table 4.5.

Table 4.5 - Registered Underground Storage Tanks within the North Meridian APA

Site	Address	Tank Status	Substances
Station 72	25620 - 140th Avenue S.E.	Removed	---
		Removed	Unleaded Gas
Lift Station #10	14321 S.E. 255th Place	Removed	---
		Operational	---
7-Eleven Store 2303-20188	13131 S.E. 240th Street	Operational	Leaded Gas
		Operational	Unleaded Gas
		Operational	Unleaded Gas
BP Store #11058	13122 S.E. 240th Street	Operational	Leaded Gas
		Operational	Unleaded Gas
		Operational	Unleaded Gas
Meridian Co. 070435	14422 S.E. 260th Street	Removed	---
		Operational	---

Exempt USTs (e.g., home heating oil USTs), as defined in WAC 173-360, are not typically included on this list. Because of these exemptions, the list may or may not represent the complete risk of environmental contamination from USTs.

Ecology Solid Waste Facility List (SWFL): This list contains a summary of information pertaining to solid waste landfills permitted by the Seattle-King County Health Department. No municipal landfills are present within the APA.

EPA Region 10, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): This list contains sites reviewed by EPA under the Comprehensive Environmental Response, Compensation, and Liability Act. No such sites are listed in the APA.

EPA Region 10, Toxics Release Inventory System (TRIS) List: This list contains an inventory of toxic chemical emissions from certain facilities. The Emergency Planning and Community Right-to-Know Act (EPCRA or SARA Title III) requires facilities that release chemicals above threshold amounts to report to EPA the annual amount released. Releases include emissions to air, water, and soil. No facilities within the APA are on the TRIS list.

EPA Region 10, Resource Conservation and Recovery Act (RCRA) Notifiers List: This list contains information on generators, transporters, and disposers of hazardous wastes. The inclusion of facilities on the RCRA list indicates there is a potential risk for spills or mishandling materials at these facilities. Three facilities in the APA were identified on the RCRA list. One is a golf course. The other two facilities are identified as small quantity generators. These facilities generate between 220 and 2,200 pounds of hazardous waste per month. The location of these sites is illustrated on Figure 4.2 listed on Table 4.6.

Table 4.6 - RCRA Notifiers within the North Meridian APA

Facility	Address	Comments
BP Oil Site 11058	13122 S.E. 240th, Kent, WA 98031	Small quantity generator
US West Communications	14422 S.E. 260th, Kent, WA 98042	Small quantity generator
Meridian Valley Country Club	24830-136th Avenue S.E., Kent, WA 98042	

4.4 Potential Ground Water Quality Concerns

The relatively shallow depth to ground water and the coarse-grained deposits identified at ground surface within a portion of the study area produce relatively susceptible conditions for ground water contamination. The following discussion briefly summarizes the potential ground water quality concerns associated with the land uses and sites of known contamination within the APA.

4.4.1 Nitrates in Ground Water

There are multiple potential sources of nitrates which could be released to ground water in the APA. These potential sources include septic systems, livestock operations, and fertilizer applications to lawns and golf courses. These potential sources are discussed briefly below.

Septic systems are used in areas which are not served by sewers. Wastewater released from septic systems contains bacteria, nutrients, and may contain household chemicals. However, the principal concern from properly maintained and used septic systems is the impact of nitrogen, which is converted and transported in the environment as nitrate in the ground water system. Nitrate is the primary constituent of concern because of its relatively high mobility in ground water systems and its potential harmful health effects to humans at high concentration levels. Regional studies have shown that ground water quality impacts from septic systems used in residential developments vary widely based on hydrogeologic setting, housing density, and system ages, types, and maintenance.

At a variety of locations in Washington, elevated concentrations of nitrates originating from golf courses have been identified. Nitrate concentrations above the federal drinking water standard (of 10 mg/L) have been reported in ground water collected near many principal golf course fertilization sites, such as putting greens. Currently, there is one golf course within the APA. At the present time, we are not aware of elevated nitrate originating from this golf course.

Agriculture land use practices can result in the release of nitrates into the ground water system. However, properly designed and operated livestock facilities can mitigate the potential for nitrate releases by implementing best management practices defined by the U.S. Soil Conservation Service. Poorly managed facilities can release nitrates via surficial runoff and infiltration to the underlying ground water system. Within the APA, agricultural practices are limited primarily to small-scale operations and do not occupy large, identifiable blocks of land.

The presence of multiple sources of nitrate in the aquifer protection area results in the potential for additive nitrate loadings to the ground water system, which may lead to a progressive decline in water quality. To date, nitrates have not been a detectable problem in the samples collected from water supply sources.

4.4.2 Pesticide Application

Pesticides are typically used in residential areas, along transportation corridors, at electrical substations and at golf courses. The term "pesticide" is used here to describe a suite of related products which include insecticides, herbicides, and fungicides. Available pesticides include 19 varieties which are restricted to permitted use (by the Washington State Department of Agriculture) and a wide variety of unpermitted, commercially available products. When applied in accordance with manufacturer specifications, pesticides are relatively immobile because they are consumed by the pests or become adsorbed to soil. Most of the products are toxic to humans and animals in small quantities, with specific risk-based toxicity data available for active ingredients in the commonly used products.

Herbicides are used on transportation corridors. State and County transportation departments are responsible for maintaining roads within the APA. Herbicides are used mainly to keep highway shoulders free from plant growth. Oust, Escort, Round-Up, Diuron, and Garlon 3A, are used on the gravel along the shoulders. They are applied at rates between 4 ounces per acre to 5.7 pounds per acre, depending on the herbicide. They are applied annually, or more frequently if needed.

Pesticides are also used by homeowners. They are used to kill garden and lawn pests, destroy weeds, kill tree stumps, eliminate fungus, and treat plant diseases. Homeowners are able to purchase only chemicals which have been approved for retail sale. Instructions are included on container labels, but there are no further restrictions provided the chemicals are used as intended.

The presence of multiple sources of pesticides in the aquifer protection area results in the potential for additive loadings to the ground water system, which may lead to a possible progressive decline in water quality. To date, pesticides have not been a detectable problem in the samples collected from water supply sources.

4.4.3 Petroleum Hydrocarbons

There are numerous potential sources for petroleum hydrocarbons within the APA. These include gasoline stations, industrial and commercial operations which fuel and maintain equipment and vehicles, and home and commercial heating oil tanks. Petroleum hydrocarbons are typically stored in USTs in volumes ranging from 300 gallons (residential use) to up to 10,000 gallons per tank (gasoline stations). Larger storage volume requirements, greater than 10,000 gallons, are typically stored above ground.

Petroleum hydrocarbons are not highly soluble in water. Their solubility is related to the length of the hydrocarbon chains which comprise the material. Short chain hydrocarbons, the types which are found in gasoline, are typically more soluble than longer chain hydrocarbons, which are found in diesel fuel and heating oil. Because these materials are not highly soluble, they are typically not found to migrate very far from the source of a spill. Petroleum hydrocarbon releases may be a greater threat at sites where other types of solvent have been spilled. These materials can sometimes act as co-solvents and increase the solubility of petroleum product and, therefore, increase the likelihood of transport of the petroleum hydrocarbons to the aquifer.

4.4.4 Metals

Ground water contamination from metals is a potential threat at commercial and industrial sites which handle or use materials with significant metallic constituents (paints, waste oil, etc.) and historical pesticide use areas (historical pesticides were typically metal based compounds). Metals can also occur in urban/suburban runoff, largely from parking lots. Metals are not highly soluble in water. Their solubility is generally related to pH and oxidation-reduction potential (Eh) in the aquifer. Naturally occurring metals can be solubilized in an aquifer near mining sites because changes in the Eh/pH relationships can sometimes be induced in the mining area. High concentrations of metals typically do not migrate far from their source areas because of their low solubility, tendency to adsorb to clay particles or organic matter, tendency to precipitate (depending of Eh/pH relationships), and/or tendency to substitute for other minerals in the aquifer.

4.4.5 Corrosive Materials

Corrosive materials (acidic and basic compounds) may be present in some products used, or contained in waste materials generated from, industrial sites within the APA. Corrosive materials can change the pH of shallow ground water and induce corrosion problems in structures which are in contact with the ground water (foundations, pipelines, etc.). Changing pH of ground water could result in mobilizing and or immobilizing other constituents, like metals, as described above. Extreme changes in pH may make ground water unsuitable for human consumption or for use in industrial processes. However, the buffering capacity of native soils and rock may minimize migration of corrosive ground water.

4.4.6 Risk Concern Land Uses

As can be seen from the preceding discussion, several types of land uses present possible ground water quality concerns within the APA. The land uses of concern within the APA can generally be grouped into four categories: residential development (medium density, residential development (rural density), transportation corridors, and industrial/commercial sites. Agricultural land uses also present risk concern. However, agricultural activities in the APA are mostly limited to hobby farming. Consequently, agricultural practices can be grouped with rural residential development. The types of concerns associated with each land use category are summarized on Table 4.7.

Table 4.7: Land Use Risk Concerns

Land Use Category	Nitrates	Pesticides	Petroleum Hydrocarbons	Metals	Corrosive Materials
Residential (medium)	yes	yes	yes	limited	no
Residential (rural)	yes	yes	yes	no	no
Transportation	no	yes	yes	limited	limited
Industrial/Commercial	yes	yes	yes	yes	yes

4.4.7 Potential Pathways for Ground Water Contamination

For aquifer protection planning, it is important to understand the potential sources and types of contamination to the APA. However, potential pathways for contaminant migration are also important to understand because these contaminant pathways can increase the vulnerability of an aquifer by decreasing travel time from a source. The following section briefly discusses the main mechanisms for transport of contaminants to the subsurface.

Discharge onto the Ground Surface: One of the main mechanisms for discharge of contaminants to an aquifer is discharge at the ground surface. Direct discharge to the ground surface occurs when products or waste materials are spilled or placed onto the ground. With the help of rainfall infiltration, the materials percolate into the subsurface and, if a sufficient volume of material is released, they eventually reach the water table and migrate in the aquifer in the downgradient direction. Discharge to the ground surface occurs, for example, when materials or chemicals are accidently or intentionally released from their containers, when waste materials are placed into a landfill, when waste waters are stored in ponds, and when chemicals, such as pesticides and fertilizers, are applied to the ground.

Direct Discharge to the Subsurface: Discharge into the subsurface is another important mechanism for transport of materials to the aquifer. Discharge into the subsurface occurs from septic systems and dry wells. It is a more direct mechanism for contaminant transport than discharge onto the ground because contaminants are discharged closer to the water table and because subsurface discharge bypasses the upper layers of soil which have the ability to absorb and disperse many types of contaminants.

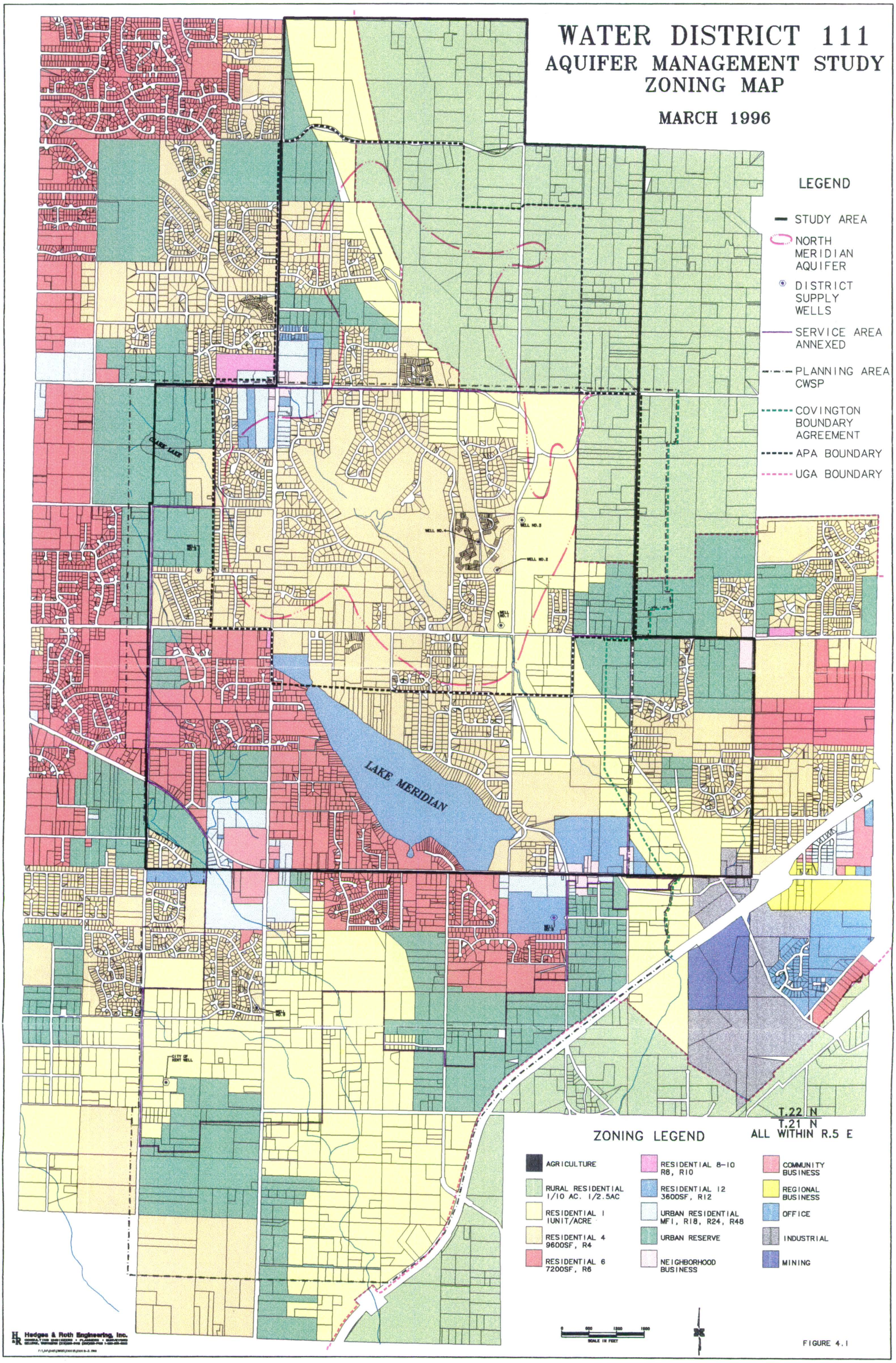
Abandoned Wells: Ground water monitoring wells and water production wells consist of a hole drilled into the ground into which metal or plastic pipe is inserted. The pipe is perforated or screened at the interval, or intervals, where ground water will be extracted. Sand or gravel is sometimes placed in the space between the borehole and the perforated (screened) area of the pipe. For wells constructed since 1971, the area between the upper portion of the borehole (to a minimum depth of 18 feet) and the pipe have been required to be filled with concrete, cement, or bentonite. Wells which are permanently no longer in use are required to be decommissioned and abandoned by pressure injection of cement or overdrilling and removal of the well pipe followed by pressure filling with cement. Proper well abandonment has been required since 1988.

Washington State has standards for construction and abandonment of wells. These standards are provided in Chapter 173-160 WAC. Water well drillers in the State must be licensed. The requirements for that program are also contained in Chapter 173-162 WAC. Because of these standards, newly constructed or recently decommissioned wells pose little increased risk for contamination of an aquifer. However, old, improperly constructed, or improperly abandoned wells can act as direct conduits for contaminant transport to the aquifer or as conduits between shallow and deeper aquifers. In such wells, transport can occur between the ground surface and aquifer zones because of lack of seals or inadequately constructed seals. Because proper abandonment procedures have only been required since 1988, it is likely that there are improperly abandoned wells in the area.

Storm Water Runoff: Rainfall onto the ground either induces infiltration into the subsurface or induces runoff. The quality of the water which infiltrates or runs off is dependant on the type of land use and the potential presence of contaminants which may be located on the ground surface. Storm water infiltration issues are similar to those discussed above as discharge to the ground surface. Storm water runoff is considered differently because it runs over the surface of the ground, picking up and dissolving potential contaminants, and may eventually discharge these contaminants to ground water via infiltration from ditches or ponds designed to percolate water.

The potential constituents of concern present in infiltrated water or runoff are diverse and reflect the land use activities in the areas of interest. Improved roadways, parking areas, and residential developments can contribute heavy metals and petroleum hydrocarbons which originate primarily from automobiles. Industrial and commercial areas can discharge the same constituents as automobiles in addition to a wide variety of organic pollutants commonly used for certain business practices (e.g., solvents, paints, dry cleaning solutions).

The largest quantities of storm water runoff are anticipated from the developed areas where there is a higher percentage of impervious land surface cover. In these areas, storm water runoff will originate from paved roadways, residential areas, and open spaces where vegetative cover has been removed.


WATER DISTRICT 111
AQUIFER MANAGEMENT STUDY
ZONING MAP
MARCH 1996
LEGEND
STUDY AREA
NORTH MERIDIAN AQUIFER
DISTRICT SUPPLY WELLS
SERVICE AREA ANNEXED
PLANNING AREA CWSP
COVINGTON BOUNDARY AGREEMENT
APA BOUNDARY
UGA BOUNDARY
LAKE MERIDIAN
CLARK LAKE
WELL NO.3
WELL NO.4
WELL NO.2
CITY OF KENT WELL
T.22 N
T.21 N
ALL WITHIN R.5 E
ZONING LEGEND
AGRICULTURE
RURAL RESIDENTIAL 1/10 AC. 1/2.5AC
RESIDENTIAL 1 1UNIT/ACRE
RESIDENTIAL 4 9600SF, R4
RESIDENTIAL 6 7200SF, R6
RESIDENTIAL 8-10 R8, R10
RESIDENTIAL 12 3600SF, R12
URBAN RESIDENTIAL MF1, R18, R24, R48
URBAN RESERVE
NEIGHBORHOOD BUSINESS
COMMUNITY BUSINESS
REGIONAL BUSINESS
OFFICE
INDUSTRIAL
MINING
SCALE IN FEET
Hedges & Roth Engineering, Inc.
FIGURE 4.1

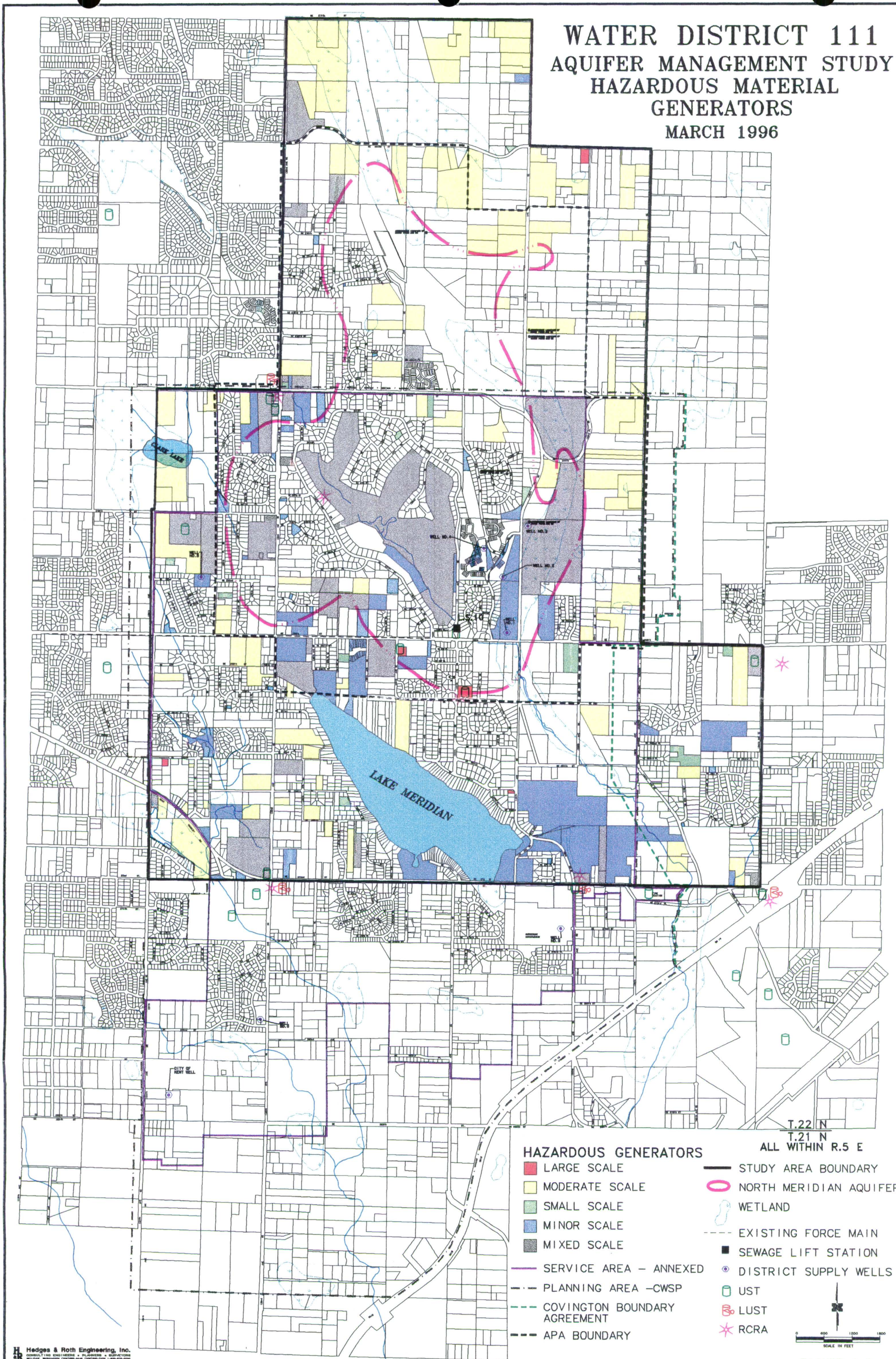

WATER DISTRICT 111
AQUIFER MANAGEMENT STUDY
HAZARDOUS MATERIAL
GENERATORS
MARCH 1996
CLARK LAKE
LAKE MERIDIAN
T.22 N
T.21 N
ALL WITHIN R.5 E
HAZARDOUS GENERATORS
LARGE SCALE
MODERATE SCALE
SMALL SCALE
MINOR SCALE
MIXED SCALE
SERVICE AREA – ANNEXED
PLANNING AREA –CWSP
COVINGTON BOUNDARY AGREEMENT
APA BOUNDARY
STUDY AREA BOUNDARY
NORTH MERIDIAN AQUIFER
WETLAND
EXISTING FORCE MAIN
SEWAGE LIFT STATION
DISTRICT SUPPLY WELLS
UST
LUST
RCRA
SCALE IN FEET
Hedges & Roth Engineering, Inc.
CONSULTING ENGINEERS • PLANNERS • SURVEYORS

FIGURE 4.2

5. MONITORING NETWORK

SECTION 5
NORTH MERIDIAN AQUIFER PROTECTION PLAN
MONITORING NETWORK PLAN

5.1 Introduction

The North Meridian Aquifer (NMA) is one of the main production sources for King County Water District 111 (KCWD 111). Robinson & Noble was asked to develop a monitoring network within the NMA to be used as part of the North Meridian Aquifer Protection Plan. The objectives of this monitoring network are that it be cost effective, use existing wells, and be capable of tracking both long-term water quality and water level changes in the defined area.

A long-term monitoring network using 15 wells has been established. This network will provide the data necessary to protect the integrity of the water quality and quantity within the North Meridian Aquifer. It includes a generalized sampling methodology designed to measure basic water levels and water quality constituents, thereby allowing general trends to be tracked. If a well or group of wells show an increasing water chemistry trend or a concentration of a constituent at or beyond a defined threshold limit, a specific targeted sampling program should then be designed to track the observed anomalous conditions. This targeted sampling will determine causes of the increasing trend as well as determine the implications of the trend relative to the KCWD 111 wells.

The original grant program initially considered developing a monitoring network by drilling two or three dedicated monitor wells within the North Meridian area. In general, dedicated monitoring wells are preferred over non-dedicated wells for long-term monitoring of water levels and water quality. This is because using dedicated wells provides specific benefits that are not available when using non-dedicated wells, including having monitoring points that are specifically designed for acquiring water quality samples and having those points be consistent through time. However, when the cost of constructing a dedicated network was considered, use of existing non-dedicated wells within the North Meridian Aquifer appeared to be more cost-effective. By using existing wells, the resulting monitoring network encompasses a larger area with more wells for less cost. Long-term consistency of sampling has been provided for by acquiring long-term access agreements with well owners.

5.2 Monitoring Network

The first step in the development of the monitoring network was the identification of existing wells within the aquifer system containing the NMA that might be suitable for monitoring. The first data set considered for the network were wells in the database developed for Robinson & Noble's hydrogeologic study on the North Meridian Aquifer (see Section 3). This database includes entries for every well of record within the area for which a quarter-quarter section location, or better, was available. Where practical within targeted areas, additional wells not in the database were identified in the field and located by interviewing area residents. From these two sources, a list of candidate wells was prepared. Initially, many wells were removed from consideration for various reasons. For example, private domestic wells drilled before well records were required do not have sufficient construction records, or piping configurations on some wells do not allow access for water level measurements. Wells known to be completed in the deep aquifer system below the North Meridian Aquifer were removed. Wells outside the targeted area for the network were also not considered.

A field location and inspection program for the candidate wells was performed during May through July 1995. The program involved visiting candidate wells identified as possibly being completed in the target aquifer system. Information collected during the inspection program included verifying the proper name of the well owners, obtaining permission from the owners to collect data, establishing accurate definition of well locations, and determining accessibility and well construction details. This field effort utilized USGS quadrangle maps, supplemented by 1989 air photos obtained from Washington Department of Natural Resources (DNR), to aid in well location. Wells for which accurate locations could not be determined or for which preliminary access by the owners was denied were removed from consideration.

Wells for which preliminary access was provided by the owners were further evaluated to determine if they qualified as monitoring points. The qualifications for use as a monitoring well included site accessibility, ease of measurement, and the suitability of the site for monitoring. The suitability of the sites was dependent on the well location relative to other wells in the network, the hydrostratigraphic unit in which the well was completed, and well construction and design characteristics. Owners of qualifying candidate wells were asked if they were willing to participate in the monitoring network. Formal access agreements with KCWD 111 were negotiated and signed by eleven participating well owners. These wells, plus the four KCWD 111 wells in the area, form the monitoring network.

Network wells were re-visited to determine monitoring procedures specific to each well. Information provided by well owners regarding well use and history was also noted. Monitoring procedures specific to each well are documented in a network monitoring manual. The manual includes descriptions, specific to individual wells, of physical procedures and problems in measuring water levels or in obtaining water quality samples.

5.2.1 Network Description

The North Meridian monitoring network consists of fifteen monitoring wells. The locations of the monitoring wells are shown on Figure 5.1. A list of the monitoring wells, well owners, locations, elevations, well depths, initial static water levels (as of July 1995), and the aquifers in which the wells are completed are presented in Table 5.1. Three are shallow wells (<55 feet deep) that are completed in perched aquifers (Anders, Edwards, and Thorsett). Twelve wells are completed in the aquifer system containing the North Meridian Aquifer, seven within the aquifer boundary and five outside the boundary. The wells in the NMA system range in depth from 54 to 170 feet. Well locations are spread out over the study area to give better coverage. Monitoring wells were unable to be established in some areas where network coverage was desired, including Section 10 and the area surrounding the common section corner of Sections 14, 15, 22, and 23. Monitoring wells were

Table 5.1. List of wells in the North Meridian Aquifer Monitoring Network (as of July 1995)

Owner	Well Name	Location	Elevation (feet, MSL)	Depth (feet)	SWL (feet, bls)	Hydrostratigraphic Unit
KCWD 111	Well 1	22N/05E-22R	340	54	35.1	North Meridian Aquifer System (inside NMA)
KCWD 111	Well 2	22N/05E-22J	335	62	6.2	North Meridian Aquifer System (inside NMA)
KCWD 111	Well 3	22N/05E-23M	350	84	15.3	North Meridian Aquifer System (inside NMA)
KCWD 111	Well 4	22N/05E-22J	430	159	86.1	North Meridian Aquifer System (inside NMA)
Meridian Valley Golf & Country Club	Well 3	22N/05E-22E	375	137	0	North Meridian Aquifer System (inside NMA)
Meridian Valley Golf & Country Club	Well 4	22N/05E-22E	450	170		North Meridian Aquifer System (inside NMA)
Anders	Private	22N/05E-14Q	490	32	3.98	Perched Aquifer
Benson	Private	22N/05E-15H	450	109	49.11	North Meridian Aquifer System (inside NMA)
Dewater	Private	22N/05E-15M	470	140	89.36	North Meridian Aquifer System (outside NMA)
Edwards	Private	22N/05E-28C	435	35	8.7	Perched Aquifer
Flannery	Private	22N/05E-26D	370	60	16.8	North Meridian Aquifer System (outside NMA)
Meehan	Private	22N/05E-27C	426	80	4.4	North Meridian Aquifer System (outside NMA)
Meyers	Private	22N/05E-14C	570	136		North Meridian Aquifer System (outside NMA)
Thorsett	Private	22N/05E-15D	535	53	17.1	Perched Aquifer
Thorsett	Private	22N/05E-15D	530	145	24.3	North Meridian Aquifer System (outside NMA)

not established in these areas because, at the present time, well owners have not been able to be reached or are unwilling to participate in the network.

5.3 Monitoring Plan

Implementation of the monitoring network will involve establishing a program of systematic data collection. It is important to collect data on a regularly scheduled basis in order to provide a consistent time-line for the data. Furthermore, a regularly scheduled data collection program is the easiest type of program to manage, and a consistent data time-line will assist in trend analysis of water quality constituents and water level data. The recommended data collection program consists of static water level measurements and two water quality sampling and analysis schedules that have been designed specifically for the potential contaminant properties, source characteristics, and hydrogeologic framework of the North Meridian Aquifer. A list of recommended chemical constituents for which concentrations should be determined of water samples is presented on Table 5.2. The total annual cost of sampling, detailed on Table 5.3, is projected to be under $3,000.

Table 5.2 - Water Quality Data Needed from the Monitoring Network

Chemical Constituent	MCL[1]	Units	Chemical Constituent	MCL[1]	Units
Basic Water Quality			Fluoride	2.0	mg/l
Bacteriological Analysis	0	per 100 mls	Iron	0.3	mg/l
Chloride	250	mg/l	Lead	0.05	mg/l
Nitrate Nitrogen	10.0	mg/l	Magnesium	---	mg/l
Iron	0.3	mg/l	Manganese	0.05	mg/l
Manganese	0.05	mg/l	Mercury	---	mg/l
Specific Conductivity	700	micromhos/cm	Nickel	0.1	mg/l
Turbidity	1.0	NTU	Nitrate Nitrogen	10.0	mg/l
			Nitrite Nitrogen	1.0	mg/l
Expanded Water Quality			Potassium	---	mg/l
Antimony	0.006	mg/l	Selenium	0.05	mg/l
Arsenic	0.05	mg/l	Silica	---	mg/l
Barium	2.0	mg/l	Silver	0.1	mg/l
Beryllium	0.004	mg/l	Sodium	---	mg/l
Bicarbonate	---	mg/l	Specific Conductivity	700	micromhos/cm
Cadmium	0.005	mg/l	pH	---	pH units
Calcium	---	mg/l	Sulfate	250	mg/l
Carbonate	---	mg/l	Thallium	0.002	mg/l
Chloride	250	mg/l	Total Dissolved Solids	500	mg/l
Chromium	0.1	mg/l	Total Hardness	---	mg/l
Color	15.0	Color units	Total Organic Carbon	1.0	mg/l
Copper	1.0	mg/l	Turbidity	1.0	NTU
Cyanide	0.2	mg/l	Zinc	5.0	mg/l

[1] Maximum Concentration Level established by the Environmental Protection Agency

Table 5.3 - Laboratory Analytical Costs

Chemical Analysis	Number of Sites	Frequency per Year	Unit Cost	Network Cost[1]
Basic Monitoring				
Bacteriological Analysis	15	1	$19.00	$285.00
Specific Conductivity	15	1	$14.00	$210.00
Chloride	15	1	$18.00	$270.00
Nitrate	15	1	$18.00	$270.00
Iron	15	1	$14.00	$210.00
Manganese	15	1	$14.00	$210.00
Turbidity	15	1	$14.00	$210.00
Total Cost of Basic Monitoring				$1665.00
Expanded Monitoring				
Complete Inorganic	3	1	$356.00	$1,068.00
Total Organic Carbon Scan	3	1	$42.00	$126.00
Total Cost of Expanded Monitoring				$1,194.00
Total Cost of Monitoring				**$2,859.00**

[1] Prices obtained from Water Management Laboratories

Twice a year, KCWD 111 should compile all the data collected in the monitoring network, prepare a summary of the data, and distribute it to the monitoring network participants. At the end of three years of data collection, all data should be reviewed to determine if any changes or modifications in the network or in sampling procedures are needed. For example, the frequency of sampling may need to be revised, or KCWD 111 may want to add new monitoring stations to the network to improve the overall data collection program.

5.3.1 Water Level Monitoring

Water level data in all of the monitoring wells should be collected once a month for three years in order to get a good baseline definition. After three years, the sampling frequency can be reconsidered. At that time, quarterly observations will likely be sufficient to show seasonal trends in water levels. All water level measurements will be converted to water level elevations to provide a consistent datum.

5.3.2 Basic Water Quality Monitoring

The monitoring plan provides for two levels of water quality monitoring: basic and expanded. The basic level of analysis should monitor key constituents to provide a basic statistical description of background water quality trends within the aquifer protection area. The water quality constituents chosen to be included in the basic monitoring were picked using information gained from the hazard inventory. Constituents to be monitored are chloride, nitrate, iron, manganese, specific conductivity, turbidity, and total coliform. Samples are to be taken annually in December from all points in the network.

According to the findings of the hazard inventory and information collected while interviewing owners of network candidate wells, the highest risks to water quality in the NMA are from septic systems and domestic livestock located in the moderate- to low-density residential portions of the area. This makes sampling for nitrate and chloride particularly important because these compounds are the major constituents that have been associated with contamination due to septic systems and livestock. December was chosen for the annual sampling time because annual peak concentrations for nitrate typically coincide with the fall-winter recharge periods. In the event that nitrate concentrations show an increasing trend and/or a concentration greater that 2.5 mg/l, or chloride concentrations show an increasing trend greater than 10 mg/l, KCWD 111 should design a targeted sampling program to provide explanations of the observed anomaly.

5.3.3 Expanded Water Quality Monitoring

The expanded level of analysis should also be completed annually, but for fewer sampling points. Chemical analyses for expanded monitoring should include a complete inorganic chemical analysis and a total organic carbon (TOC) scan. These analyses will provide a detailed description of ground water quality that the basic level of monitoring cannot. Because the concentrations of constituents in the complete inorganic group are stable in unpolluted ground water, the annual frequency of sampling for these constituents should be sufficient to detect trends and anomalies. Since the ground water quality is already known in the KCWD 111 wells and not in the neighboring wells, the expanded monitoring consists of a three-year program sampling different wells each year at varying distances from the KCWD 111 wells. Table 5.4 shows the water quality sampling schedule over the first three years. The first three wells to be sampled are located the farthest from the KCWD 111 wells. The three wells to be sampled the following year are located closer to KCWD 111 wells, and the last two (a third well to be sampled has yet to be chosen) to sampled are located close to the KCWD 111 wells. In the event that TOC scans show an increasing trend and/or a concentration beyond a limit value (yet to be set), KCWD 111 should collect further samples and test for volatile organic compounds (VOCs) and/or synthetic organic compounds (SOCs).

Table 5.4 - Expanded Sampling Schedule for Monitoring Network from 1995 to 1997

Sample Year	Well
December (1995)	Meyers Thorsett Edwards
December (1996)	Anders Benson Dewater
December (1997)	Flannery Meehan Third well to be determined

5.3.4 Field Parameter Monitoring

In addition to the basic and expanded levels of water quality monitoring, field values of temperature, specific conductivity, and pH should be measured at the time of each monitoring event. These parameters can be measured with a small portable meter. These field parameters are important because the concentrations of some constituents are temperature and pH-dependent, and seasonal variations in field parameters may be indicative of variations in other constituents. The field parameters are likely to exhibit seasonal changes. Therefore, it is recommended that these parameters be determined with each water level measurement and each water quality sample collected.

5.4 Summary and Conclusions

The main goal of this portion of the project was to establish a cost-effective monitoring network for the North Meridian Aquifer Protection Plan. Robinson & Noble conducted a well-cataloguing program and designed a data collection plan. The cataloguing was based upon a well database developed during the hydrogeologic study (Section 3).

The monitoring network was established by identifying suitable wells and locating them in the field. Well owners, who had wells that qualified, were asked to provide periodic access for water level measurements and water quality sampling. The resulting network consists of fifteen monitoring wells. Three of these wells are completed in the perched aquifer system and the rest are completed in the North Meridian Aquifer system.

A systematic data collection program was established for the network. It requires regularly scheduled sampling of water quality and water levels. The program will provide a basic statistical description of background water level and water quality trends. The water quality and monitoring program contains two levels of analysis. The basic level of analysis samples key constituents of the major water quality hazards, septic drainfields and domestic livestock, and is designed to highlight increasing trends and/or concentrations above a triggering threshold. The expanded level of analysis will provide a detailed description of water quality by sampling the complete inorganic chemistry of the water. All the monitoring points will be annually tested at the basic level in December. Selected wells will be tested at the expanded monitoring level once a year for a period of three years. Water temperature, specific conductivity, and pH will also be tested.

The District should consider drilling one or two additional monitoring wells for inclusion in the network. One well should be located around the intersection of Sections 14, 15, 22 and 23, and the second one should be located in Section 10. These wells are recommended to fill key areas of the NMA where agreements with well owners could not be established or no suitable wells were available.

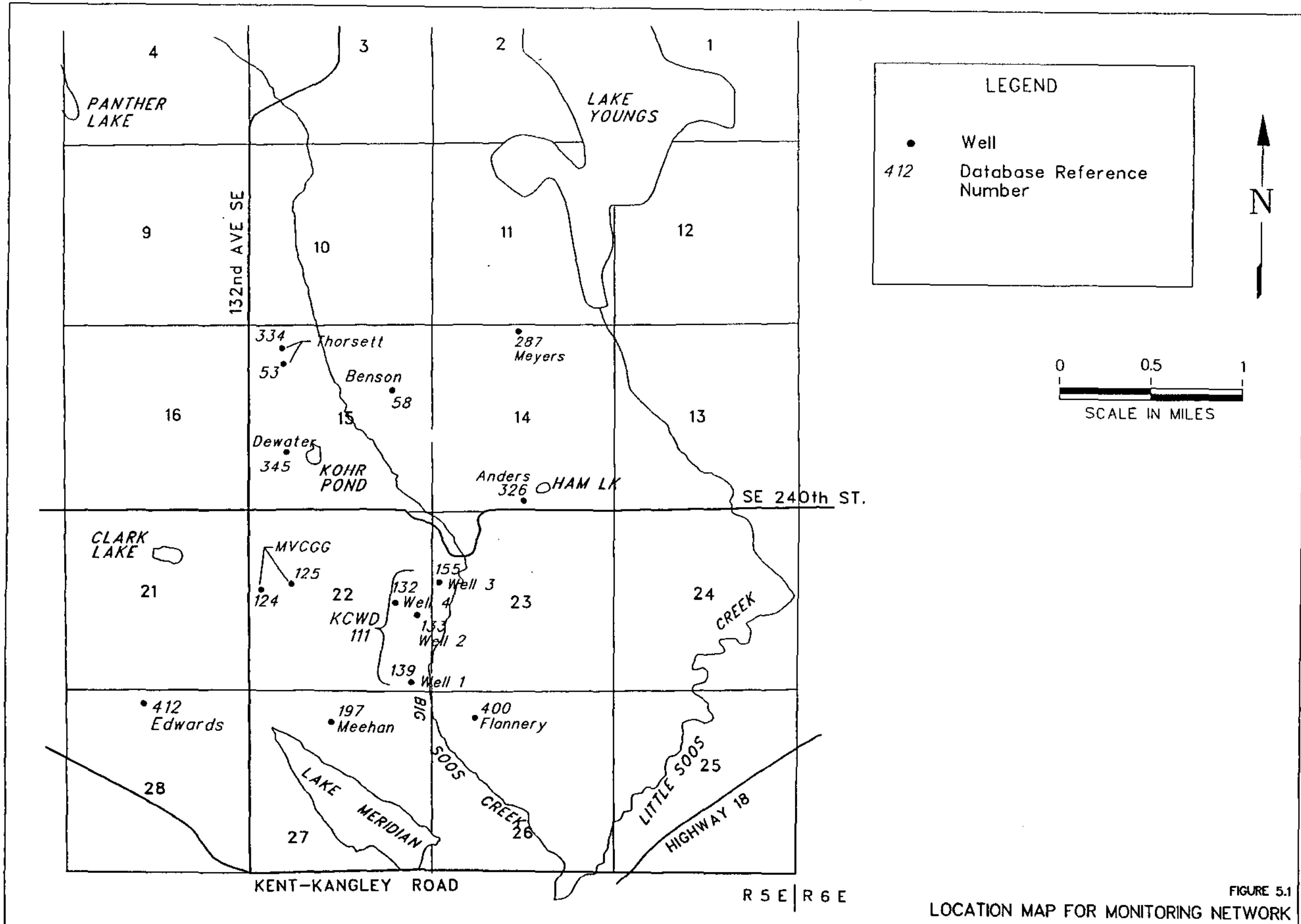


FIGURE 5.1

LOCATION MAP FOR MONITORING NETWORK

NORTH MERIDIAN AQUIFER PROTECTION STUDY

ROBINSON & NOBLE, INC.

SEPTEMBER 1995. JOB NO. WHP13

6. EXISTING PROGRAMS

SECTION 6
NORTH MERIDIAN AQUIFER PROTECTION PLAN
EXISTING REGULATORY PROGRAMS

6.1 Introduction

The hazard inventory and risk assessment (Section 4) identified potential and known sources of contamination in the APA. This section will examine existing regulatory programs designed to mitigate the risk associated with contaminant sources and identify management strategies which will be used to enhance the protection of ground water within the APA.

Federal, state, and local regulatory programs have been in place for many years to help control pollutants from development and human activity. These programs have been implemented, and continue to be implemented, relatively independently of each other. For example, programs for water pollution control have not always been coordinated with those of air pollution control, solid waste control, or hazardous materials management, etc. Nevertheless, these programs constitute the basis for pollution control in general, and provide a framework for developing more integrated approaches.

Aquifer protection programs offer an opportunity to integrate the existing regulatory programs into a more effective environmental protection effort. Specifically, aquifer protection programs have a limited geographic focus, have specific risk reduction priorities, are of considerable local interest, and provide the opportunity for local control. These factors lend themselves to the effective integration and focus of the many existing regulatory programs, with options for enhancement and new program development where the existing programs do not meet local needs.

Under Chapter 173-100 WAC, the South King County Ground Water Advisory Committee is developing the South King County Ground Water Management Plan (SKCGWMP). The draft SKCGWMP (March 1995) contains management strategies designed to address perceived threats to ground water quality and quantity in south King County. Summaries of the SKCGWMP recommendations are discussed here to portray the south King County concerns. It will be important to support and enhance the SKCGWMP as it provides the building block for aquifer protection, particularly since the APA is within the County's jurisdiction for zoning land use and implementations activities.

Finally, based on existing programs and the recommendation of the SKCGWMP, possible enhancements to existing programs and the need for additional site-specific programs were assessed. These additional requirements are presented in the form of aquifer protection management strategies and associated tasks. These strategies are organized according to activity, and are presented in the next section of this report.

6.2 Existing Regulatory Programs

The following section provides a brief discussion of the existing regulatory programs which are in place and are designed to protect ground water from contamination.

6.2.1 Contaminated Site Investigation and Clean-up - CERCLA and MTCA

The Federal "Superfund" legislation of 1980 (Comprehensive Environmental Response, Compensation and Liability Act - CERCLA) was created to assure that the nation's most contaminated sites were cleaned up. The major provisions of CERCLA include:

- Facility owners/operators are required to identify and report sites where hazardous substances were deposited in the past, and are required to report current releases of hazardous substances.
- EPA promulgated regulations which outline the investigation and remedial action processes for identified sites. These regulations are included in the National Contingency Plan (NCP)(40 CFR Part 300).
- EPA is authorized to investigate and inspect sites, and use the information gathered during that process to "rank" sites to determine their priority. Sites that rank highly are placed on the National Priorities List (NPL).
- EPA can use federal dollars to clean up highly ranked contaminated sites, and can sue to recover dollars from the people who are responsible for the contamination, namely, the Potentially Responsible Parties (PRPs).

The APA does not include any sites that were inspected under CERCLA.

Superfund was amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA). SARA provided a 5-year extension of Superfund, with an increased budget. It also added more structure to the program, requiring that EPA meet firm deadlines for site investigation and cleanup, record decisions through the administrative record, and be more proactive at involving the public in the decision-making process.

The State of Washington had over 500 contaminated sites listed by the middle of the 1980's. In response to the need, Washington began a state clean-up effort. This effort was largely funded by general tax revenue and, because of the limited funding, was targeted to only a few sites. The state legislature subsequently responded by providing a "State Superfund" legislation which was followed within two years (1988) by the Model Toxics Control Act (MTCA) - an initiative from the people (Initiative 97).

While the procedural details of these state programs differ somewhat, the thrust has been to make progress on what has become a list of over 900 sites in Washington. The basic differences between the Superfund and MTCA programs are as follows:

- MTCA includes provisions to encourage responsible parties to perform voluntary cleanup of a site.

- MTCA provides specified clean-up standards for hundreds of constituents, including petroleum products in the air, soil, surface water, and ground water.

- MTCA encourages public input into the clean-up process at many points, unlike Superfund, which allows for public participation once a remedy is selected.

No MTCA sites are located in the APA.

6.2.2 Underground Storage Tanks

Underground storage tanks (USTs) typically contain motor fuels or heating oil, but may also contain solvents or other compounds. Old or improperly installed and maintained tanks frequently leak. The most common causes of leaks are structural failure, corrosion, improper fittings, improper installation, and natural phenomena. Soil and ground water can be contaminated by leaks from USTs and associated piping.

Federal regulations (Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks, 40 CFR 290 Part 280) were developed by the EPA under Subtitle "I" of the RCRA to prevent leaks from USTs. The EPA regulations contain requirements for proper underground storage tank design, leak detection, overfill protection, tank inventory monitoring, financial responsibility, leak reporting, remedial action, and removal.

In 1989, the State of Washington enacted legislation creating a comprehensive program for the regulation of USTs and a reinsurance program to assist owners and operators in demonstrating financial assurance under EPA's financial responsibility requirements. The law contained in Chapter 90.76 RCW required Ecology to develop UST rules as stringent as the EPA regulations. These rules are contained in Chapter 173-360 WAC.

The existing Ecology program for USTs is comprehensive. Owners of all tanks covered by the regulations must apply for and obtain an annual permit in order to operate. The regulations and permit requirements include:

- Properly completing an installation checklist filled out by a licensed tank installation supervisor.

- Certification of compliance with corrosion protection for tanks and piping, financial responsibility requirements, and release detection requirements.

- Performance standards for new tanks and that existing tanks upgrade according to a schedule.

- Examination and licensing for firms and persons involved in UST-related activities.

- Allowing authorized representatives of the State access to the premises for inspection of records, to sample, or otherwise monitor operations.

- Revoking permits revoked for non-compliance. It is illegal for suppliers to deliver a product to a tank unless a valid permit is displayed. It is also illegal to deliver to a tank known to be leaking.

Five tanks are registered with Ecology in the APA study area (see Section 4.3.2). It is important to note that the above state and federal UST regulatory programs do not cover all USTs. Notable exceptions are:

- Farm or residential UST systems of 1,100 gallons or less capacity used for storing motor fuel for non-commercial purposes.

- UST systems used for storing heating oil for consumptive use on the premises where stored, except for systems with a capacity of more than 1,100 gallons, which have a reporting requirement.

- USTs with a capacity of 10,000 gallons or less are exempted from environmental review under SEPA.

The first two exceptions noted above, however, are subject to local regulatory authority under Article 79 of the Uniform Fire Code (UFC). Installation of new, and removal of abandoned, home heating oil tanks is regulated by the King County Fire Marshal's Office, local fire districts, and cities under the UFC. The UFC requires that tanks which have been unused longer than a year be properly closed in a manner approved by the appropriate fire official.

Leaking Underground Storage Tanks: Leaking underground storage tanks (LUSTs) are handled by a separate (from the USTs or non-leaking tanks) regulatory approach. Both EPA and Ecology have programs for cleaning up leaking underground storage tanks. For the EPA, this has largely been a funding program to states to implement clean-up programs. For the state Department of Ecology, the program has involved regulation development, reporting requirements, and clean-up standards.

Releases of hazardous substances from underground storage tanks in this state are currently addressed by Ecology through oversight of voluntary clean-up actions by tank owners or through enforcement actions under the MTCA. MTCA created the Toxics Control Account and describes the many possible uses of revenues, one of which is funding for the Ecology LUST Program clean-up activities. In cases where a financially solvent owner/operator cannot be identified or is unwilling to undertake appropriate clean-up actions, Ecology will directly undertake the cleanup of a site under this Act. If a financially solvent, responsible party can be identified, Ecology will seek to recover costs incurred in any clean-up action.

Jurisdiction for LUSTs in King County rests with the Department of Ecology. One LUST was identified in the study area.

6.2.3 On-Site Septic Systems

As described in Section 4, potential contaminants from septic tanks and drainfields include pathogenic organisms, toxic substances, and nitrogen compounds. Regulatory jurisdiction over on-site sewage disposal systems depends on the type of waste and the size of the system. Industrial disposal, as well as large domestic on-site septic systems (14,500 gallons per day or more), is regulated by Ecology. DOH regulates systems with flows between 3,500 and 14,499 gallons per day, while the Seattle-King County Health Department has jurisdiction over smaller systems.

The purpose of the state on-site sewerage regulations (Chapter 248-96 WAC) is twofold:

- Minimize the potential for public exposure to sewage from on-site sewage systems.
- Minimize adverse effects to public health of discharges from on-site sewage systems to ground water and surface water.

Under this regulation, siting, design, construction, repair, and replacement of on-site sewerage are controlled through the use of standards and permits. The goal is to achieve long-term sewage treatment and effluent disposal and to limit the discharge of contaminants to waters of the state. Both industrial and domestic systems must now comply with the state's ground water standards (Chapter 173-200 WAC).

6.2.4 Hazardous Materials/Hazardous Waste

Hazardous Materials Use: Commercial use of chemicals can present significant risk to ground water. While there is always the possibility of a chemical release to the environment when using and handling chemicals, significant releases of liquids frequently occur in one of two ways:

- Accidental releases or spills. Handling materials always presents a risk of spills, but the risk can be reduced by proper handling methods, spill prevention measures, and spill response preparedness.
- Improper disposal. Most waste materials, which are construed to be hazardous, are regulated by EPA and/or the state. For regulated materials, disposal decisions must be documented and reported, and the disposal facility must be licensed.

Hazardous Material Storage: The storage of hazardous materials is regulated under the Superfund Amendments and Re-authorization Act of 1986 (SARA). This law, in addition to providing the extension and changes to CERCLA as described above, contains Title III, provisions for "Community Right to Know" and emergency response.

As required by this law, facilities handling hazardous materials must report quantities which are stored on site. The purpose of these reports is to notify the community (especially emergency response groups and agencies) of the types and amounts of chemicals on hand. "Reportable quantities" vary from chemical to chemical and can go as low as one pound. In addition, facilities must report annually on any releases of these chemicals into the environment. EPA keeps a database of the reported releases, entitled the Toxic Release Inventory. No releases within the APA were identified in this database.

State and local fire regulations also regulate the amount and type of hazardous materials stored at any location. For example, above-ground storage of gasoline is generally prohibited in most counties. Under the Uniform Fire Code (Articles 79 and 80), heating oil tanks which are not in use must be closed, and spill prevention measures need to be taken for storage of materials above ground.

Hazardous Material Transportation - Labeling, Placarding, Shipping Papers: Regulation of the transportation of hazardous materials is provided by the U.S. Department of Transportation (DOT). DOT regulations are focused on three areas: labeling, placarding, and shipping papers (manifests). DOT has very specific requirements for labeling hazardous materials. Vehicles carrying these materials must be placarded with the appropriate signage. Recent changes to DOT regulations require emergency information to be placed on shipping papers (such as a phone number where 24-hour emergency response information is available) and that emergency response information be maintained in the transporting vehicle.

Hazardous waste transportation is partially regulated under RCRA and utilizes a specific manifest form, which was developed to track waste material from point of origin to disposal. There are no programs to provide notification to local government of special hazards related to transport of materials within their jurisdiction.

Hazardous Waste: The Federal Resource Conservation and Recovery Act (RCRA) of 1976 (40 CFR 260), as amended in 1984, regulates hazardous waste. RCRA was termed the "cradle to grave" legislation because the legislation required controls on hazardous wastes from the time of their creation to their ultimate disposal.

Washington was one of the first states to pass legislation and create regulations comprehensive enough to warrant partial authorization by EPA to administer portions of RCRA. Under the state's dangerous waste regulations (Chapter 173-303 WAC), waste materials thought to be hazardous must be "designated" through a process of determining the characteristics of the material. Large quantity hazardous waste generators must meet strict requirements for accumulation and storage of waste, recordkeeping, and disposal. No large quantity RCRA facilities were identified in the APA. However, three small quantity RCRA facilities were found (see Section 4.3.2).

Like the federal regulations, generation of small quantities of hazardous waste is exempt from most provisions of the state rules. The regulatory threshold amounts, however, are ten times lower under the state rules than those of EPA. Even so, small quantity generators, companies who generate up to 220 pounds of hazardous waste per month, are relatively uncontrolled and free from requirements.

Waste reduction planning is also required of Washington businesses (Hazardous Waste Reduction Act of 1990). Under the terms of this legislation, large quantity generators of hazardous waste must develop plans for the reduction of waste. The overall goal of the legislation was for a 50% reduction of hazardous waste generated in the state by 1995.

Emergency Response: The SARA Title III also required that local governments create a Local Emergency Planning Committee (LEPC) and have an Emergency Response Coordinator on staff. Part of this committee's function is to assimilate information on chemical use and release in the area. Through the LEPC, topics such as training, chemical storage, and incident response are discussed. In this manner, close coordination is enhanced in the event of a release or spill. In all cases, except state highways, the local fire district is the Incident Command Agency. For state highways, the State Patrol serves in this role.

Under Section I of SARA, there are provisions for worker protection relating to emergency response. Federal and state rules require any business which handles hazardous materials to provide training for their workers in emergency response. The training is required at different levels depending on the level of emergency response expected from the worker.

6.2.5 Use of Pesticides and Fertilizers

The ground water contamination potential from pesticides and fertilizers has been discussed in Section 4.4. The use of pesticides is regulated under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (1975). FIFRA allows states authority to register or restrict pesticide use. In Washington, this activity has been delegated to the state Department of Agriculture. Washington has its own statutory control under the Washington Pesticide Control Act (Chapter 15.58 RCW) and the Pesticide Application Act (Chapter 17.21 RCW). Washington Department of Agriculture is responsible for pesticide registration, quality control sampling, and testing and licensing of applicators.

Like many of Washington's counties, King County has an active Conservation District program which, with the assistance of the Washington State Cooperative Extension Service and the United States Department of Agriculture Soil Conservation Service, provides technical assistance to land owners. This assistance takes many forms. Fertilizer application rates, appropriate animal density, and animal waste disposal and utilization are common topics. In many cases, recommendations are formalized in a Farm Plan. The Conservation District also provides a conduit for funding of soil and water conservation and environmental protection measures.

6.2.6 Landfills

Solid waste landfills are regulated by the federal, state, and local governments. Ecology regulations entitled Criteria of Municipal Solid Waste Landfills are included in Chapter 173-351 WAC. These regulations include standards for:

- Location of landfills relative to flood plains, wetlands, unstable areas, and seismic impact zones. These standards apply to new landfills and lateral expansions of existing landfills.

- Design criteria for new landfills including composite liners, leachate collection and removal systems, design of ground water monitoring systems, ground water sampling and analysis, reporting of ground water monitoring data, ground water modeling, hydrogeologic reports, and corrective action. The standards also include restrictions on the minimum separation between the bottom of the landfill and highest ground water.

- Operating the landfill.

King County has jurisdiction over design, construction, operation, and closure of solid waste facilities in King County. These facilities are regulated under the code of the King County Board of Health, Title 10. No landfills are located in the APA.

6.2.7 Storm Water

As discussed in Section 4.4, storm water is not only a source of ground water recharge, but is also a potential source of contamination. Storm water discharges are regulated by the federal government under Section 402 of the Clean Water Act. Federal regulations were promulgated in 40 CFR Part 122. The intent of the federal program is to minimize the concentrations of pollutants which are discharged with storm water from industrial and construction sites. The federal program includes the following basic components:

- Permits are required for "storm water discharges associated with industrial activities." For example, industrial facilities which store raw materials, manufacture goods, or store products which may come in contact with storm water, must apply for a general permit.

- The permit requires that facilities implement a storm water pollution prevention plan (SWPP) and utilize best management practices (BMPs) to control the quality of storm water discharges. Typical BMPs include practices like: covering raw material stockpiles, sweeping sites to minimize pollutants which could be carried by storm water runoff, or installing and maintaining sediment detention sumps or basins. Besides summarizing BMPs, SWPPs also summarize reporting requirements, inspection and maintenance requirements, and establish a team of people at each site who are responsible for implementation of the plan.

- Construction sites which disturb more than 5 acres must apply for a general storm water permit. The intent behind this requirement is minimize sediment-laden storm water runoff from construction sites.

The Department of Ecology has jurisdiction over the storm water program in the state. It has authored a general permit for discharges associated with industrial activity, which would typically apply to industrial facilities within the APA, and has written some specific industrial category permits (e.g., sand and gravel mining sites). It has also authored a draft permit for construction sites.

The Ecology program goes somewhat further than the federal program in that it requires permit holders to monitor storm water quality at the point of discharge to surface water or ground water. However, Ecology does not require the installation of ground water monitoring wells to determine potential impact to ground water from storm water infiltration practices.

6.2.8 Monitoring Well Construction

As discussed in Section 4.4, ground water monitoring wells can be a conduit for contaminant transport between the ground surface and an aquifer if they are improperly constructed or abandoned. Regulation of wells in Washington began in 1971 under the direction of Ecology. Two areas of focus of this program are well construction standards (Chapter 173-160 WAC- Minimum Standards for Construction and Maintenance of Wells) and licensing (Chapter 173-162 WAC Regulation and Licensing of Well Contractors and Operators).

The well construction standards include:

- General requirements for well construction notification, design and construction of wells, sealing of casings, and capping requirements.
- Specific requirements for water supply wells including well location, design and construction of the well and seal, well testing, and well abandonment procedures.
- Specific requirements of resource protection (monitoring) wells including design and construction standards for the casing, surface protection, seals, well screen, filter pack, development and abandonment procedures.

The Regulation and Licensing of Well Contractors and Operators includes requirements for licensing water well drillers, examination requirements, and lists responsibilities of licensed well contractors.

6.3 South King County Ground Water Management Strategies Planned for Risk Reduction

The South King County Ground Water Management Plan identified topics or potential problems of concern and, as part of the planning process, will adopt ground water management strategies. The SKCGWMP (March 1995 Draft) identified the following topics for consideration:

- special area designations to enhance ground water protection
- storm water management
- hazardous materials management

- underground storage tank management
- on-site sewage disposal system use
- pesticides and fertilizers
- well construction and abandonment
- sewer pipes
- solid waste landfills
- burial of human remains
- sand and gravel mining
- land application of biosolids and effluent
- ground water quantity

These topics were analyzed in an issue paper format, developed by Seattle-King County Health Department (SKCHD) and project consultants. The issue papers contained technical information about the topic, a description of the existing regulations and programs, and identified issues that could be addressed by one or more management strategies. The South King County Ground Water Advisory Committee (GWAC) discussed and modified these papers to become strategy recommendations.

In developing the management strategies, the South King County GWAC attempted to make maximum use of existing governmental programs and regulatory structures. The management strategies were based upon thorough research into the problems as presented in the issue papers. Each strategy was evaluated for feasibility, including implementation cost. The South King County GWAC preferred strategies that could be understood and supported by the citizens in the south King County area.

As the South King County GWAC considered each issue, data collection and management, and educational management strategies were adopted for many of the issues. These were compiled into a data collection and management program and an education program.

The South King County GWAC realized that the adopted strategies would not completely prevent contamination problems from occurring in the south King County aquifers, but that they should greatly limit the frequency and severity of such problems. The South King County Ground Water Management Plan is intended to provide a framework to assist cooperation between various regulatory agencies through implementation of the adopted ground water protection measures. It is also intended to serve as a guide to further focus research on aquifers and address data and regulatory protection gaps.

The SKCGWMP discussion of strategies is organized in the following way:

- programs related to ground water quality and quantity
- programs related to ground water quality
- programs related to ground water quantity

Tables 6.1, 6.2, and 6.3 summarize the ground water management strategies listed in the SKC-GWMP.

The strategies presented in the SKCGWMP were used as a basis for the strategies considered for this APP. The consultant team reviewed the strategies provided by the SKCGWMP and augmented them with additional strategies which are specific and strategic to this APA. The following section presents the recommended aquifer protection strategies for the APA.

Table 6.1 - Programs Related to Ground Water Quality and Quantity

Special Area Designations	Stormwater	Education	Data
Areas with a critical recharging effect on aquifers used for potable water per RCW 36.70A Growth Management.	Amendment or adoption of the King County surface water design manuals to require infiltration, treatment, and no net reduction in recharge as appropriate.	Cooperation in including ground water education in existing programs.	Continued data collection, analysis, and management.
Aquifer Protection Areas per the 1986 amendments to the federal Safe Drinking Water Act.	Maintenance of rural and open space in high potential aquifer recharge areas.	Assess and report on adequacy of all education programs.	
Environmentally Sensitive Areas per WAC 197-11 State Environmental Policy Act rules.	Pretreatment of infiltrated stormwater in high potential aquifer recharge areas.	Supplemental program development (new education elements).	
Special Protection Areas per WAC 173-200 Water Quality Standards for Ground Waters of the State of Washington.	Sponsor research on long-term ground water impacts.	Coordinate implementation of education efforts (joint ground water education programs).	
Sole Source Aquifers per the federal Safe Drinking Water Act of 1974.	Coordination between Department of Ecology, Puget Sound Water Quality Authority, and King County on surface and ground water quality planning efforts.		
Aquifer Protection Areas per RCW 36.36.	Assess adequacy of existing stormwater systems. Establish priority for upgrades.		
	Roadway runoff - priority to recharge areas for implementation of new standards.		
	Evaluate effects of soil amendments on stormwater moisture and nutrient retention.		

Table 6.2 - Programs Related to Ground Water Quality Only

Hazardous Materials	Underground Storage Tanks	On-Site Sewage Treatment and Disposal Systems Use	Pesticide and Fertilizer Use	Well Construction and Abandonment
Support state hazardous waste plan implementation.	Provide local implementation of underground storage tank regulations.	Require water systems to conduct nitrate loading analysis. Require alternative disposal in areas of high (>5 mg/l) nitrate.	Fund Farm Plan development.	Support enforcement of standards.
Require vertical separation from ground water for dangerous waste management units.	Add control requirements within County.	Initiate a hazardous materials management program for on-site systems.	Evaluate pesticide reduction program of Extension Service.	Seek delegation of well drilling program.
Develop specific zones for treatment or storage facilities.	Regulate existing "exempt" tanks.	Prohibit sale of system cleaners.	Cities and County to use low risk methods for vegetation management.	Regulate well location identification.
Include assistance in site discovery and public education.	Investigate local authority for underground home heating tanks.	Prohibit use of systems for disposal of any materials except domestic sewage.	Support strategies for education and management.	Explore funding for proper abandonment.
Implement the Uniform Fire Code (Article 80).	Amend Building Code to include home underground tanks (if necessary).	Conduct household hazardous waste education.		Promote an education program on well construction.
Implement SARA Title III (Emergency Planning and Community Right to Know).	Regulate heating oil tank abandonment and maintenance.	Education programs on proper system maintenance.		
Have water systems assess transportation risk/ develop programs for mitigation.	Database development on underground tanks.	Require "as-builts" of systems to be recorded with deed.		
Work with DOH on transportation risk mitigation.	Educate owners on tanks and their risks.			

Table 6.2 - Programs Related to Ground Water Quality Only (continued)

Sewer Pipe Concerns	Solid Waste Landfills	Burial of Human Remains	Sand and Gravel Mining	Land Application of Biosolids and Effluent
Encourage adoption of routine leak detection and repair programs.	Determine existing level of ground water protection - improve regulations if necessary.	Search for and evaluated informational studies on the subject.	Regulatory compliance with NPDES and Ecology general permit requirements .	Re-use guideline revision - limits within aquifer areas.
Require "leakproof" piping for new construction and accelerated program for replacement in aquifer areas.	Prohibit siting or expansion of landfills in high potential recharge areas by adoption of Chapter 173-351 by reference.		Support regulatory changes to provide better protection of ground water.	
Improved backfill to reduce ground water transmission.	Evaluate waste screening procedures.		Include best management practices in SEPA guidance document.	
	Proceed with investigation of abandoned sites.		Carefully evaluate land use of reclaimed mines.	
	Education on waste disposal and ground water effects.		Amend zoning code to protect ground water from effects of use of reclaimed mines.	

Table 6.3 - Programs Related to Ground Water Quantity Only

Develop policies and ordinances: aquifer recharge, clearing, interim development standards, impervious cover
SEPA enhancements
Data needs - ground water data program
Support sea water intrusion policy (Ecology)
Utility pumping data to Ecology
Adoption of landscaping ordinance - conservation
Group B - water conservation
Xeriscaping education
Conservation education to individual system owners
Investigate artificial recharge programs
Recommendations to establish decline limits / prevent decline

7. STRATEGIES AND TASKS

SECTION 7
NORTH MERIDIAN AQUIFER PROTECTION AREA MANAGEMENT STRATEGIES AND IMPLEMENTATION TASKS

7.1 Introduction

In order to accomplish the protection of the APA in an orderly and cost-effective manner, the District should adopt the following aquifer protection management strategies. These strategies are separated into six categories based on specific aspects of aquifer protection management. In addition to following these strategies, the District needs to address certain implementation tasks. These tasks are listed in order of recommended priority and reference the specific risk areas they address. Maximum effectiveness can be achieved in implementing the APP through a cooperative effort between the District, other purveyors who have designated protection areas in the south King County area, and the state and local agencies which regulate potentially harmful activities within the APA. The strategies and tasks presented here are similar to those presented by the Covington Water District and the City of Kent for their wellhead protection plans. They were jointly developed between the three entities in order to establish common ground water protection strategies within the south King County area. However, because some of the strategies and tasks are more applicable to the North Meridian Aquifer than other protection areas, the order of prioritization listed in this plan is different than in the other purveyor's plans.

7.2 Aquifer Protection Management Strategies

The following sections detail proposed strategies developed to protect the integrity of the water quality and quantity parameters at the North Meridian Aquifer.

7.2.1 Long-Term Management and Cooperation

This aquifer protection program is designed to be a continuing management activity, to be adapted and to evolve as needed, to meet future changes in the District's philosophies and/or changes in the physical or geochemical conditions of the aquifer system. As such, the management strategies and practices outlined within this study provide a general direction and tone, but will periodically need to be refined to fit specific conditions. Additional adaptations may be needed to address future activities and regulations, or changes in current regulations, that may affect the APA. The following strategies are recommended in order to address the long-term management aspects of the plan.

Strategy #1: Establish an Aquifer Protection Steering Group. The District could establish an aquifer protection steering group. The group would meet periodically to:

- evaluate the implementation status of the aquifer protection tasks
- review federal, state, and local programs regarding aquifer protection
- review changes in surface activities within the APA
- meet aquifer protection regulations and requirements

The group should strive to focus existing and future applicable water quality and quantity resource programs toward the APA; meet on a recommended quarterly basis for the first three years following plan implementation; and establish an appropriate meeting schedule following the 3-year period. The group could include a representation similar to that established for the project development Review Committee, which includes representatives from the King County Water District 111, Covington Water District, City of Kent, Washington Department of Ecology, Washington Department of Health, King County Department of Natural Resources, the Chamber of Commerce, and local citizens.

Strategy #2: Land Management Activities. The District could encourage owners or agencies responsible for large land parcels and developments to use and monitor best management practices (BMP) for control, reduction, and restriction of potential contaminants into the APA.

7.2.2 Aquifer Protection Land Use Strategies

King County Water District 111 has no authority to directly control land use in the APA. Therefore, the District must develop a cooperative relationship with those state and local agencies which do administer land use programs. At the present time, the best strategy for the District is to seek from pertinent agencies appropriate special designations for the APA. Accordingly, the following is recommended.

Strategy #3: Special Protection Area Designation. The District could consider having the APA designated as a special protection area. Since various state and local regulations exist for designating special protection areas, the District should evaluate and seek the different designations which may be most beneficial. Specifically, the District could pursue any of the following: a Special Protection Area designation under the state ground water quality standards (WAC-173-200), designation of Special Use Area by the Department of Agriculture, or designation as an Environmentally Sensitive Area under various King County programs.

7.2.3 Aquifer Protection Regulatory Strategies

This APP is designed to use the existing statutory rules and regulations to protect ground water quality. The steering group, in coordination with state and local agencies having statutory authority in the area, would monitor regulated activities within the APA. Consequently, the following regulatory strategies are recommended.

Strategy #4: APA Well Drilling. The District should encourage the delegation of well construction inspection authority be transferred from the Department of Ecology to the

Seattle-King County Health Department. With or without this transfer of authority, the District should encourage more frequent well construction inspection than currently occurs.

Strategy #5: SEPA/Hydrogeologic Evaluations. The District should request King County Department of Development and Environmental Services (DDES) to require hydrogeologic evaluations to specifically address impacts to ground water quality and quantity parameters for any development within the APA which requires SEPA action or seeks a Determination of Non-Significance (DNS) designation. Additionally, the District should enter into a Memorandum of Understanding (MOU) with DDES seeking District comment on the effects such development will have on the ground water system. Designation of the area as a Special Protection Area will be the first step toward gaining such an agreement.

Strategy #6: Septic Tanks. The District should request King County to require that as-builts, drafted by a septic design professional, of new septic systems be recorded with property deeds. Additionally, the District should support the implementation of laws and regulations requiring proper inspection and maintenance of septic systems.

7.2.4 Planning Strategies

A substantial degree of future protection for the APA will be achieved through present-day planning and coordination. In order to accomplish the required level of future protection, the following strategies are recommended:

Strategy #7: Sewers. The District, in coordination with the managers of local sewer systems, should develop emergency plans to be implemented in the advent of sewage leaks or spills. The District could encourage the County to require all industrial and commercial facilities within the APA to connect to sanitary sewers, if such services are reasonably available.

Strategy #8: Farm Planning. The District and the County Conservation Districts in the area should discuss how farming practices can affect ground water. The District should encourage and support the County Conservation Districts in their farm planning, such that farm plans include items specifically designed to protect ground water quality.

Strategy #9: Storm Water Management. The District should promote research on the impact of storm water discharge on water quantity and quality. Additionally, the District, in coordination with the responsible agencies, should evaluate the adequacy of storm water facilities, including proper routing, retention, and detention. A balance must be found that allows optimum recharge of storm water to ground water systems while adequately protecting the water quality of the aquifers.

Strategy #10: Emergency Response for Transportation Corridors. The District should notify the appropriate emergency response organizations on the location of the APA and establish formal communication protocols with the first-response emergency units.

Strategy #11: Petroleum Pipelines. The District could document the location and use of petroleum pipelines and establish emergency response plans for pipeline failure. These efforts should be coordinated with the pipeline companies and the federal, state, and county agencies responsible for emergency, petroleum-product spill response.

Strategy #12: Hazardous Material Transport. The District should consider investigating the feasibility of re-routing the transport of hazardous materials away from the APA.

7.2.5 Data Management Strategies

One of the principal goals of the APP is the development of a data collection network and analysis plan capable of providing the District with advance warning of contamination to the District's water supply. The following data management strategies seek to establish and maintain scientific data upon which future APP actions can be based.

Strategy #13: Ground Water Monitoring. The District should actively participate in the collection and analysis of regional and local ground water information. This can be accomplished by following the APA monitoring plan detailed in this study and cooperating with the South King County RWA, Seattle-King County Health Department, Department of Health, DNR, SWM, Department of Ecology, and other entities seeking to monitor the ground water resources of the region. The well network in this plan has been designed to provide the District with long-term information on ground water quality and quantity and to also serve as a central network system alerting the District of potential ground water quality problems. The data collected through the network should be summarized and reviewed annually and shared with the above-noted agencies to resolve any identified problems and evaluate the effectiveness of the network.

Strategy #14: Abandoned Well Inventory. The District could locate and inventory decommissioned, abandoned and unused wells. Owners of these wells could be notified of the potential liability such wells cause and be educated on the benefits of well decommissioning.

Strategy #15: Herbicide and Pesticide Survey. The District could inventory and monitor major herbicide and pesticide use within the APA. This inventory may be used to guide future ground water monitoring and aquifer protection-related education programs. In addition, the District could encourage county, state, and private land managers to use vegetation management practices which protect ground water quality.

Strategy #16: Underground Storage Tanks Inventory. The District could inventory and locate underground storage tanks. Besides those presently identified by the current hazard inventory, this inventory should include new tanks placed after the hazard inventory was finished, and residential home heating oil USTs/and or other tanks that were not previously identified.

Strategy #17: Drywell Monitoring. The District could encourage King County Surface Water Management to develop an evaluation and monitoring plan for drywells within the APA.

7.2.6 Education Strategies

Education of the public and industrial/commercial occupants of the APA concerning ground water protection is a critical portion of the APP. Through proper education, the degree and potential for future contamination can be greatly reduced; therefore, the following recommendations are made.

Strategy #18: Aquifer Protection Education Programs. The District has already begun ground water educational programs and should continue to educate the APA residents, particularly on ground water quality issues. The APA could be targeted for distribution of literature regarding septic tank maintenance, fuel oil storage tank maintenance and abandonment, residential use of herbicides and pesticides, and hazardous material use, disposal and storage.

In addition to District-run programs, the District could participate in and support small-quantity waste disposal programs and actively work with state and local government in developing and creating public education programs concerning ground water.

7.3 Aquifer Protection Implementation Tasks

The above strategies deal with management of the APA. In order to accomplish the protection of the APA, specific tasks should be performed. Consequently, we recommend the District adopt the aquifer protection implementation tasks listed below. These tasks have been ordered in their recommended priority of implementation. The District may institute all or a portion of these tasks, depending upon available funding, time, or other concerns. The risk concern categories are discussed in Section 4.4.6 and displayed in Table 4.7.

Task 1: Create and operate an Aquifer Protection Steering Group. This group will:

- have the APA adopted by King County per policy NE-333 of the 1994 King County Comprehensive Plan
- strive to focus the applicable state and local programs to the area
- review management strategies
- incorporate new data
- evaluate new requirements
- oversee educational programs
- evaluate new approaches to aquifer protection

Risk concern categories: All

Task 2: Communicate the extent of the APA to County Planning. King County Planning may wish to consider the APA in their designations of critical areas regulations, susceptibility mapping, and development permitting. The District should provide susceptibility data to King County for updating of their maps.

Risk concern categories: All

Task 3: Consider seeking designation of the APA as a special protection area. As defined in Strategy #3, there are numerous special designations the District may wish to seek in order to protect the APA. The implementation steering group could evaluate the protection offered by these designations and seek those most appropriate for the APA.

Risk concern categories: Industrial-Commercial and Transportation

Task 4: Locate "Aquifer Protection Area" signs at the APA boundary along transportation corridors.

Risk concern categories: All

Task 5: Establish formal communication with first responders. This task is more fully described in the Spill Response Section of the APP.

Risk concern categories: Industrial-Commercial and Transportation

Task 6: Communicate the location of the APA, explain basic aquifer protection philosophy, and address specific aquifer protection concerns to industrial/commercial site owners.

Risk concern category: Industrial-Commercial category

Task 7: Conduct ground water monitoring for analysis of nitrate according to the aquifer protection ground water monitoring plan. Establish a nitrate early-warning value to allow for timely action in the event of increasing concentrations.

Risk concern categories: Residential (medium) and Residential (rural)

Task 8: Participate in a regional ground water data development and management program. This will help assure that an adequate regional database is developed.

Risk concern categories: All

Task 9: Assure that the hydrogeologic impact of surface development is adequately evaluated during the SEPA process.

Risk concern categories: Residential (medium), Residential (Rural), and Industrial-Commercial

Task 10: Require sewer hook-up for all industrial-commercial facilities within the APA if sewer service is reasonably available.

Risk concern category: Industrial-Commercial

Task 11: Review routine leak detection procedures for sewer lines. Coordinate with local and regional sewer authorities to improve the quantity and frequency of leak detection within the designated aquifer protection area.

Risk concern categories: Residential (medium) and Industrial-Commercial

Task 12: Request utilities to use "leakproof" piping for new sewer construction and replace older lines. Coordinate with local and regional sewer authorities to use leakproof piping for new lines within the APA where feasible.

Risk concern categories: Residential (medium) and Industrial-Commercial

Task 13: Develop emergency response procedures for sewer force main breaks within the APA. Coordinate with local and regional sewer authorities in the development of emergency response plans in the event of a severe line break within the APA.

Risk concern category: Industrial-Commercial

Task 14: Support the implementation of state laws and regulations regarding septic system inspection and maintenance programs.

Risk concern category: Residential (medium) and Residential (rural)

Task 15: Encourage requirement that engineering as-builts of new septic systems be recorded with property deeds. These as-builts should be drawn and submitted by registered, professional designers licensed by Washington State.

Risk concern categories: Residential (medium) and Residential (rural)

Task 16: Work with responsible parties to assess adequacy of storm water systems. This task should evaluate the adequacy of the existing storm water detention facilities, establish priority for storm water upgrades, and seek maximum infiltration of storm water.

Risk concern categories: Residential (medium) and Industrial-Commercial

Task 17: Coordinate and promote the evaluation of storm water detention, retention, and routing priorities.

Risk concern categories: Residential (medium) and Industrial-Commercial

Task 18: Review water quality data generated under general NPDES Storm Water Permit.

Risk concern categories: Residential (medium) and Industrial-Commercial

Task 19: Promote research on the impacts of storm water discharge from residential areas.

Risk concern categories: Residential (medium) and Residential (rural)

Task 20: Encourage the periodic monitoring of drywells.

Risk concern categories: Residential (medium), Residential (rural), and Industrial-Commercial

Task 21: Promote and coordinate with King County Local Hazardous Waste Management Program the public education programs regarding household hazardous materials use, storage and disposal.

Risk concern categories: Residential (medium) and Residential (rural)

Task 22: Coordinate environmental education projects with appropriate County agencies to focus efforts on the APA.

Risk concern categories: All

Task 23: Participate in public education programs to notify public concerning the impact of septic systems on the APA.

Risk concern categories: Residential (medium) and Residential (rural)

Task 24: Promote and coordinate public education programs concerning proper septic tank maintenance and proper hazardous waste disposal.

Risk concern categories: Residential (medium) and Residential (rural)

Task 25: Promote and coordinate public education programs concerning underground tank hazards, leak detection methods, and proper removal and closure procedures. These programs should target owners of exempt underground tanks.

Risk concern categories: Residential (medium) and Residential (rural)

Task 26: Encourage development and use of best management practices. This effort should focus upon large land units including large residential developments, schools, golf courses, and parks.

Risk concern categories: Residential (medium) and Industrial-Commercial

Task 27: The District could inventory decommissioned, abandoned or unused wells in the aquifer protection area. The owners of these wells should be informed about proper well decommissioning procedures.

Risk concern categories: Residential (medium) and Residential (rural)

Task 28: The District could develop data on the number and size of exempt underground tanks within the APA.

Risk concern categories: Residential (medium) and Residential (rural)

Task 29: Investigate the need for re-routing transport of hazardous materials through the APA.

Risk concern category: Transportation

Task 30: Support King County in seeking delegation of well drilling inspection authority. This regulatory body could provide advance notice of drilling to the District and allow more frequent inspection of wells drilled within the APA than currently occurs.

Risk concern category: Residential (rural)

Task 31: Request county, state, and private land owners to utilize vegetation management practices to protect water quality.

Risk concern categories: Residential (medium), Residential (rural), and Industrial-Commercial

Task 32: Document the type and amount of herbicide and pesticide application. This activity should focus upon transportation corridors and recreation parcels.

Risk concern categories: Residential (rural) and Transportation

Task 33: Survey pesticide and herbicide use; work with the Washington State University Cooperative Extension Office and King County using available data to modify future ground water monitoring and aquifer protection-related education programs. Data collected should be used to guide which water quality analyses are to be performed for monitoring network samples. Data can also be used in the education of the public on the handling and disposal of hazardous materials.

Risk concern categories: Residential (medium) and Residential (rural)

Task 34: Conduct ground water monitoring for analysis of pesticides and herbicides according to the ground water monitoring plan.

Risk concern categories: Residential (medium), Residential (rural), and Transportation

8. SPILL RESPONSE

8.1 Introduction

The purpose of this section is to outline and evaluate spill response procedures and capability for the North Meridian APA. To conduct this evaluation, major spill response organizations were identified. Local response organizations were contacted to determine their response capabilities, back-up assistance, and general understanding of wellhead protection issues.

Spill events can be large or small, and can exist of highly toxic or inert materials. Events can occur under conditions, and in locations, where the spill is easily contained or where clean-up time is plentiful, or they can occur where surface water, waterways, or ground water are under immediate threat. This range of possibilities has prompted a spill response (and emergency response) system which is nationwide in scope and can involve federal agencies, yet is designed to handle the more common, small-scale (yet potentially dangerous) spills. This assessment takes into account this range of possible spills and responses.

The ability of the District to affect the protocols and procedures of the national and state response systems is limited. However, the majority of spills are small and require local response. Therefore, for the purposes of this effort, focus is given to local response capabilities and to the needs associated with these local response systems.

8.2 Spill Response in the North Meridian Aquifer Area

8.2.1 Local Fire Departments and Districts

Local operational response to hazardous material spills is the responsibility of local fire departments or districts. Spill response for the North Meridian APA is handled by the City of Kent, which is also responsible for hazardous material (HAZMAT) response. The role as a first responder is to control the scene and call for assistance. This may involve attempts to slow down or stop spills or leaks, if this can be done within the training and capabilities of the fire district. Kent HAZMAT has fully trained personnel and sufficient equipment to adequately respond to most spill scenarios.

8.2.2 State Patrol

The State Patrol is the pre-designated Incident Command Agency for all incidents occurring on state highways. Without a pre-arranged agreement with the City of Kent for HAZMAT incidents, the State Patrol must contact an agency with jurisdiction and capability (such as the City of Kent) to secure a HAZMAT team response. This situation may represent an unnecessary delay and, therefore, presents a risk to the surface and ground water quality, particularly along Highway 18.

8.2.3 Department of Ecology

The role of the Department of Ecology will be described in detail in the remainder of the section. This agency often provides an important function in spill management and cleanup. They are not generally considered a "first response" agency but, because of their regional offices and their environmental protection responsibilities, they often are quickly on-scene, and provide clean-up or containment advise and services (through contractors).

8.3 State and Regional Support for Local Spill Response Capability

Spill response planning has been underway throughout King County and within Washington State for many years. As a result, there are many plans in existence, each focusing on a specific geographical area or type of substance. In addition, organizations involved in the storage and transportation of hazardous materials have been required to develop contingency plans. Accordingly, this assessment of spill response capability and recommendations for enhanced response is intended to utilize and be consistent with existing spill response plans for the area and the state.

The foundation for systems and procedures outlined in this section are described in documents such as the "Statewide Master Oil and Hazardous Substance Spill Contingency Plan" (Master Plan - Department of Ecology, 1991) and the "Washington State Comprehensive Emergency Management Plan" (Department of Community Development, 1987).

Currently underway at the state level (by the Department of Ecology) is the continuing process of development of the State Master Oil and Hazardous Substance Spill Contingency Plan. The next major phase in this effort is the production of a volume of the plan specifically focused on operational issues. This document, when completed, will provide spill responders and key agency staff with the information and procedural guidelines necessary to effectively respond to spills. These procedures will include such items as enforcement protocols and laboratory support procedures.

The following are the spill response plans and types of plans in effect in Washington State which cover inland (non-marine) areas such as aquifer protection areas and ground water recharge areas: (Portions of existing statewide documents have been condensed and modified for presentation in this section.)

- National Oil and Hazardous Substances Pollution and Contingency Plan (NCP) - prepared by the Environmental Protection Agency.
- Oil and Hazardous Substance Pollution Contingency Plan for Federal Region 10 (RCP) - prepared by Region 10 of EPA.

- Washington Statewide Master Oil and Hazardous Substance Spill Contingency Plan - prepared by the Department of Ecology.

- Washington State Emergency Response Plan - prepared by the Department of Community, Trade, and Economic Development (CTED).

- Local Emergency Response Plans - prepared by county governments.

8.4 Spill Response Terminology

In the various contingency plans applicable to Washington State, there are repeated references to an "Incident Commander (IC)" and an "On-Scene (Site) Coordinator (OSC)." The IC is the person who is in command of an incident during its emergency phase and OSC is the person who is in charge of spill or release management and cleanup. While there is an IC in charge of the situation, the OSC takes direction from this person. After the emergency response is complete, the site responsibility is transferred to the authority of the OSC for final cleanup.

8.5 Spill Response Organizations

Depending on the magnitude of the spill event, numerous organizations at all levels of government, some voluntary organizations, and the private sector, can have a role in spill response and cleanup. Each of the plans mentioned above describes the relationship and roles of these organizations in terms of the particular concern. Listed below are a few of the organizations which might be, depending on the size and nature of the release, involved in a spill response in an aquifer protection area or ground water recharge area.

8.5.1 Ecology Spill Response Team

The Ecology Spill Response Team consists of Washington State Department of Ecology regional office personnel. This team is responsible for determining the source, cause, and responsible party of spills, as well as initiating appropriate enforcement action. Additional responsibilities include ensuring containment, cleanup, and disposal are carried out adequately. The team coordinates its actions with other state, federal, and local agencies.

8.5.2 Local Response Team

The Local Response Team (LRT) consists of state and local government agencies, industry personnel, academic organizations, and other private interests which may assist the OSC in pollution response and planning. The composition and level of participation in the LRT is dependent upon the area involved, the hazard posed, and the type of assistance required. Normally, the LRT will consist of the state environmental response agency and clean-up contractors.

8.5.3 Technical Assistance Team

The Technical Assistance Team (TAT) is a contractor used by the EPA Region 10 office to provide technical oversight at spills and uncontrolled hazardous waste sites. Requests for the TAT are made via the EPA. Once on site, the TAT will report the situation to the EPA duty officer who then decides whether an EPA OSC needs to be on scene.

8.5.4 Natural Resource Damage Assessment Team

Initially, the resource damage assessment program was an Ecology-led effort designed to organize the state natural resource trustee agencies into an effective resource damage assessment task force. The state Natural Resource Damage Assessment (NRDA) team consists of representatives from Ecology, the Department of Fish and Wildlife (DFW), the Parks and Recreation Commission, the Department of Natural Resources (DNR), CTED, and the Department of Health (DOH). In the event of a major pollution event which damages natural resources, this committee's mission is to organize personnel, materials, and equipment necessary to conduct reconnaissance evaluations and initiate detailed assessments of natural resource damages.

8.5.5 EPA Environmental Response Team

The Environmental Response Team (ERT), based in Edison, New Jersey, was established to advise the OSC and Regional Response Team (RRT) on environmental issues surrounding spill containment, cleanup, and damage assessment. ERT personnel have expertise in areas such as treatment technology, biology, chemistry, hydrology, geology, and engineering.

8.5.6 Regional Response Team

The RRT, consisting of representatives from selected federal and state agencies, performs functions similar to those performed nationally by the National Response Team (NRT). Essentially, the RRT is the regional body responsible for planning and preparedness before a spill occurs, and provides advice to the OSC following such incidents.

8.5.7 National Response Team

The NRT consists of representatives from the various federal agencies (such as EPA, the US Coast Guard (USCG), Fish and Wildlife Service, etc). It serves as the national body for planning and preparedness actions prior to a spill and as an emergency advisory center when a spill occurs.

8.6 Roles and Responsibilities

8.6.1. Introduction

Spill response in Washington State may involve the active participation of a significant number of agencies, organizations, and private individuals. Spill response plans stress that, for spill response procedures to be effectively executed, each party must be fully aware of their specific roles and responsibilities. Moreover, there must be an understanding of the roles of other parties involved in response activities, as well as effective coordination, cooperation, and communication among responding agencies, organizations, and individuals.

This section describes the specific roles and responsibilities of the key parties, including:

- Responsible party or spiller
- Federal and state agencies
- Local government
- Facility owners
- Contractors

8.6.2 The Responsible Party

The primary responsibility for assessing, responding to, and containing a spill or discharge falls upon the individual, agency, and/or company responsible for the spill incident. The responsible party (RP), whether there is an approved contingency plan or not, is responsible for containment and cleanup of the spill, disposal of contaminated debris, restoration of the environment, and payment of damages. State and federal law specifically require that the removal of a discharge of oil or hazardous substance should be immediate.

8.6.3 Environmental Protection Agency

The EPA has primary responsibility for spills that occur on inland U.S. waters not under USCG jurisdiction, and all land spills. As directed by the NCP, the EPA is pre-designated as OSC for spills occurring under its jurisdiction.

8.6.4 Department of Ecology

Ecology is the lead state agency for environmental pollution response within the State of Washington. As such, it has pre-designated the state OSC and the IC for many spills occurring in state jurisdiction. In the event of a spill occurring on a state highway, Ecology coordinates with the Washington State Patrol, with the State Patrol assuming responsibility as IC and Ecology acting as the lead agency responsible for clean-up activities.

8.6.5 State Patrol

The State Patrol acts as the designated Incident Command agency for incidents on interstate and state highways, and other roads and jurisdictions as delegated. When a spill occurs on a state highway, Ecology joins the Unified Command and acts as the lead agency for clean-up response.

8.6.6 Department of Community, Trade, and Economic Development - Emergency Management Division

Washington State Emergency Management Division (EMD) is responsible for:

- Developing and maintaining a State Comprehensive Emergency Management Plan.
- Maintaining a 24-hour capability to receive notification of incidents and request for assistance and initial notification to local, state, federal response agencies.
- Activating the State Emergency Operations Center (EOC) as needed to coordinate state resource identification and acquisition in support of Ecology response.
- Providing Public Information Officer (PIO) support to the Incident Command.
- Maintaining an updated list of NRDA team members submitted by participating agencies.
- Maintaining and updating a notification list of local, state, and federal agencies involved in emergency response.
- Coordinating the procurement of state resources for use by the OSC or as requested by local EMD or other designated local response agency or state response agencies.
- Participating in the NRDA team.

8.6.7 Department of Fish and Wildlife (DFW)

The DFW is a state agency with trustee responsibilities for wildlife, game fish, food fish, non-game fish, shellfish, and their associated habitats. The agency is also responsible for state facilities (hatcheries, properties, launching ramps, and related facilities) and assorted equipment. Of special concern to the DFW are high-value habitats which may be used as nursery grounds for fish or wildlife. DFW is a participant on the NRDA team.

8.6.8 Department of Health (DOH)

The DOH has the responsibility for beach closures for human health and safety purposes, public health concerns from contaminated food supply (e.g. shellfish), and general health-related matters for the safety of the public. In addition, DOH is to render all appropriate laboratory support and services to the OSC. DOH is a participant in the NRDA team.

8.6.9 Department of Transportation (DOT)

The DOT may provide traffic control, equipment, and personnel for non-hazardous clean-up activities on state and interstate highways. The DOT may provide and mobilize equipment necessary in a major spills incident.

8.6.10 Local Responders

Local emergency response organizations such as local police, county police, and local fire districts have a key role to play in most spill situations. The "first responders" for the majority of spills are these local entities. They provide for immediate protection of health, property, and the environment. It is this group of responders who determine the need for additional assistance and mobilization of the additional resources mentioned in this section.

8.6.11 Local Emergency Planning and Emergency Management

Local governments have a duty to be prepared for all disaster emergencies. The County's Emergency Management Division (EMD) is charged with establishing Local Emergency Planning Districts (LEPD) and Local Emergency Planning Committees (LEPC) to facilitate planning efforts.

LEPC's have the responsibility to create local emergency response plans. General requirements for local response plans are contained in Title III of the Superfund Amendments and Re-authorization Act of 1986. Generally, local agencies, particularly fire services and law enforcement agencies, can be activated to provide emergency response services when there is a threat to life and property. Emergency response services may include: fire and explosion controls, investigation, and documentation, perimeter control, evacuation, traffic controls, and initial containment or even removal of materials, depending on the nature of the incident.

8.7 Incident Response Management

8.7.1 Notification Requirements and Local Response Relationship

The party responsible (RP) for a spill is required by state law to notify the NRT and the EMD. The RP is also encouraged to contact the nearest appropriate regional office of Ecology. The following is a list of phone numbers for agency notification.

Washington State Emergency Management Division	1-800-258-5990
Washington State Department of Ecology	
24-hour Emergency Spill Response	1-360-407-6300
Northwest Office - Bellevue	1-206-649-7000
Kent Fire Department (HAZMAT) (non-emergency)	1-206-859-3322
King County Police (non-emergency)	1-206-296-3311
Washington State Patrol (non-emergency)	1-206-455-7700
Covington Water District	1-206-631-0565

King County Water District #111	1-206-631-3770
City of Kent - Public Works	1-206-859-3395
Environmental Protection Agency - Seattle	1-206-553-1263
National Response Center	1-800-424-8802

In most spill response situations, the initial call is to a local emergency response agency such as the local fire department or district, local police, or others. The use of the "911" system will activate the local response. These first responders provide the initial on-scene control, and manage the scene under the Incident Command System described below.

8.7.2 State Incident Command System

Introduction: The State of Washington's spill response is organized and managed under an Incident Command System (ICS). The ICS is a functional component of a larger program, the National Interagency Incident Management System (NIIMS), which was developed years ago for the interagency management of large forest fires. The ICS, although less complex than the NIIMS, is designed to allow for the day-to-day management of response efforts and resources for all oil and hazardous substance spill responses, from the very small or routine efforts to the largest catastrophic spills involving multi-agency jurisdictions.

Specifically, the system operates in the following scenarios:

- Single Jurisdiction/Single Agency
- Single Jurisdiction/Multi-Agency
- Multi-Jurisdiction/Multi-Agency

The ICS concept is built upon teamwork coordination and cooperation between all entities involved, or potentially involved, in a spill response. Teamwork is encouraged throughout all phases of incident management including the preparedness for, mitigation of, response to, and recovery from a spill of any type or size. Ecology has taken steps to ensure there is effective teamwork, coordination, and participation in the ICS by appropriate state and local agencies in addition to the USCG and the EPA.

Unified Command Structure: In Washington State, the ICS operates using a Unified Command Structure involving representatives of Ecology, the federal government (USCG/EPA), industry, and in some circumstances local government. A Unified Command Structure is called for when the spill is multi-jurisdictional in nature, e.g., when public safety and welfare, as well as environmental damage, is imminent.

Under the Unified Command Structure, the three key On-Site Coordinators (OSC) -- federal, state, and industry -- will share decision-making authority in the command post and consult with each other regarding spill response and clean-up management issues. Participation in the Unified Command Structure does not mean that agencies such as the USCG, EPA, and Ecology, which have roles and responsibilities set by federal and state statute, are relinquishing or surrendering their authority by participating in a Unified Command Structure. Emergency situations, however, may require some actions to be taken outside of the normal permitting process.

The Unified Command Structure is a consistent, systematic means of organizing a variety of agencies, having jurisdictional responsibilities surrounding an incident, into one concerted effort. The concept offers uniform and trackable procedures that enable all emergency response agencies to perform their roles effectively, yet in unison. A Unified Command is intended to be located as close to the site of the spill as practicable, without interfering in the actual spill response activities.

Organization and Staffing Principles of ICS: The ICS organization is functionally oriented around four major areas: command, planning, logistics, and administration. The flexibility to expand this organization as situations dictate is designed within the ICS, without the need to conduct major organizational changes or a cumbersome transition into a different operational system during a spill response. For example, in a minor incident, a single person may serve as the OSC and perform all functions. In a major incident, the command may consist of a united command with federal and state representatives, the RP, the OSC, a staff, and a group of sections and functional units. Participants in the Unified Command/Command Post and the OSCs are normally pre-designated, and the sections and function units are filled in as needed.

It is important for those parties and agencies participating in ICS to understand that the key to its effective operation is the acknowledgment that the IC is in charge of the entire operation, the OSC is in charge of spill cleanup during the incident, while the section chiefs and functional unit leaders are in charge of their units or sections. As a rule, sections should have a single individual in charge who has the authority to make decisions and to give orders. Without this authority, the system will fail. Accordingly, it is a maxim of ICS that section chiefs should be selected based on their experience and qualifications, not rank or seniority within their relative agency or organization.

The staffing requirements of the ICS should be viewed as a dynamic activity, not one based upon maintaining a precisely defined level. Flexibility is a key element of ICS, allowing the command structure to be as large and sophisticated, or as small and compact, as the spill event requires. As long as common sense is used, the system can be modified to fit any incident. The size of the ICS will be determined by the IC on the scene of the spill.

8.8 Recommended Spill Response Improvements for the North Meridian APA

8.8.1 Establish Responder Group

As part of the implementation of this plan, a spill responder group (consisting of local, fire, police, emergency management, water districts) should be established to discuss spill response in the APA. Efforts should be made to communicate the extent of protection area to the first responder organizations. This "forum" for discussion of aquifer protection issues could take the form of a sub-group of the LEPC, or could be developed independently.

8.8.2 Complete Mutual Aid Agreements

Response scenarios involving potential first responders (such as the State Patrol, the King County Police, or others) should be reviewed to assure that the response protocols are clearly understood and the response system is as streamlined as possible.

8.8.3 Discuss Aquifer Precautions

Through a local "responders" group, discussion should focus not only on the location of the aquifer, but also on specific protocols and procedures for response in the aquifer zone. For example, certain types of responses may be more protective than others, depending on the chemical, the location within the protection area, and the tradeoffs affecting immediate public health and safety.

9. REFERENCES

SECTION 9
NORTH MERIDIAN AQUIFER PROTECTION PLAN
REFERENCES

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10. APPENDICES

APPENDIX I
NORTH MERIDIAN AQUIFER PROTECTION PLAN
HYDROGEOLOGIC STUDY WELL DATABASE

The following collection of well data was collected and compiled into a computerized database for use with the project. It was used extensively in the hydrogeologic study, described in Section 3, and in the designing of the monitoring well network, Section 5. The complete text of the computerized database is included herein.

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	East	Elevation Data (ft. MSL) Elevation	Method
1	22N/05E-09A0	4724541220954	HERSHBERGER		472454	1220954	S	5251314	562976	430	M
2	22N/05E-09A0	4724551220955	MEYERS K		472455	1221000	F	5251477	562843	435	M
3	22N/05E-09A0	4724561220956	GATSOS		472456	1220956	S	5251493	562993	430	M
4	22N/05E-09J0	4724251200954	DUNCAN		472425	1220954	S	5250543	563008	451	M
5	22N/05E-09M0	4724271221100	AIRINGTON		472427	1221100	S	5250293	561619	451	M
6	22N/05E-10A0	4724531220848	SCHMITZ J R		472453	1220848		5251379	564547	450	
7	22N/05E-10A0	4724431220841	BRUCE JEFF		472445	1220841	S	5251610	564620	485	M
8	22N/05E-10E0	4724391220940	DAY		472439	1220940	S	5250997	563377	348	M
9	22N/05E-10H0	4724401220838	DELANO		472440	1220838	S	5251042	564304	515	M
10	22N/05E-10H0	4724401220840	NEWHOLD		472440	1220840	S	5250795	564513	500	M
11	22N/05E-10H0	4724401220850	HILL MARY		472440	1220850	S	5250992	564318	525	M
12	22N/05E-10H0	4724351220851	BUTENKO CON		472435	1220851	S	5250851	564304	535	M
13	22N/05E-10J0	4724251220839	VERT		472425	1220839	S	5250428	564550	540	M
14	22N/05E-10J0	4724291220854	VAN DYKE MERLE		472429	1220854	S	5250691	564279	535	M
15	22N/05E-10K0	4724291220857	CLARK		472429	1220857	S	5250400	564300	500	M
16	22N/05E-10K0	4724231220902	HULK PAUL		472423	1220902	S	5250670	564140	530	M
17	22N/05E-10Q0	4724121220857	DRAGOO		472412	1220857	S	5249950	563950	420	M
18	22N/05E-10R0	4724131220835	GUEST JOHN		472413	1220835		5250172	564639	525	M
19	22N/05E-10R0	4724541220840			472454	1220840	S	5251429	564604	455	M
20	22N/05E-11L0	4724281220800	CAMBELL STEWART		472428	1220800		5250622	565374	500	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds
F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter
L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
1	22N/05E-09A	HERSHBERGER		MAXWELL		156.00	1952		6		SA
2	22N/05E-09A	MEYERS K		JOHNSON		120.00	1959		6	O	SA
3	22N/05E-09A	GATSOS		JOHNSON		150.00			6		SA
4	22N/05E-09J	DUNCAN				90.00	1951		6		SA
5	22N/05E-09M	AIRINGTON		JOHNSON		74.00	1956		6		SA
6	22N/05E-10A	SCHMITZ J R				57.00			0		?
7	22N/05E-10A	BRUCE JEFF		JOHNSON	78.00	78.00	1980	A	6	O	PA
8	22N/05E-10E	DAY		JOHNSON		90.00	1957		8	O	SA
9	22N/05E-10H	DELANO				105.00	1956		6		SA
10	22N/05E-10H	NEWHOLD		JOHNSON DRLG		96.00	1974	C	6	P	SA
11	22N/05E-10H	HILL MARY		JOHNSON	115.00	115.00	1981	A	6	O	SA
12	22N/05E-10H	BUTENKO CON		JOHNSON	148.00	148.00	1977	A	6	O	SA
13	22N/05E-10J	VERT		JOHNSON		133.00	1961		6		SA
14	22N/05E-10J	VAN DYKE MERLE		JOHNSON	147.00	147.00	1979	A	6	O	SA
15	22N/05E-10K	CLARK		JOHNSON DRIL		112.00	1974	C	6	P	SA
16	22N/05E-10K	HULK PAUL		JOHNSON	140.00	140.00	1978	A	6	O	SA
17	22N/05E-10Q	DRAGOO		JOHNSON DRLG		73.00	1975	C	6	P	SA
18	22N/05E-10R	GUEST JOHN		JOHNSON	121.00	121.00	1973	C	6	P	PA
19	22N/05E-10R			JOHNSON		90.00			0		?
20	22N/05E-11L	CAMBELL STEWART		NW PUMP	86.00	86.00	1976	A	6	O	SA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen G = Gravel Pack P = Perforations O = Open bottom

Completion Aquifer Codes: ? = Unknown NMA = North Meridian Aquifer PA = Perched Aquifer System DA = Deep Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
1	22N/05E-09A	HERSHBERGER		156.00	0.00	.F.	53.55	06/15/62	1.00	
2	22N/05E-09A	MEYERS K		120.00	0.00	.F.	68.79	06/28/62	-0.50	
3	22N/05E-09A	GATSOS		150.00	0.00	.F.	63.52	06/28/62	-1.10	
4	22N/05E-09J	DUNCAN		90.00	0.00	.F.	71.19	06/15/62	-4.00	
5	22N/05E-09M	AIRINGTON		74.00	0.00	.F.	60.73	06/21/62		
6	22N/05E-10A	SCHMITZ J R		57.00	0.00	.F.	0.00	/ /		
7	22N/05E-10A	BRUCE JEFF		78.00	0.00	.F.	56.00	02/18/80	-0.30	
8	22N/05E-10E	DAY		90.00	0.00	.F.	-10.00	/ /		
9	22N/05E-10H	DELANO		105.00	0.00	.F.	91.57	06/07/62		
10	22N/05E-10H	NEWHOLD		86.00	96.00	.F.	73.00	/ /		
11	22N/05E-10H	HILL MARY		115.00	0.00	.F.	0.00	/ /	-0.50	
12	22N/05E-10H	BUTENKO CON		148.00	0.00	.F.	107.00	06/08/77		
13	22N/05E-10J	VERT		133.00	0.00	.F.	118.00	/ /		
14	22N/05E-10J	VAN DYKE MERLE		147.00	0.00	.F.	110.00	04/11/79	-0.30	
15	22N/05E-10K	CLARK		102.00	112.00	.F.	92.00	/ /		
16	22N/05E-10K	HULK PAUL		140.00	0.00	.F.	61.00	05/15/78	-0.10	
17	22N/05E-10Q	DRAGOO		63.00	73.00	.F.	18.40	09/22/75		
18	22N/05E-10R	GUEST JOHN		111.00	121.00	.F.	82.00	07/16/73		
19	22N/05E-10R			90.00	0.00	.F.	0.00	/ /		
20	22N/05E-11L	CAMBELL STEWART		86.00	0.00	.F.	52.00	02/10/76		

	Local Number	Owner	Well Name	TEST RESULTS GPM	Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
1	22N/05E-09A	HERSHBERGER								SKC DB, LUZIER	.F.	.F.	.F.	.F.
2	22N/05E-09A	MEYERS K		20						SKC DB, LUZIER	.T.	.F.	.F.	.F.
3	22N/05E-09A	GATSOS								SKC DB, LUZIER	.F.	.F.	.F.	.F.
4	22N/05E-09J	DUNCAN								SKC DB, LUZIER	.F.	.F.	.F.	.F.
5	22N/05E-09M	AIRINGTON								SKC DB, LUZIER	.F.	.F.	.F.	.F.
6	22N/05E-10A	SCHMITZ J R								SKC DATABASE	.F.	.F.	.F.	.F.
7	22N/05E-10A	BRUCE JEFF		16	10.00	4.00				SKC DATABASE	.T.	.F.	.F.	.F.
8	22N/05E-10E	DAY		20						SKC DB, LUZIER	.T.	.F.	.F.	.F.
9	22N/05E-10H	DELANO								SKC DB, LUZIER	.F.	.F.	.F.	.F.
10	22N/05E-10H	NEWHOLD		18	9.00	4.00				SKC DATABASE	.T.	.F.	.F.	.F.
11	22N/05E-10H	HILL MARY		22	15.00	2.50				SKC DATABASE	.T.	.F.	.F.	.F.
12	22N/05E-10H	BUTENKO CON		20	21.00	3.50				SKC DATABASE	.T.	.F.	.F.	.F.
13	22N/05E-10J	VERT		15						SKC DB, LUZIER	.F.	.F.	.F.	.F.
14	22N/05E-10J	VAN DYKE MERLE		15	23.00	4.00				SKC DB, DOE LOG	.T.	.F.	.F.	.F.
15	22N/05E-10K	CLARK		12	5.00	2.00				SKC DATABASE	.T.	.F.	.F.	.F.
16	22N/05E-10K	HULK PAUL		32	30.00	4.00				SKC DATABASE	.T.	.F.	.F.	.F.
17	22N/05E-10Q	DRAGOO		30	18.40					SKC DB, DOE	.T.	.F.	.F.	.F.
18	22N/05E-10R	GUEST JOHN		12	5.00	2.00				SKC DATABASE	.T.	.F.	.F.	.F.
19	22N/05E-10R									SKC DB, LUZIER	.F.	.F.	.F.	.F.
20	22N/05E-11L	CAMBELL STEWART		20	17.00	2.00				SKC DATABASE	.T.	.F.	.F.	.F.

	Owner	Well Name	Remarks
1	HERSHBERGER		OPENING DEPTH ASSUMED
2	MEYERS K		FINISH AND OPENING DEPTH ASSUMED
3	GATSOS		OPENING DEPTH ASSUMED
4	DUNCAN		OPENING DEPTH ASSUMED
5	AIRINGTON		OPENING DEPTH ASSUMED
6	SCHMITZ J R		OPENING DEPTH ASSUMED
7	BRUCE JEFF		BAIL TEST
8	DAY		FLOWING WELL, SWL ASSUMED; FINISH AND OPENING DEPTH ASSUMED
9	DELANO		OPENING DEPTH ASSUMED
10	NEWHOLD		BAIL TEST
11	HILL MARY		BAIL TEST
12	BUTENKO CON		BAIL TEST
13	VERT		OPENING DEPTH ASSUMED
14	VAN DYKE MERLE		BAIL TEST
15	CLARK		BAIL TEST
16	HULK PAUL		BAIL TEST
17	DRAGOO		ARTESIAN FLOW RATE
18	GUEST JOHN		BAIL TEST
19			OPENING DEPTH ASSUMED
20	CAMBELL STEWART		BAIL TEST

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	UTM Coordinates East	Elevation Data (ft. MSL) Elevation	Elevation Data (ft. MSL) Method
21	22N/05E-11M0	4724261220817	KNUTTEN ROBERT		472426	1220817	F	5250558	564988	525	M
22	22N/05E-11N0	4724131220823	PARKER		472413	1220823	S	5250250	564715	528	M
23	22N/05E-11N0	4724171220827	GRIFFIN CHARLES		472417	1220827	S	5250282	564801	525	M
24	22N/05E-11P0	4724111220800	SMITH		472411	1220800	S	5250103	565383	560	M
25	22N/05E-11P0	4724121220801	BARRON ROGER		472411	1220814	S	5250083	565072	600	M
26	22N/05E-11Q0	4724121220744	TOTAL CONST CO		472412	1220744	S	5250117	565720	500	M
27	22N/05E-11Q0	4724061220742	SWETLOW BILL		472406	1220742	F	5249983	565765	520	M
28	22N/05E-14A0	4724001220735	IDOINGS		472400	1220735	S	5249932	566138	490	M
29	22N/05E-14B0	4724001220749	PEDERSON		472400	1220749	S	5249771	565603	580	M
30	22N/05E-14C0	4724001220805	PALO		472400	1220805	S	5249871	565144	605	M
31	22N/05E-14C0	4724011220804	FANCHER		472401	1220804	S	5249720	565416	585	M
32	22N/05E-14D0	4724031220818	MARIAN PAUL		472403	1220818		5249856	564989	570	M
33	22N/05E-14E0	4723441220829	COOLEY JOHN		472344	1220829	S	5249269	565018	425	M
34	22N/05E-14F0	4723461220804	HULK CLIFFORD		472341	1220802	S	5249431	565395	590	M
35	22N/05E-14G0	4723511220751	WAMBOLT		472351	1220751	S	5249545	565555	575	M
36	22N/05E-14G0	4723431220743	BACON		472343	1220743	S	5249249	565734	550	M
37	22N/05E-14G0	4723441220744	GILBERTSON		472344	1220744	S	5249285	565699	550	M
38	22N/05E-14H0	4723451220733	YURCZYK		472345	1220733	S	5249301	565942	550	M
39	22N/05E-14H0	4723461220734	CARKEEK		472346	1220734	S	5249343	565918	550	M
40	22N/05E-14H0	4723471220735	MCCARTHY		472347	1220735	S	5249377	565885	550	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
21	22N/05E-11M	KNUTTEN ROBERT		JOHNSON	80.00	80.00	1978	A	6	O	PA
22	22N/05E-11N	PARKER		JOHNSON		106.00			6		PA
23	22N/05E-11N	GRIFFIN CHARLES		JOHNSON	106.00	106.00	1983	A	6	O	PA
24	22N/05E-11P	SMITH		JOHNSON DRLG		67.00	1975	C	6	P	PA
25	22N/05E-11P	BARRON ROGER		JOHNSON DRLG	151.00	151.00	1975	A	6	F	PA
26	22N/05E-11Q	TOTAL CONST CO		EVERGREEN		40.00	1973	C	0	O	PA
27	22N/05E-11Q	SWETLOW BILL		NORTHWEST	96.00	96.00	1981	A	6	O	SA
28	22N/05E-14A	IDDINGS		JOHNSON		75.00	1959		6		PA
29	22N/05E-14B	PEDERSON		JOHNSON		114.00	1975	C	0	P	PA
30	22N/05E-14C	PALO		JOHNSON		176.00			6		PA
31	22N/05E-14C	FANCHER		JOHNSON		144.00	1962		6		PA
32	22N/05E-14D	MARIAN PAUL		JOHNSON DRLL	141.00	141.00	1975	C	6	P	SA
33	22N/05E-14E	COOLEY JOHN		JOHNSON	80.00	80.00	1977	A	6	O	SA
34	22N/05E-14F	HULK CLIFFORD		JOHNSON DRIL	182.00	182.00	1974	C	6	P	SA
35	22N/05E-14G	WAMBOLT		JOHNSON	137.00	137.00	1961	C	0	O	PA
36	22N/05E-14G	BACON		NORTHWEST PU		93.00		C	6	S	PA
37	22N/05E-14G	GILBERTSON		JOHNSON DRIL		144.00	1975	C	6	P	SA
38	22N/05E-14H	YURCZYK		JOHNSON DRIL		128.00		C	6	P	SA
39	22N/05E-14H	CARKEEK		JOHNSON DRIL		121.00		C	6	P	PA
40	22N/05E-14H	MCCARTHY		JOHNSON DRIL		142.00	1962	C	6	P	SA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen G = Gravel Pack P = Perforations O = Open bottom

Completion Aquifer Codes: ? = Unknown NMA = North Meridian Aquifer PA = Perched Aquifer System DA = Deep Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
21	22N/05E-11M	KNUTTEN ROBERT		80.00	0.00	.F.	49.00	04/17/79	-0.30	
22	22N/05E-11N	PARKER		106.00	0.00	.F.	74.55	06/07/62		
23	22N/05E-11N	GRIFFIN CHARLES		106.00	0.00	.F.	80.00	06/21/83	-0.30	
24	22N/05E-11P	SMITH		57.00	67.00	.F.	53.00	/ /		
25	22N/05E-11P	BARRON ROGER		141.00	151.00	.F.	129.00	06/03/75		
26	22N/05E-11Q	TOTAL CONST CO		40.00	0.00	.F.	10.00	03/05/73		
27	22N/05E-11Q	SWETLOW BILL		96.00	0.00	.F.	64.00	10/12/81	-1.56	
28	22N/05E-14A	IDOINGS		75.00	0.00	.F.	1.89	04/03/62		
29	22N/05E-14B	PEDERSON		104.00	114.00	.F.	94.00	09/04/75		
30	22N/05E-14C	PALO		176.00	0.00	.F.	147.79	12/06/60	0.50	
31	22N/05E-14C	FANCHER		144.00	0.00	.F.	122.50	05/31/62		
32	22N/05E-14D	MARIAN PAUL		131.00	141.00	.F.	120.00	11/17/75		
33	22N/05E-14E	COOLEY JOHN		80.00	0.00	.F.	5.00	01/04/78	-0.50	
34	22N/05E-14F	HULK CLIFFORD		172.00	182.00	.F.	148.00	02/14/74	-0.40	
35	22N/05E-14G	WAMBOLT		137.00	0.00	.F.	103.47	05/31/62	-0.20	
36	22N/05E-14G	BACON		88.00	0.00	.F.	65.00	/ /		
37	22N/05E-14G	GILBERTSON		134.00	144.00	.F.	115.00	05/13/75		
38	22N/05E-14H	YURCZYK		118.00	128.00	.F.	103.00	06/26/74		
39	22N/05E-14H	CARKEEK		111.00	121.00	.F.	85.00	08/26/74		
40	22N/05E-14H	MCCARTHY		132.00	0.00	.F.	114.00	08/03/62		

	Local Number	Owner	Well Name	TEST RESULTS GPM	Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
21	22N/05E-11M	KNUTTEN ROBERT		20	16.00	4.00				SKC DATABASE	.T.	.F.	.F.	.F.
22	22N/05E-11N	PARKER		24						SKC DB, LUZIER	.F.	.F.	.F.	.F.
23	22N/05E-11N	GRIFFIN CHARLES		30	10.00	2.00				SKC DATABASE	.T.	.F.	.F.	.F.
24	22N/05E-11P	SMITH		10	3.00	2.00				SKC DATABASE	.T.	.F.	.F.	.F.
25	22N/05E-11P	BARRON ROGER		15	1.00	5.00				SKC DATABASE	.T.	.F.	.F.	.F.
26	22N/05E-11Q	TOTAL CONST CO		20	10.00	4.00				SKC DATABASE	.T.	.F.	.F.	.F.
27	22N/05E-11Q	SWETLOW BILL		35	17.00	1.00				SKC DATABASE	.T.	.F.	.F.	.F.
28	22N/05E-14A	IDOINGS								SKC DB, LUZIER	.F.	.F.	.F.	.F.
29	22N/05E-14B	PEDERSON		20	9.00	4.00				SKC DATABASE	.T.	.F.	.F.	.F.
30	22N/05E-14C	PALO								SKC DB, LUZIER	.F.	.F.	.F.	.F.
31	22N/05E-14C	FANCHER								SKC DB, LUZIER	.F.	.F.	.F.	.F.
32	22N/05E-14D	MARIAN PAUL		14	2.00	4.50				SKC DATABASE	.T.	.F.	.F.	.F.
33	22N/05E-14E	COOLEY JOHN		30	30.00	4.00				SKC DATABASE	.T.	.F.	.F.	.F.
34	22N/05E-14F	HULK CLIFFORD		20	4.00	3.00				SKC DATABASE	.T.	.F.	.F.	.F.
35	22N/05E-14G	WAMBOLT		10						SKC DB, LUZIER	.T.	.F.	.F.	.F.
36	22N/05E-14G	BACON		12	7.00	2.00				SKC DATABASE	.T.	.F.	.F.	.F.
37	22N/05E-14G	GILBERTSON		12	5.00	2.00				SKC DATABASE	.T.	.F.	.F.	.F.
38	22N/05E-14H	YURCZYK		9	15.00	2.00				SKC DATABASE	.T.	.F.	.F.	.F.
39	22N/05E-14H	CARKEEK		14	3.00	2.00				SKC DATABASE	.T.	.F.	.F.	.F.
40	22N/05E-14H	MCCARTHY		18						SKC DATABASE	.T.	.F.	.F.	.F.

	Owner	Well Name	Remarks
21	KNUTTEN ROBERT		BAIL TEST
22	PARKER		OPENING DEPTH ASSUMED
23	GRIFFIN CHARLES		AIR JET TEST
24	SMITH		GRAVEL FILLED AT BOTTOM, 66-67 FEET; BAIL TEST
25	BARRON ROGER		GRAVEL PACKED 144-151 FEET; BAIL TEST
26	TOTAL CONST CO		BAIL TEST
27	SWETLOW BILL		BAIL TEST
28	IDOINGS		OPENING DEPTH ASSUMED
29	PEDERSON		BAIL TEST
30	PALO		OPENING DEPTH ASSUMED
31	FANCHER		OPENING DEPTH ASSUMED
32	MARIAN PAUL		GRAVEL FILLED AT BOTTOM, 140-141 FEET; BAIL TEST
33	COOLEY JOHN		BAIL TEST
34	HULK CLIFFORD		BAIL TEST
35	WAMBOLT		FINISH AND OPENING DEPTH ASSUMED
36	BACON		SCREEN DEPTH NOT SPECIFIED, 5-FOOT SCREEN AT BOTTOM ASSUMED; BAIL TEST
37	GILBERTSON		BAIL TEST
38	YURCZYK		BAIL TEST
39	CARKEEK		BAIL TEST
40	MCCARTHY		PERF ZONE NOT SPECIFIED, ASSUMED AT TOP OF SAND & GRAVEL LAYER AT WELL BOTTOM

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	UTM Coordinates East	Elevation Data (ft. MSL) Elevation	Elevation Data (ft. MSL) Method
41	22N/05E-14K0	4723351220749	BENSON RON		472335	1220749	S	5249016	565615	560	M
42	22N/05E-14L0	4723361220759	REICHEL		472336	1220759	S	5249029	565415	525	M
43	22N/05E-14L0	4723371220759	WHITNEY FRED		472337	1220759		5249062	565415	525	M
44	22N/05E-14M0	4723341220824	BRAKEL		472334	1220824	S	5248803	564944	450	M
45	22N/05E-14M0	4723351220826	DARRAGH		472335	1220826	S	5248999	564833	425	M
46	22N/05E-14N0	4723181220827	ABBOTT LEON		472318	1220827	S	5248487	564808	420	M
47	22N/05E-14P0	4723191220807	IMLAY		472319	1220807	S	5248359	565314	502	M
48	22N/05E-14P0	4723201220808	HESS		472320	1220808	S	5248414	565222	510	M
49	22N/05E-14P0	4723211220809	EDDY		472321	1220809	S	5248434	565153	510	M
50	22N/05E-15A0	4723591220842	GOULD		472359	1220842	S	5249740	564496	400	M
51	22N/05E-15B0	4723011220900	STARK		472301	1220900	S	5249790	564090	400	M
52	22N/05E-15B0	4724021220904	MACLACHLAN DAVID		472402	1220904	S	5249887	564030	400	M
53	22N/05E-15D0	4723551220936	THORSETT AL		472355	1220936	S	5249611	563346	530	M
54	22N/05E-15E0	4723471220939	BRANDON WAYNE		472344	1220936	S	5249333	563339	510	M
55	22N/05E-15E0	4723481220940	BURNETT		472348	1220940	S	5249510	563105	510	M
56	22N/05E-15F0	4723431220920	EVANS DANIEL		472343	1220920	S	5249263	563687	440	M
57	22N/05E-15H0	4723461220838	NORKOOL-KOBE VIRGINIA		472346	1220838	S	5249395	564540	415	M
58	22N/05E-15H0	4722481220847	NORCOOL CARL		472347	1220847	S	5249368	564391	430	M
59	22N/05E-15J0	4723311220847	LEARNE HAROLD		472331	1220847	S	5248902	564394	425	M
60	22N/05E-15J0	4723321220835	LEARNE HAROLD		472332	1220835	S	5248909	564645	435	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
41	22N/05E-14K	BENSON RON		JOHNSON	165.00	165.00	1980	A	8	O	SA
42	22N/05E-14L	REICHEL		H O MEYER		131.00		C	6	O	SA
43	22N/05E-14L	WHITNEY FRED		RICHARDSON	160.00	140.00	1975	A	6	O	SA
44	22N/05E-14M	BRAKEL		JOHNSON		62.00			6		SA
45	22N/05E-14M	DARRAGH		JOHNSON DRIL		62.00	1974	C	6	P	SA
46	22N/05E-14N	ABBOTT LEON		MEULLER	114.00	114.00	1984	C	6	S	SA
47	22N/05E-14P	IMLAY		JOHNSON		71.00	1961		6	O	PA
48	22N/05E-14P	HESS				184.00	1922		7		?
49	22N/05E-14P	EDDY		MERLE JOHNSO		136.00			6		?
50	22N/05E-15A	GOULD		JOHNSON		70.00	1960		6	O	SA
51	22N/05E-15B	STARK		JOHNSON DRIL		56.00		C	6	P	NMA
52	22N/05E-15B	MACLACHLAN		JOHNSON	120.00	120.00	1983	A	6	O	SA
53	22N/05E-15D	THORSETT AL		JOHNSON	185.00	145.00	1981	A	6	P	PA
54	22N/05E-15E	BRANDON WAYNE		JOHNSON	164.00	164.00	1958	C	8	P	SA
55	22N/05E-15E	BURNETT		JOHNSON		64.00			6	P	PA
56	22N/05E-15F	EVANS DANIEL				160.00			0		NMA
57	22N/05E-15H	NORKOOL-KOBE		SHILLING		66.00	1932	C	6		SA
58	22N/05E-15H	NORCOOL CARL		NW PUMP&DRLL	109.00	109.00	1977	A	6	S	NMA
59	22N/05E-15J	LEARNE HAROLD				116.00	1972		0		NMA
60	22N/05E-15J	LEARNE HAROLD				96.00	1972		0		NMA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen G = Gravel Pack P = Perforations O = Open bottom

Completion Aquifer Codes: ? = Unknown NMA = North Meridian Aquifer PA = Perched Aquifer System DA = Deep Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
41	22N/05E-14K	BENSON RON		165.00	0.00	.F.	120.00	02/28/80	1.80	
42	22N/05E-14L	REICHEL		131.00	0.00	.F.	119.00	02/25/69		
43	22N/05E-14L	WHITNEY FRED		140.00	0.00	.F.	121.00	11/28/75		
44	22N/05E-14M	BRAKEL		62.00	0.00	.F.	24.34	05/31/62		
45	22N/05E-14M	DARRAGH		32.00	62.00	.F.	18.00	07/06/74		
46	22N/05E-14N	ABBOTT LEON		109.00	114.00	.F.	80.00	08/12/84	-0.70	
47	22N/05E-14P	IMLAY		71.00	0.00	.F.	56.57	05/27/62		
48	22N/05E-14P	HESS		184.00	0.00	.F.	0.00	/ /		
49	22N/05E-14P	EDDY		136.00	0.00	.F.	0.00	/ /		
50	22N/05E-15A	GOULD		70.00	0.00	.F.	-1.00	/ /		
51	22N/05E-15B	STARK		46.00	56.00	.F.	37.00	07/23/74		
52	22N/05E-15B	MACLACHLAN		120.00	0.00	.F.	18.00	03/01/83	-0.75	
53	22N/05E-15D	THORSETT AL		50.00	0.00	.F.	20.00	05/11/81	-0.60	
54	22N/05E-15E	BRANDON WAYNE		149.00	159.00	.F.	144.00	06/13/58	-0.40	
55	22N/05E-15E	BURNETT		54.00	64.00	.F.	39.00	01/01/56		
56	22N/05E-15F	EVANS DANIEL		160.00	0.00	.F.	0.00	/ /	0.60	
57	22N/05E-15H	NORKOOL-KOBE		66.00	0.00	.F.	20.00	06/01/62		
58	22N/05E-15H	NORCOOL CARL		97.00	109.00	.F.	43.00	12/20/77		
59	22N/05E-15J	LEARNE HAROLD		116.00	0.00	.F.	0.00	/ /	-0.70	
60	22N/05E-15J	LEARNE HAROLD		96.00	0.00	.F.	0.00	/ /	-0.70	

	Local Number	Owner	Well Name	GPM	TEST RESULTS Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
41	22N/05E-14K	BENSON RON		55	25.00	4.00				SKC DATABASE	.T.	.F.	.F.	.F.
42	22N/05E-14L	REICHEL		10						SKC DATABASE	.T.	.F.	.F.	.F.
43	22N/05E-14L	WHITNEY FRED		10	10.00	1.00				SKC DATABASE	.T.	.F.	.F.	.F.
44	22N/05E-14M	BRAKEL		19						SKC DB, LUZIER	.F.	.F.	.F.	.F.
45	22N/05E-14M	DARRAGH		20	29.00	0.50				SKC DATABASE	.T.	.F.	.F.	.F.
46	22N/05E-14N	ABBOTT LEON		8	18.00	1.00				SKC DATABASE	.T.	.F.	.F.	.F.
47	22N/05E-14P	IMLAY		20						SKC DB, LUZIER	.T.	.F.	.F.	.F.
48	22N/05E-14P	HESS								SKC DB, LUZIER	.F.	.F.	.F.	.F.
49	22N/05E-14P	EDDY		9						SKC DB, LUZIER	.F.	.F.	.F.	.F.
50	22N/05E-15A	GOULD		18	10.00	5.00				SKC DB, LUZIER	.T.	.F.	.F.	.F.
51	22N/05E-15B	STARK		12	4.00	1.50				SKC DATABASE	.T.	.F.	.F.	.F.
52	22N/05E-15B	MACLACHLAN		60	60.00	4.00				SKC DATABASE	.T.	.F.	.F.	.F.
53	22N/05E-15D	THORSETT AL								SKC DATABASE	.T.	.F.	.F.	.F.
54	22N/05E-15E	BRANDON WAYNE		60						SKC DB, LUZIER	.T.	.F.	.F.	.F.
55	22N/05E-15E	BURNETT		20	5.00	4.00				SKC DB, LUZIER	.T.	.F.	.F.	.F.
56	22N/05E-15F	EVANS DANIEL								SKC DATABASE	.T.	.F.	.F.	.F.
57	22N/05E-15H	NORKOOL-KOBE		200						SKC DB, LUZIER	.F.	.F.	.F.	.F.
58	22N/05E-15H	NORCOOL CARL		70	25.00	1.00				SKC DATABASE	.T.	.F.	.F.	.F.
59	22N/05E-15J	LEARNE HAROLD								SKC DATABASE	.F.	.F.	.F.	.F.
60	22N/05E-15J	LEARNE HAROLD								SKC DATABASE	.F.	.F.	.F.	.F.

	Owner	Well Name	Remarks
41	BENSON RON		BAIL TEST
42	REICHEL		
43	WHITNEY FRED		BAIL TEST
44	BRAKEL		OPENING DEPTH ASSUMED
45	DARRAGH		BAIL TEST
46	ABBOTT LEON		
47	IMLAY		FINISH AND OPENING DEPTH ASSUMED
48	HESS		OPENING DEPTH ASSUMED
49	EDDY		OPENING DEPTH ASSUMED
50	GOULD		FINISH AND OPENING DEPTH ASSUMED; FLOWS 6 GPM, SWL ESTIMATED
51	STARK		BAIL TEST
52	MACLACHLAN		BAIL TEST
53	THORSETT AL		PERF ZONE NOT SPECIFIEC, ASSUMED AT TOP OF SAND & GRAVEL ZONE
54	BRANDON WAYNE		
55	BURNETT		
56	EVANS DANIEL		HIGH IRON; OPENING DEPTH ASSUMED
57	NORKOOL-KOBE		OPENING DEPTH ASSUMED
58	NORCOOL CARL		BAIL TEST
59	LEARNE HAROLD		OWNER REPORTS HIGH IRON AND SMELL; OPENING DEPTH ASSUMED
60	LEARNE HAROLD		OPENING DEPTH ASSUMED

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	UTM Coordinates East	Elevation Data (ft. MSL) Elevation	Method
61	22N/05E-15L0	4723331220917	UHM		472333	1220917	S	5248936	563778	480	M
62	22N/05E-15L0	4723341220918	D		472334	1220918	S	5248975	563730	480	M
63	22N/05E-15L0	4723281220913	ROWE STEPHEN		472328	1220913	S	5248794	563856	482	M
64	22N/05E-15M0	4723331220935	BRODEN		472330	1220943	S	5248840	563204	430	M
65	22N/05E-15N0	4723181220941	LITTLE		472318	1220941	S	5248654	563091	410	M
66	22N/05E-15P0	4723251220914	HEATH FRANK		472325	1220914	S	5248694	563795	495	M
67	22N/05E-16D0	4724001221057	MOURER		472400	1221057	S	5249773	561568	475	M
68	22N/05E-16L0	4723361221034	KENT SCHOOL DISTRICT 415		472327	1221046	S	5248754	561895	485	
69	22N/05E-16M0	4723341221055	CLARK H P		472336	1221103	S	5249073	561544	450	M
70	22N/05E-16M0	4723351221056	ALFARONE		472335	1221056	S	5248995	561694	475	M
71	22N/05E-16M0	4723361221057	DOEFLINGER		472328	1221049	S	5248759	561838	475	M
72	22N/05E-16M0	4723281221105	GARBER L E		472328	1221105	S	5248776	561506	475	M
73	22N/05E-16P0	4723191221036	FRANKS		472319	1221036	S	5248356	562186	455	M
74	22N/05E-16P0	4723201201037	BROWN		472320	1221037	S	5248548	561978	475	M
75	22N/05E-16P0	4723241221035	MEYERS GERALD		472324	1221035	S	5248644	562129	485	M
76	22N/05E-16Q0	4723191221017	MERGENTHAL		472319	1221017	S	5248376	562506	425	M
77	22N/05E-16Q0	4723191221019	BELLETTE		472316	1221021	S	5248420	562410	425	M
78	22N/05E-16Q0	4723201221020	GUTHMILLER		472320	1221020	S	5248537	562459	425	M
79	22N/05E-21A0	4723091221003	FLEMING		472309	1221003	S	5248292	563003	415	M
80	22N/05E-21B0	4723051221022	GABRIELSON RICHARD		472305	1221022		5248089	562402	440	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
61	22N/05E-15L	UHM		JOHNSON DRIL		114.00	1974	C	6	F	NMA
62	22N/05E-15L	D		JOHNSON DRIL		115.00		C	6		NMA
63	22N/05E-15L	ROWE STEPHEN		NORTHWEST	200.00	200.00	1981	A	6	O	NMA
64	22N/05E-15M	BRODEN		JOHNSON	160.00	160.00	1958	C	6	O	SA
65	22N/05E-15N	LITTLE		JOHNSON DRIL		78.00	1975	C	0	P	SA
66	22N/05E-15P	HEATH FRANK		JOHNSON	152.00	152.00	1981	A	6	O	NMA
67	22N/05E-16D	MOURER				145.00			6		SA
68	22N/05E-16L	KENT SCHOOL		GAUDIO	470.00	411.00	1958	C	12	P	DA
69	22N/05E-16M	CLARK H P		MEYER	232.00	232.00	1962	C	6	O	?
70	22N/05E-16M	ALFARONE				170.00	1962		6		SA
71	22N/05E-16M	DOEFLINGER		JOHNSON	159.00	159.00	1960	C	6	P	SA
72	22N/05E-16M	GARBER L E			166.00	166.00	1964	C	6	P	SA
73	22N/05E-16P	FRANKS		JAMES BELL		150.00	1953		6	O	SA
74	22N/05E-16P	BROWN		JOHNSON		58.00	1960		6	O	PA
75	22N/05E-16P	MEYERS GERALD		EVERGREEN	276.00	275.00	1976	C	6	O	DA
76	22N/05E-16Q	MERGENTHAL		JOHNSON		58.00			6	O	PA
77	22N/05E-16Q	BELLETTE		JOHNSON DRIL	60.00	60.00	1975	C	6	P	PA
78	22N/05E-16Q	GUTHMILLER		JOHNSON DRIL		99.00	1973	C	6	P	SA
79	22N/05E-21A	FLEMING		JOHNSON & MA		52.00	1952		6		PA
80	22N/05E-21B	GABRIELSON		JOHNSON DRLL	114.00	114.00	1976	A	6	P	SA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen P = Perforations O = Open bottom G = Gravel Pack

Completion Aquifer Codes: ? = Unknown PA = Perched Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer NMA = North Meridian Aquifer DA = Deep Aquifer System

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
61	22N/05E-15L	UHM		114.00	0.00	.F.	95.00	03/22/74		
62	22N/05E-15L	D		115.00	0.00	.F.	95.00	03/25/74		
63	22N/05E-15L	ROWE STEPHEN		200.00	0.00	.F.	108.00	08/07/81	-1.20	
64	22N/05E-15M	BRODEN		160.00	0.00	.F.	66.27	06/15/62	-0.25	
65	22N/05E-15N	LITTLE		68.00	78.00	.F.	60.00	/ /		
66	22N/05E-15P	HEATH FRANK		152.00	0.00	.F.	109.00	02/25/81	-0.70	
67	22N/05E-16D	MOURER		145.00	0.00	.F.	118.57	06/20/62		
68	22N/05E-16L	KENT SCHOOL		344.00	355.00	.F.	230.80	02/17/58		
69	22N/05E-16M	CLARK H P		232.00	0.00	.F.	88.00	06/19/62		
70	22N/05E-16M	ALFARONE		170.00	0.00	.F.	151.77	06/20/62		
71	22N/05E-16M	DOEFLINGER		147.00	159.00	.F.	145.87	06/20/62	-1.50	
72	22N/05E-16M	GARBER L E		156.00	166.00	.F.	140.00	06/10/64	0.10	
73	22N/05E-16P	FRANKS		150.00	0.00	.F.	117.23	06/19/62	1.00	
74	22N/05E-16P	BROWN		58.00	0.00	.F.	34.00	12/03/62		
75	22N/05E-16P	MEYERS GERALD		275.00	0.00	.F.	230.00	10/08/76	-1.00	
76	22N/05E-16Q	MERGENTHAL		58.00	0.00	.F.	34.23	06/19/62		
77	22N/05E-16Q	BELLETTE		50.00	60.00	.F.	43.00	06/21/75	-0.30	
78	22N/05E-16Q	GUTHMILLER		90.00	100.00	.F.	79.00	09/01/73		
79	22N/05E-21A	FLEMING		52.00	0.00	.F.	11.49	10/13/61	0.20	
80	22N/05E-21B	GABRIELSON		104.00	114.00	.F.	100.00	06/07/76		

	Local Number	Owner	Well Name	TEST RESULTS GPM	Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
61	22N/05E-15L	UHM		12						SKC DATABASE	.T.	.F.	.F.	.F.
62	22N/05E-15L	D		12						SKC DATABASE	.T.	.F.	.F.	.F.
63	22N/05E-15L	ROWE STEPHEN		100	12.00	1.00				SKC DATABASE	.T.	.F.	.F.	.F.
64	22N/05E-15M	BRODEN		50						SKC DB, LUZIER	.T.	.F.	.F.	.F.
65	22N/05E-15N	LITTLE		20	6.00	5.00				SKC DATABASE	.T.	.F.	.F.	.F.
66	22N/05E-15P	HEATH FRANK		10	30.00	3.50				SKC DATABASE	.T.	.F.	.F.	.F.
67	22N/05E-16D	MOURER								SKC DB, LUZIER	.F.	.F.	.F.	.F.
68	22N/05E-16L	KENT SCHOOL		108	70.00	3.00		2000		SKC DB, R&N	.T.	.F.	.F.	.T.
69	22N/05E-16M	CLARK H P		6						SKC DB, LUZIER	.T.	.F.	.F.	.F.
70	22N/05E-16M	ALFARONE								SKC DB, LUZIER	.F.	.F.	.F.	.F.
71	22N/05E-16M	DOEFLINGER		18						SKC DB, LUZIER	.T.	.F.	.F.	.F.
72	22N/05E-16M	GARBER L E		18						SKC DATABASE	.T.	.F.	.F.	.F.
73	22N/05E-16P	FRANKS		7						SKC DB, LUZIER	.T.	.F.	.F.	.F.
74	22N/05E-16P	BROWN		40						SKC DB, LUZIER	.T.	.F.	.F.	.F.
75	22N/05E-16P	MEYERS GERALD		10	29.00	2.00				SKC DB, DOE LOG	.T.	.F.	.F.	.F.
76	22N/05E-16Q	MERGENTHAL		15						SKC DB, LUZIER	.T.	.F.	.F.	.F.
77	22N/05E-16Q	BELLETTE		6						SKC DATABASE	.T.	.F.	.F.	.F.
78	22N/05E-16Q	GUTHMILLER		18	4.00	2.00				SKC DATABASE	.T.	.F.	.F.	.F.
79	22N/05E-21A	FLEMING								SKC DB, LUZIER	.F.	.F.	.F.	.F.
80	22N/05E-21B	GABRIELSON		18		4.00				SKC DATABASE	.T.	.F.	.F.	.F.

	Owner	Well Name	Remarks
61	UHM		GRAVEL PACKED 114, OPENING DEPTH ASSUMED
62	D		OPENING DEPTH ASSUMED
63	ROWE STEPHEN		LOCATION FIELD CHECKED
64	BRODEN		FINISH AND OPENING DEPTH ASSUMED
65	LITTLE		BAIL TEST
66	HEATH FRANK		BAIL TEST
67	MOURER		OPENING DEPTH ASSUMED
68	KENT SCHOOL		ALSO PERFS 443-448 AND 457-463, THESE ZONES ESTIMATED TO YIELD 20 GPM; PERFS BACKFILLED
69	CLARK H P		FINISH AND OPENING DEPTH ASSUMED
70	ALFARONE		OPENING DEPTH ASSUMED
71	DOEFLINGER		
72	GARBER L E		
73	FRANKS		FINISH AND OPENING DEPTH ASSUMED
74	BROWN		FINISH AND OPENING DEPTH ASSUMED
75	MEYERS GERALD		DEEPENED WELL
76	MERGENTHAL		FINISH AND OPENING DEPTH ASSUMED
77	BELLETTE		GRAVEL PACKED 59
78	GUTHMILLER		BAIL TEST
79	FLEMING		OPENING DEPTH ASSUMED
80	GABRIELSON		

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	East	Elevation Data (ft. MSL) Elevation	Method
81	22N/05E-21B0	4723091221015	LOYER		472309	1221015	S	5248251	562578	485	M
82	22N/05E-21B0	4723111221014	WALLA FRED		472311	1221027	S	5248273	562299	460	M
83	22N/05E-21D0	4723081221058	GRANLUND		472308	1221058	S	5248073	561514	480	M
84	22N/05E-21E0	4722541221052	FRANK DICK		472251	1221052	S	5247661	561768	475	M
85	22N/05E-21E0	4722581221053	MC CANN		472258	1221053	S	5247710	561511	480	M
86	22N/05E-21E0	4722571221052	BAIRD		472257	1221052	S	5247873	561838	485	M
87	22N/05E-21F0	4722571221037	MORDHORST		472257	1221037	S	5247744	562078	435	M
88	22N/05E-21G0	4722511221014	WAGNER		472249	1221013	S	5247567	562586	465	M
89	22N/05E-21G0	4722521221013	WAGNER		472249	1221011	S	5247607	562559	465	M
90	22N/05E-21J0	4722401220955	SNOW		472240	1220955	S	5247362	562893	465	M
91	22N/05E-21J0	4722401220956	HIGHLAND WATER		472241	1221005	S	5247331	562785	475	M
92	22N/05E-21J0	4722421220957	SNOW		472242	1220957	S	5247375	562950	455	M
93	22N/05E-21J0	4722411220956	SNOW D		472239	1220958	S	5247305	562893	470	M
94	22N/05E-21K0	4722411221022	KENT, S.L.		472241	1221022	S	5247145	562381	515	M
95	22N/05E-21K0	4722421221023	KENT, S.L.		472242	1221023	S	5247191	562387	520	M
96	22N/05E-21K0	4722411221021	COLUMBIA GREENHOUSE		472241	1221021	S	5247330	562431	510	M
97	22N/05E-21L0	4722431221039	SWOEN		472243	1221039	S	5247436	562041	480	M
98	22N/05E-21L0	4722441221040	GRIFFITHS		472244	1221040	S	5247470	562215	500	M
99	22N/05E-21L0	4722451221041	GRIFFITHS		472245	1221041	S	5247416	562234	500	M
100	22N/05E-21L0	4722461221042	WESTHERSON		472246	1221042	S	5247325	562106	475	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
81	22N/05E-21B	LOYER				76.00			6		PA
82	22N/05E-21B	WALLA FRED		JOHNSON DRIL	268.00	268.00	1974	C	6	P	DA
83	22N/05E-21D	GRANLUND		DAVIS		232.00	1958		6		DA
84	22N/05E-21E	FRANK DICK		JOHNSON DRLL	314.00	314.00	1976	A	6	O	DA
85	22N/05E-21E	MC CANN		BELL		285.00	1953		6	O	DA
86	22N/05E-21E	BAIRD		MAXWELL		201.00			6		DA
87	22N/05E-21F	MORDHORST				170.00	1940		6		DA
88	22N/05E-21G	WAGNER		JOHNSON DRIL	185.00	185.00	1967	C	8	S	SA
89	22N/05E-21G	WAGNER		SHILLING		82.00	1945		6		PA
90	22N/05E-21J	SNOW		MAXWELL		165.00	1961		6	O	?
91	22N/05E-21J	HIGHLAND WATER		JOHNSON DRIL	178.00	170.00	1967	V	8	P	SA
92	22N/05E-21J	SNOW				11.60	1900	D	4		PA
93	22N/05E-21J	SNOW D				61.00	1890	D	36		PA
94	22N/05E-21K	KENT, S.L.		SCHILLING		225.00	1929		8		SA
95	22N/05E-21K	KENT, S.L.				26.80	1925	D	48		PA
96	22N/05E-21K	COLUMBIA		JOHNSON	215.00	215.00	1977	A	6	O	SA
97	22N/05E-21L	SWOEN				20.00	1951	D	36	C	PA
98	22N/05E-21L	GRIFFITHS		JOHNSON		160.00	1952		6		?
99	22N/05E-21L	GRIFFITHS				112.00	1952	D	42		PA
100	22N/05E-21L	WESTHERSON		JOHNSON		264.00			8		DA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen G = Gravel Pack P = Perforations O = Open bottom

Completion Aquifer Codes: ? = Unknown NMA = North Meridian Aquifer PA = Perched Aquifer System DA = Deep Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
81	22N/05E-21B	LOYER		76.00	0.00	.F.	0.00	/ /		
82	22N/05E-21B	WALLA FRED		258.00	268.00	.F.	185.00	08/13/74	-0.40	
83	22N/05E-21D	GRANLUND		232.00	0.00	.F.	0.00	/ /		
84	22N/05E-21E	FRANK DICK		293.00	0.00	.F.	245.00	04/28/76	-1.90	
85	22N/05E-21E	MC CANN		285.00	0.00	.F.	0.00	/ /		
86	22N/05E-21E	BAIRD		201.00	0.00	.F.	198.00	10/03/61		
87	22N/05E-21F	MORDHORST		170.00	0.00	.F.	0.00	/ /		
88	22N/05E-21G	WAGNER		170.00	185.00	.F.	87.00	11/15/67		
89	22N/05E-21G	WAGNER		82.00	0.00	.F.	60.00	10/08/61	-0.80	
90	22N/05E-21J	SNOW		165.00	0.00	.F.	0.00	/ /		
91	22N/05E-21J	HIGHLAND WATER		150.00	160.00	.F.	95.00	/ /		
92	22N/05E-21J	SNOW		11.60	0.00	.F.	4.29	10/08/61		
93	22N/05E-21J	SNOW D		61.00	0.00	.F.	54.53	10/08/61		
94	22N/05E-21K	KENT, S.L.		225.00	0.00	.F.	174.90	10/04/61	0.20	
95	22N/05E-21K	KENT, S.L.		27.00	0.00	.F.	9.85	10/04/61	0.40	
96	22N/05E-21K	COLUMBIA		215.00	0.00	.F.	175.00	08/24/77	-0.40	
97	22N/05E-21L	SWOEN		20.00	0.00	.F.	8.00	/ /		
98	22N/05E-21L	GRIFFITHS		160.00	0.00	.F.	0.00	/ /		
99	22N/05E-21L	GRIFFITHS		112.00	0.00	.F.	100.00	/ /		
100	22N/05E-21L	WESTHERSON		264.00	0.00	.F.	0.00	/ /		

	Local Number	Owner	Well Name	GPM	TEST RESULTS Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
81	22N/05E-21B	LOYER								SKC DB, LUZIER	.F.	.F.	.F.	.F.
82	22N/05E-21B	WALLA FRED		8	45.00	3.00				SKC DATABASE	.T.	.F.	.F.	.F.
83	22N/05E-21D	GRANLUND								SKC DB, LUZIER	.F.	.F.	.F.	.F.
84	22N/05E-21E	FRANK DICK		10	35.00	4.00				SKC DATABASE	.T.	.F.	.F.	.F.
85	22N/05E-21E	MC CANN								SKC DB, LUZIER	.T.	.F.	.F.	.F.
86	22N/05E-21E	BAIRD								SKC DB, LUZIER	.F.	.F.	.F.	.F.
87	22N/05E-21F	MORDHORST								SKC DB, LUZIER	.F.	.F.	.F.	.F.
88	22N/05E-21G	WAGNER		75	53.00	3.00				SKC DATABASE	.T.	.F.	.F.	.F.
89	22N/05E-21G	WAGNER								SKC DB, LUZIER	.F.	.F.	.F.	.F.
90	22N/05E-21J	SNOW		15						SKC DB, LUZIER	.T.	.F.	.F.	.F.
91	22N/05E-21J	HIGHLAND WATER		75						SKC DATABASE	.T.	.F.	.F.	.F.
92	22N/05E-21J	SNOW								SKC DATABASE	.F.	.F.	.F.	.F.
93	22N/05E-21J	SNOW D								SKC DB, LUZIER	.F.	.F.	.F.	.F.
94	22N/05E-21K	KENT, S.L.								SKC DB, LUZIER	.F.	.F.	.F.	.F.
95	22N/05E-21K	KENT, S.L.								SKC DB, LUZIER	.F.	.F.	.F.	.F.
96	22N/05E-21K	COLUMBIA		16	20.00	3.00				SKC DATABASE	.T.	.F.	.F.	.F.
97	22N/05E-21L	SWOEN								SKC DATABASE	.F.	.F.	.F.	.F.
98	22N/05E-21L	GRIFFITHS								SKC DB, LUZIER	.F.	.F.	.F.	.F.
99	22N/05E-21L	GRIFFITHS								SKC DB, LUZIER	.F.	.F.	.F.	.F.
100	22N/05E-21L	WESTHERSON								SKC DB, LUZIER	.F.	.F.	.F.	.F.

	Owner	Well Name	Remarks
81	LOYER		OPENING DEPTH ASSUMED
82	WALLA FRED		BAIL TEST
83	GRANLUND		OPENING DEPTH ASSUMED
84	FRANK DICK		BAIL TEST
85	MC CANN		FINISH AND OPENING DEPTH ASSUMED
86	BAIRD		OPENING DEPTH ASSUMED
87	MORDHORST		OPENING DEPTH ASSUMED
88	WAGNER		
89	WAGNER		BAD TASTE AND SMELL; HIGH IRON; OPENING DEPTH ASSUMED
90	SNOW		FINISH AND OPENING DEPTH ASSUMED
91	HIGHLAND WATER		SURFACE SEAL CONCRETE
92	SNOW		OPENING DEPTH ASSUMED
93	SNOW D		OPENING DEPTH ASSUMED
94	KENT, S.L.		OPENING DEPTH ASSUMED
95	KENT, S.L.		OPENING DEPTH ASSUMED
96	COLUMBIA		BAIL TEST
97	SWOEN		OPENING DEPTH ASSUMED
98	GRIFFITHS		OPENING DEPTH ASSUMED
99	GRIFFITHS		OPENING DEPTH ASSUMED
100	WESTHERSON		OPENING DEPTH ASSUMED

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	UTM Coordinates East	Elevation Data (ft. MSL) Elevation	Elevation Data (ft. MSL) Method
101	22N/05E-21M0	4722431220826	OLIVERS ABE		472244	1221059	S	5247368	561596	475	M
102	22N/05E-21P0	4722331221033	ISHAM		472233	1221033	S	5246783	562122	435	M
103	22N/05E-21P0	4722341221034	JOHNSON		472228	1221032	S	5246895	562188	455	M
104	22N/05E-21P0	4722331221035	BOETOW		472233	1221035	S	5247023	562174	465	M
105	22N/05E-21P0	4722231221032	PERSONETTE MARLEN		472223	1221032	S	5246788	562203	450	M
106	22N/05E-21Q0	4722321221014	MATSON		472232	1221014	S	5246775	562583	487	M
107	22N/05E-21Q0	4722511221012	ROCKWELL		472251	1221012	S	5247584	562401	480	M
109	22N/05E-21R0	4722321220954	STANLEY		472232	1220954	S	5246820	562685	483	M
110	22N/05E-21R0	4722331221955	ELLIS		472233	1221955	S	5246769	562729	475	M
111	22N/05E-21R0	4722341220956	SWANSON		472234	1220956	S	5246856	562888	448	M
112	22N/05E-21R0	4722311221011	KCWD 111	WELL 5	472232	1221013	S	5247069	562601	518	L
112A	22N/05E-21R		KCWD 111	WELL 5A	0	0		5247068	562558	515	L
113	22N/05E-22A0	4723141220847	KELLY		472314	1220847	S	5248280	564368	480	M
114	22N/05E-22A0	4723091220848	LOE		472309	1220848	S	5248200	564343	485	M
115	22N/05E-22A0	4723151220848	SOELTER		472315	1220848	S	5248014	564445	480	M
116	22N/05E-22B0	4723111220901	GORA		472311	1220901	S	5248251	564092	540	M
117	22N/05E-22B0	4723121220902	ALMONT WILBUR		472311	1220910	S	5248261	563899	490	M
118	22N/05E-22C0	4723111220915	JOHNSON		472311	1220915	S	5248256	563783	465	M
119	22N/05E-22D0	4723091220937	MATHENA		472309	1220937	S	5248024	563130	410	M
120	22N/05E-22D0	4723101220938	KADDEN		472310	1220938	S	5248254	563093	400	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
101	22N/05E-21M	OLIVERS ABE		SHILLING		290.00	1928	C	6		DA
102	22N/05E-21P	ISHAM				53.50	1960	D	38		PA
103	22N/05E-21P	JOHNSON		DORSTEN		135.00	1959	C	6	O	SA
104	22N/05E-21P	BOETOW				15.20	1930	D	36		PA
105	22N/05E-21P	PERSONETTE		NORTHWEST	320.00	320.00	1979	A	6	P	DA
106	22N/05E-21Q	MATSON				220.00	1943		6		PA
107	22N/05E-21Q	ROCKWELL		JOHNSON		97.00	1959		6		PA
109	22N/05E-21R	STANLEY		JOHNSON		100.00	1959		6		?
110	22N/05E-21R	ELLIS		JOHNSON		90.00			6		?
111	22N/05E-21R	SWANSON		JOHNSON		63.00	1962		6	O	PA
112	22N/05E-21R	KCWD 111	WELL 5	ARMSTRONG	373.00	368.00	1982	C	12	P	DA
112A	22N/05E-21R	KCWD 111	WELL 5A	CHARON	1210.00	334.00	1991	C H	12	S	DA
113	22N/05E-22A	KELLY		JOHNSON		187.00	1957		6		NMA
114	22N/05E-22A	LOE		JOHNSON		202.00	1973	C	6	P	NMA
115	22N/05E-22A	SOELTER				18.50		D	36		PA
116	22N/05E-22B	GORA		GOLDEN RULE		81.00	1973	C	6	O	PA
117	22N/05E-22B	ALMONT WILBUR		WESTERN WATE	221.00	221.00	1973	A	6	O	?
118	22N/05E-22C	JOHNSON		SHILLING		200.00	1928	C	6	P	PA
119	22N/05E-22D	MATHENA		DAVIS		117.00	1951		6		NMA
120	22N/05E-22D	KADDEN				120.00			6		SA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen G = Gravel Pack P = Perforations O = Open bottom

Completion Aquifer Codes: ? = Unknown NMA = North Meridian Aquifer PA = Perched Aquifer System DA = Deep Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
101	22N/05E-21M	OLIVERS ABE		290.00	0.00	.F.	230.00	10/03/61	2.90	
102	22N/05E-21P	ISHAM		54.00	0.00	.F.	45.29	07/03/62	-4.30	
103	22N/05E-21P	JOHNSON		135.00	0.00	.F.	116.10	10/04/61	8.00	
104	22N/05E-21P	BOETOW		15.00	0.00	.F.	10.89	10/04/61		
105	22N/05E-21P	PERSONETTE		295.00	312.00	.F.	280.00	12/04/79		
106	22N/05E-21Q	MATSON		220.00	0.00	.F.	-1.00	/ /		
107	22N/05E-21Q	ROCKWELL		97.00	0.00	.F.	80.00	01/01/59	-1.00	
109	22N/05E-21R	STANLEY		100.00	0.00	.F.	90.78	07/03/62	-2.00	
110	22N/05E-21R	ELLIS		90.00	0.00	.F.	77.07	07/05/62	-1.52	
111	22N/05E-21R	SWANSON		63.00	0.00	.F.	4.93	07/05/62	0.53	
112	22N/05E-21R	KCWD 111	WELL 5	278.00	329.00	.T.	142.00	02/15/82		ELEVATION IS FOR TOP OF CASING, SU=2.28
112A	22N/05E-21R	KCWD 111	WELL 5A	302.00	324.00	.F.	152.70	11/21/91	-2.30	TOP OF CASING
113	22N/05E-22A	KELLY		187.00	0.00	.F.	0.00	/ /		
114	22N/05E-22A	LOE		192.00	202.00	.F.	137.00	08/03/73		
115	22N/05E-22A	SOELTER		18.50	0.00	.F.	16.21	10/13/61		
116	22N/05E-22B	GORA		81.00	0.00	.F.	39.00	/ /		
117	22N/05E-22B	ALMONT WILBUR		221.00	0.00	.F.	0.00	/ /		
118	22N/05E-22C	JOHNSON		80.00	110.00	.F.	18.00	/ /		
119	22N/05E-22D	MATHENA		117.00	0.00	.F.	30.00	/ /		
120	22N/05E-22D	KADDEN		120.00	0.00	.F.	18.00	10/10/61	-5.30	

	Local Number	Owner	Well Name	GPM	TEST RESULTS Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
101	22N/05E-21M	OLIVERS ABE								SKC DB, LUZIER	.F.	.F.	.F.	.F.
102	22N/05E-21P	ISHAM								SKC DB, LUZIER	.F.	.F.	.F.	.F.
103	22N/05E-21P	JOHNSON								SKC DB, LUZIER	.T.	.F.	.F.	.F.
104	22N/05E-21P	BOETOW								SKC DB, LUZIER	.F.	.F.	.F.	.F.
105	22N/05E-21P	PERSONETTE		5	62.00	1.00				SKC DATABASE	.T.	.F.	.F.	.F.
106	22N/05E-21Q	MATSON		2						SKC DB, LUZIER	.F.	.F.	.F.	.F.
107	22N/05E-21Q	ROCKWELL								SKC DATABASE	.F.	.F.	.F.	.F.
109	22N/05E-21R	STANLEY								SKC DB, LUZIER	.F.	.F.	.F.	.F.
110	22N/05E-21R	ELLIS								SKC DB, LUZIER	.F.	.F.	.F.	.F.
111	22N/05E-21R	SWANSON		12						SKC DB, LUZIER	.T.	.F.	.F.	.F.
112	22N/05E-21R	KCWD 111	WELL 5	160	55.00	24.00	0.0001000	3000		SKC DB, R&N	.T.	.T.	.F.	.T.
112A	22N/05E-21R	KCWD 111	WELL 5A	167	86.20	4.50	0.0001000	3000		R&N 80-56F	.T.	.T.	.F.	.T.
113	22N/05E-22A	KELLY								SKC DB, LUZIER	.F.	.F.	.F.	.F.
114	22N/05E-22A	LOE		16	1.00	3.00				SKC DB, DOE LOG	.T.	.F.	.F.	.F.
115	22N/05E-22A	SOELTER								SKC DB, LUZIER	.F.	.F.	.F.	.F.
116	22N/05E-22B	GORA		6	20.00	2.00				SKC DATABASE	.T.	.F.	.F.	.F.
117	22N/05E-22B	ALMONT WILBUR								SKC DATABASE	.T.	.F.	.F.	.F.
118	22N/05E-22C	JOHNSON		60	70.00	4.00				SKC DB, LUZIER	.T.	.F.	.F.	.F.
119	22N/05E-22D	MATHENA								SKC DB, LUZIER	.F.	.F.	.F.	.F.
120	22N/05E-22D	KADDEN								SKC DB, LUZIER	.F.	.F.	.F.	.F.

	Owner	Well Name	Remarks
101	OLIVERS ABE		OPENING DEPTH ASSUMED
102	ISHAM		OPENING DEPTH ASSUMED
103	JOHNSON		FINISH AND OPENING DEPTH ASSUMED
104	BOETOW		OPENING DEPTH ASSUMED
105	PERSONETTE		BAIL TEST
106	MATSON		FLOWING WELL, SWL ASSUMED; OPENING DEPTH ASSUMED
107	ROCKWELL		OPENING DEPTH ASSUMED
109	STANLEY		OPENING DEPTH ASSUMED
110	ELLIS		OPENING DEPTH ASSUMED
111	SWANSON		FINISH AND OPENING DEPTH ASSUMED
112	KCWD 111	WELL 5	STORAGE COEFF. FROM WELL 5A TESTING
112A	KCWD 111	WELL 5A	MUD ROTARY BY OELKE BELOW 384 FEET. ZONE FROM 530-560 TESTED, T LESS THAN 1000 GPD/FT. ZONE FROM 425-475 FEET TESTED, Q/S < 1
113	KELLY		OPENING DEPTH ASSUMED
114	LOE		BAIL TEST, 1 FOOT DRAWDOWN ASSUMED (0 FEET LISTED ON DOE WELL LOG)
115	SOELTER		OPENING DEPTH ASSUMED
116	GORA		BAIL TEST
117	ALMONT WILBUR		
118	JOHNSON		
119	MATHENA		OPENING DEPTH ASSUMED
120	KADDEN		OPENING DEPTH ASSUMED

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	UTM Coordinates East	Elevation Data (ft. MSL) Elevation	Elevation Data (ft. MSL) Method
121	22N/05E-22D0	4723111220939	BARRIE		472311	1220939	S	5248261	563318	395	M
122	22N/05E-22D0	4723121220940	SCHORTGEN		472312	1220940	S	5248302	563429	420	M
123	22N/05E-22E0	4722521220944	HAAG		472252	1220944	S	5247824	563112	400	M
124	22N/05E-22E0	4722531220944	MERIDIAN VALLEY GOLF COURS		472249	1220946	S	5247571	563148	450	M
125	22N/05E-22E0	4722541220915	MERIDIAN VALLEY COUNTRY CL		472252	1220935	S	5247666	563369	375	M
126	22N/05E-22E0	4722551220916	VALLEY DEVELOPMENT CORP		472250	1220949	S	5247609	563089	445	M
127	22N/05E-22H0	4722571220847	LOE		472257	1220847	S	5247924	564320	505	M
129	22N/05E-22J0	4722381220837	BARKER		472238	1220837	S	5247365	564613	360	M
130	22N/05E-22J0	4722411220835	MERIDIAN FIRS DEVELOPMENT		472241	1220835	S	5247326	564626	365	M
132	22N/05E-22J0	4722411220845	KCWD 111	WELL 4	472241	1220845		5247353	564417	423	L
133	22N/05E-22J0	4722351220837	KCWD 111	WELL 2	472235	1220837		5247159	564602	339	L
134	22N/05E-22M0	4722381220945	FLEMING		472238	1220945	S	5247202	563156	470	M
135	22N/05E-22N0	4722311220943	PETERSON		472231	1220943	S	5246789	563106	427	M
136	22N/05E-22N0	4722321220944	GILES		472225	1220949	S	5246852	563116	440	M
137	22N/05E-22P0	4722321220921	NESLAND		472232	1220921	S	5246847	563509	450	M
138	22N/05E-22P0	4722331220922	JACOBSEN		472233	1220922	S	5246880	563717	447	M
139	22N/05E-22R0	4722231220838	KCWD 111	WELL 1	472223	1220838	S	5246808	564582	331	L
141	22N/05E-22R0	4722241220841	KCWD 111	256TH ST TEST WELL	472224	1220841		5246790	564586	325	M
142	22N/05E-23A0	4723111220736	HERBST		472311	1220736	S	5248201	566180	535	M
143	22N/05E-23A0	4723121220737	ANDERSON		472312	1220737	S	5248060	566157	537	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
121	22N/05E-22D	BARRIE		JOHNSON		81.50	1959		6		SA
122	22N/05E-22D	SCHORTGEN		SHILLING		69.00	1952		6		PA
123	22N/05E-22E	HAAG		J C MAXWELL		40.00	1951		8		?
124	22N/05E-22E	MERIDIAN VALLEY		JOHNSON DRLG	170.00	170.00	1967	C	8	S	NMA
125	22N/05E-22E	MERIDIAN VALLEY		JOHNSON DRLG	170.00	143.00	1967	C	10	P	?
126	22N/05E-22E	VALLEY		JOHNSON	174.00	174.00	1967	A	8	P	NMA
127	22N/05E-22H	LOE				26.00		D	24	Z	PA
129	22N/05E-22J	BARKER		JOHNSON		48.00	1954		6		NMA
130	22N/05E-22J	MERIDIAN FIRS		JOHNSON	54.00	54.00	1955	C	6	P	NMA
132	22N/05E-22J	KCWD 111	WELL 4	MUELLER	170.00	158.00	1982	C	12	S	NMA
133	22N/05E-22J	KCWD 111	WELL 2	MUELLER	68.00	62.00	1982	C	12	S	NMA
134	22N/05E-22M	FLEMING				40.00		D	48		PA
135	22N/05E-22N	PETERSON		JOHNSON		143.00	1954		6		SA
136	22N/05E-22N	GILES		JOHNSON	75.00	75.00	1954		6	O	PA
137	22N/05E-22P	NESLAND				65.00	1925	D	48		PA
138	22N/05E-22P	JACOBSEN				67.00		D	48		PA
139	22N/05E-22R	KCWD 111	WELL 1	ARMSTRONG	259.50	58.00	1984	C	12	S	NMA
141	22N/05E-22R	KCWD 111	256TH ST TEST WELL	ARMSTRONG	960.00		1981	C H	8		?
142	22N/05E-23A	HERBST		LENORD CEVIN		165.00			6		SA
143	22N/05E-23A	ANDERSON				140.00			6		SA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen G = Gravel Pack P = Perforations O = Open bottom

Completion Aquifer Codes: ? = Unknown NMA = North Meridian Aquifer PA = Perched Aquifer System DA = Deep Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
121	22N/05E-22D	BARRIE		81.50	0.00	.F.	18.00	10/13/61	-4.90	
122	22N/05E-22D	SCHORTGEN		69.00	0.00	.F.	25.56	10/13/61	1.00	
123	22N/05E-22E	HAAG		40.00	0.00	.F.	0.00	/ /		
124	22N/05E-22E	MERIDIAN VALLEY		160.00	170.00	.F.	85.00	06/30/67		
125	22N/05E-22E	MERIDIAN VALLEY		50.00	143.00	.F.	-10.00	04/28/87		
126	22N/05E-22E	VALLEY		154.00	174.00	.F.	83.00	06/21/67		
127	22N/05E-22H	LOE		26.00	0.00	.F.	13.28	10/13/61	0.50	
129	22N/05E-22J	BARKER		48.00	0.00	.F.	16.60	05/31/62	-3.00	
130	22N/05E-22J	MERIDIAN FIRS		50.00	54.00	.F.	15.20	07/21/65	2.90	
132	22N/05E-22J	KCWD 111	WELL 4	143.90	156.30	.F.	74.90	03/03/83		ELEV. IS FOR CURRENT TOP OF CASING,
133	22N/05E-22J	KCWD 111	WELL 2	44.00	54.00	.F.	-1.60	11/30/82		ELEV IS FOR CURRENT TOP OF CASING,
134	22N/05E-22M	FLEMING		40.00	0.00	.F.	21.79	10/08/61	0.40	
135	22N/05E-22N	PETERSON		143.00	0.00	.F.	41.57	07/05/62		
136	22N/05E-22N	GILES		75.00	0.00	.F.	14.59	07/05/62	-0.30	
137	22N/05E-22P	NESLAND		65.00	0.00	.F.	31.53	07/09/62		
138	22N/05E-22P	JACOBSEN		67.00	0.00	.F.	34.16	07/09/62		
139	22N/05E-22R	KCWD 111	WELL 1	43.00	53.00	.F.	2.50	01/07/81		ELEV. FOR CURRENT TOP OF CASING, SU=4.5
141	22N/05E-22R	KCWD 111	256TH ST TEST WELL	0.00	0.00	.F.	0.00	/ /		
142	22N/05E-23A	HERBST		165.00	0.00	.F.	137.84	04/05/62	-2.00	
143	22N/05E-23A	ANDERSON		140.00	0.00	.F.	0.00	/ /		

	Local Number	Owner	Well Name	TEST RESULTS GPM	Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
121	22N/05E-22D	BARRIE								SKC DB, LUZIER	.F.	.F.	.F.	.F.
122	22N/05E-22D	SCHORTGEN								SKC DB, LUZIER	.F.	.F.	.F.	.F.
123	22N/05E-22E	HAAG								SKC DB, LUZIER	.F.	.F.	.F.	.F.
124	22N/05E-22E	MERIDIAN VALLEY		165	71.00	4.00		5400		SKC DB, R&N	.T.	.F.	.F.	.F.
125	22N/05E-22E	MERIDIAN VALLEY		100	87.00	8.00		600		SKC DB, R&N	.T.	.F.	.F.	.F.
126	22N/05E-22E	VALLEY		200	37.00	3.00		3700		SKC DB, R&N	.T.	.F.	.F.	.F.
127	22N/05E-22H	LOE								SKC DB, LUZIER	.F.	.F.	.F.	.F.
129	22N/05E-22J	BARKER								SKC DB, LUZIER	.F.	.F.	.F.	.F.
130	22N/05E-22J	MERIDIAN FIRS		25	10.00	2.00				SKC DATABASE	.F.	.F.	.F.	.F.
132	22N/05E-22J	KCWD 111	WELL 4	390	51.00	24.00		15000		SKC DB, R&N	.T.	.F.	.F.	.T.
133	22N/05E-22J	KCWD 111	WELL 2	298	44.00	6.00		24000		SKC DB, R&N	.T.	.F.	.T.	.T.
134	22N/05E-22M	FLEMING								SKC DB, LUZIER	.F.	.F.	.F.	.F.
135	22N/05E-22N	PETERSON								SKC DB, LUZIER	.F.	.F.	.F.	.F.
136	22N/05E-22N	GILES		15						SKC DB, LUZIER	.T.	.F.	.F.	.F.
137	22N/05E-22P	NESLAND								SKC DB, LUZIER	.F.	.F.	.F.	.F.
138	22N/05E-22P	JACOBSEN								SKC DB, LUZIER	.F.	.F.	.F.	.F.
139	22N/05E-22R	KCWD 111	WELL 1	154	31.30	4.00		6400	11000	SKC DB, R&N	.T.	.F.	.T.	.T.
141	22N/05E-22R	KCWD 111	256TH ST TEST WELL							SKC DB, R&N	.T.	.T.	.F.	.F.
142	22N/05E-23A	HERBST								SKC DB, LUZIER	.F.	.F.	.F.	.F.
143	22N/05E-23A	ANDERSON								SKC DB, LUZIER	.F.	.F.	.F.	.F.

	Owner	Well Name	Remarks
121	BARRIE		OPENING DEPTH ASSUMED
122	SCHORTGEN		OPENING DEPTH ASSUMED
123	HAAG		OPENING DEPTH ASSUMED
124	MERIDIAN VALLEY		TRANSMISSIVITY FROM R&N 1987 TESTING
125	MERIDIAN VALLEY		WELL TESTED BY R&N IN 1987, AT THAT TIME, WELL FLOWS 10 GPM; SWL ESTIMATED FROM SPECIFIC CAPACITY DATA; TRANSMISSIVITY FROM R&N TEST
126	VALLEY		TRANSMISSIVITY FROM R&N 1987 TESTING
127	LOE		OPENING DEPTH ASSUMED
129	BARKER		OPENING DEPTH ASSUMED
130	MERIDIAN FIRS		
132	KCWD 111	WELL 4	CURRENT TOP OF CASING IS 2.16 FEET ABOVE TOC AT CONSTRUCTION; CONSTRUCTION SWL AND RECENT SWL ARE ADJUSTED TO DEPTH BELOW CURRENT MP, WHOSE
133	KCWD 111	WELL 2	CURRENT TOP OF CASING IS 2.04 FEET ABOVE TOC AT CONSTRUCTION; CONSTRUCTION SWL AND RECENT SWL ARE ADJUSTED TO CURRENT MP (EL. ABOVE); T
134	FLEMING		OPENING DEPTH ASSUMED
135	PETERSON		OPENING DEPTH ASSUMED
136	GILES		FINISH AND OPENING DEPTH ASSUMED
137	NESLAND		OPENING DEPTH ASSUMED
138	JACOBSEN		OPENING DEPTH ASSUMED
139	KCWD 111	WELL 1	CURRENT TOP OF CASING IS 3.86 FEET ABOVE TOC AT CONSTRUCTION; CONSTRUCTION SWL AND RECENT SWL ARE ADJUSTED TO CURRENT MP(ELEV. ABOVE);
141	KCWD 111	256TH ST	CABLE-TOOL TO 379, MUD ROTARY BY RICHARDSON TO 960; NOT COMPLETED
142	HERBST		OPENING DEPTH ASSUMED
143	ANDERSON		OPENING DEPTH ASSUMED

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	East	Elevation Data (ft. MSL) Elevation	Method
144	22N/05E-23B0	4723071220750	HIATT		472307	1220750	S	5248312	565493	500	M
145	22N/05E-23C0	4723071220806	HUFF		472307	1220806	S	5248112	565378	520	M
146	22N/05E-23E0	4722571220826	PATTON JOHN		472257	1220826	S	5247846	564832	350	M
147	22N/05E-23F0	4722541220811	AUGERSON TERRY		472254	1220811	S	5247839	565261	486	M
148	22N/05E-23F0	4722551220758	WILCOX		472255	1220758	S	5247784	565418	525	M
149	22N/05E-23F0	4722561220759	PARROTT		472256	1220759	S	5247794	565373	525	M
150	22N/05E-23G0	4722541220759	OLSON		472254	1220759	S	5247637	565553	535	M
151	22N/05E-23H0	4722491220736	RINTALA		472249	1220736	S	5247854	566157	530	M
152	22N/05E-23L0	4722421220805	WIRAG		472242	1220805	S	5247177	565422	485	M
153	22N/05E-23L0	4722431220806	FOURNIER JR		472236	1220758	S	5247236	565409	505	M
155	22N/05E-23M0	4722421220828	KCWD 111	WELL 3	472245	1220832	S	5247479	564716	351	L
156	22N/05E-23P0	4722321220802	STEARNS		472232	1220802	S	5246874	565297	456	M
157	22N/05E-23P0	4722231220809	EVOY ROBERT		472223	1220809	S	5246817	565190	425	M
158	22N/05E-23Q0	4722331220749	BIZEK		472226	1220747	S	5246914	565644	460	M
159	22N/05E-23R0	4722321220734	SCRIBNER		472232	1220734	S	5247089	566094	473	M
160	22N/05E-24B0	4723081220630	SCHLAEGEL		472308	1220630	S	5248310	567158	510	M
161	22N/05E-24C0	4723101220648	PETERSON		472310	1220648	S	5248300	566916	527	M
162	22N/05E-24Q0	4722331220630	SMITHSON		472233	1220630	S	5246867	567329	430	M
163	22N/05E-24D0	4723101220710	DOHERTY		472310	1220710	S	5248096	566344	530	M
164	22N/05E-24E0	4722531220714	TORGERSON T. J.		472253	1220714	S	5247721	566358	525	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
144	22N/05E-23B	HIATT		MALCOLM		147.00	1960		6		PA
145	22N/05E-23C	HUFF				90.00	1961		6		PA
146	22N/05E-23E	PATTON JOHN		JOHNSON	37.00	37.00	1984	A	6	O	NMA
147	22N/05E-23F	AUGERSON TERRY		JOHNSON	131.00	131.00	1978	A	6	O	SA
148	22N/05E-23F	WILCOX		JOHNSON DRIL		103.00	1974	C	6	P	PA
149	22N/05E-23F	PARROTT				180.00		V	8		SA
150	22N/05E-23G	OLSON				144.00			6		SA
151	22N/05E-23H	RINTALA		SHILLING		141.00	1936		6		SA
152	22N/05E-23L	WIRAG		SHILLING		104.00			6		SA
153	22N/05E-23L	FOURNIER JR		DORSTEN		118.00	1960		8		SA
155	22N/05E-23M	KCWD 111	WELL 3	MUELLER	84.00	84.00	1982	C	12	S	NMA
156	22N/05E-23P	STEARNS		JOHNSON		87.00	1961		6		SA
157	22N/05E-23P	EVOY ROBERT		JOHNSON	89.00	89.00	1982	A	6	O	SA
158	22N/05E-23Q	BIZEK		JOHNSON DRIL	108.00	108.00	1975	C	6	P	SA
159	22N/05E-23R	SCRIBNER		MAXWELL		86.10			6		SA
160	22N/05E-24B	SCHLAEGEL		JOHNSON		119.00			6	P	SA
161	22N/05E-24C	PETERSON		JOHNSON		126.00	1958		6		SA
162	22N/05E-24Q	SMITHSON		MYRL JOHNSON		85.00			6		SA
163	22N/05E-24D	DOHERTY		JOHNSON		150.00	1958		6	O	SA
164	22N/05E-24E	TORGERSON T. J.		JOHNSON	140.00	140.00	1956	C	6	O	SA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen G = Gravel Pack P = Perforations O = Open bottom

Completion Aquifer Codes: ? = Unknown NMA = North Meridian Aquifer PA = Perched Aquifer System DA = Deep Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
144	22N/05E-23B	HIATT		147.00	0.00	.F.	56.80	05/27/62		
145	22N/05E-23C	HUFF		90.00	0.00	.F.	79.00	/ /		
146	22N/05E-23E	PATTON JOHN		37.00	0.00	.F.	10.00	08/08/84	-0.50	
147	22N/05E-23F	AUGERSON TERRY		131.00	0.00	.F.	102.00	03/24/78	-0.50	
148	22N/05E-23F	WILCOX		93.00	103.00	.F.	90.00	02/07/74		
149	22N/05E-23F	PARROTT		180.00	0.00	.F.	140.00	10/03/63		
150	22N/05E-23G	OLSON		144.00	0.00	.F.	138.18	06/01/62	-2.50	
151	22N/05E-23H	RINTALA		141.00	0.00	.F.	134.53	04/05/62	-0.40	
152	22N/05E-23L	WIRAG		104.00	0.00	.F.	97.15	06/01/62	-1.00	
153	22N/05E-23L	FOURNIER JR		118.00	0.00	.F.	107.60	06/01/62	1.00	
155	22N/05E-23M	KCWD 111	WELL 3	54.00	74.00	.F.	6.30	12/01/82		ELEV. FOR CURRENT TOP OF CASING, SU=2.9
156	22N/05E-23P	STEARNS		87.00	0.00	.F.	75.40	07/11/62		
157	22N/05E-23P	EVOY ROBERT		89.00	0.00	.F.	60.00	10/08/82	-0.40	
158	22N/05E-23Q	BIZEK		98.00	108.00	.F.	84.00	01/16/75		
159	22N/05E-23R	SCRIBNER		86.10	0.00	.F.	77.90	04/05/62		
160	22N/05E-24B	SCHLAEGEL		102.00	115.00	.F.	107.20	04/02/62		
161	22N/05E-24C	PETERSON		126.00	0.00	.F.	0.00	/ /		
162	22N/05E-24Q	SMITHSON		85.00	0.00	.F.	61.00	/ /		
163	22N/05E-24D	DOHERTY		150.00	0.00	.F.	135.44	04/09/62	0.40	
164	22N/05E-24E	TORGERSON T. J.		140.00	0.00	.F.	132.00	04/05/62	0.80	

	Local Number	Owner	Well Name	GPM	TEST RESULTS Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
144	22N/05E-23B	HIATT								SKC DB, LUZIER	.F.	.F.	.F.	.F.
145	22N/05E-23C	HUFF								SKC DB, LUZIER	.F.	.F.	.F.	.F.
146	22N/05E-23E	PATTON JOHN		100	12.00	2.00				SKC DATABASE	.T.	.F.	.F.	.F.
147	22N/05E-23F	AUGERSON TERRY		20	10.00	4.00				SKC DATABASE	.T.	.F.	.F.	.F.
148	22N/05E-23F	WILCOX		15	1.00	3.00				SKC DATABASE	.T.	.F.	.F.	.F.
149	22N/05E-23F	PARROTT								SKC DATABASE	.F.	.F.	.F.	.F.
150	22N/05E-23G	OLSON								SKC DB, LUZIER	.F.	.F.	.F.	.F.
151	22N/05E-23H	RINTALA		17						SKC DB, LUZIER	.F.	.F.	.F.	.F.
152	22N/05E-23L	WIRAG								SKC DB, LUZIER	.F.	.F.	.F.	.F.
153	22N/05E-23L	FOURNIER JR		50						SKC DB, LUZIER	.F.	.F.	.F.	.F.
155	22N/05E-23M	KCWD 111	WELL 3	483	42.00	10.00	0.0001500	70000	20000	SKC DB, R&N	.T.	.F.	.F.	.T.
156	22N/05E-23P	STEARNS		8						SKC DB, LUZIER	.F.	.F.	.F.	.F.
157	22N/05E-23P	EVOY ROBERT		25	15.00	2.50				SKC DATABASE	.T.	.F.	.F.	.F.
158	22N/05E-23Q	BIZEK								SKC DATABASE	.T.	.F.	.F.	.F.
159	22N/05E-23R	SCRIBNER								SKC DB, LUZIER	.F.	.F.	.F.	.F.
160	22N/05E-24B	SCHLAEGEL		18						SKC DB, LUZIER	.T.	.F.	.F.	.F.
161	22N/05E-24C	PETERSON								SKC DB, LUZIER	.F.	.F.	.F.	.F.
162	22N/05E-24Q	SMITHSON								SKC DATABASE	.F.	.F.	.F.	.F.
163	22N/05E-24D	DOHERTY		20						SKC DB, LUZIER	.T.	.F.	.F.	.F.
164	22N/05E-24E	TORGERSON T. J.								SKC DB, LUZIER	.T.	.F.	.F.	.F.

	Owner	Well Name	Remarks
144	HIATT		OPENING DEPTH ASSUMED
145	HUFF		OPENING DEPTH ASSUMED
146	PATTON JOHN		AIR JET TEST
147	AUGERSON TERRY		BAIL TEST. LOCATION FIELD CHECKED.
148	WILCOX		BAIL TEST, 1 FOOT DRAWDOWN ASSUMED (0 FEET LISTED ON DOE WELL LOG)
149	PARROTT		OPENING DEPTH ASSUMED
150	OLSON		OPENING DEPTH ASSUMED
151	RINTALA		OPENING DEPTH ASSUMED
152	WIRAG		OPENING DEPTH ASSUMED
153	FOURNIER JR		OPENING DEPTH ASSUMED
155	KCWD 111	WELL 3	CURRENT TOP OF CASING IS 3.73 ABOVE TOC AT CONSTRUCTION; CONSTRUCTION SWL AND RECENT SWL ADJUSTED TO CURRENT MP (ELEV. ABOVE); T DATA FROM
156	STEARNS		OPENING DEPTH ASSUMED
157	EVOY ROBERT		BAIL TEST
158	BIZEK		
159	SCRIBNER		OPENING DEPTH ASSUMED
160	SCHLAEGEL		
161	PETERSON		OPENING DEPTH ASSUMED
162	SMITHSON		OPENING DEPTH ASSUMED
163	DOHERTY		FINISH AND OPENING DEPTH ASSUMED
164	TORGERSON T. J.		FINISH AND OPENING DEPTH ASSUMED

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	UTM Coordinates East	Elevation Data (ft. MSL) Elevation	Elevation Data (ft. MSL) Method
165	22N/05E-24E0	4722591220712	STINNETT		472259	1220712	S	5247790	566365	527	M
166	22N/05E-24E0	4723101200710	MANNY R. J.		472258	1220715	S	5248008	566340	530	M
167	22N/05E-24E0	4722591220712	NELSON		472259	1220712	S	5247910	566328	525	M
168	22N/05E-24G0	4722571220623	LEARN RICHARD		472257	1220623	S	5247858	567435	475	M
170	22N/05E-24J0	4722411220608	CROCKER		472241	1220608	S	5247434	567690	435	M
171	22N/05E-24J0	4722411220608	JULIAN		472241	1220608	S	5247290	567635	445	M
172	22N/05E-24J0	4722401220610	ONEILL PHILLIP		472238	1220603	S	5247287	567827	435	M
173	22N/05E-24M0	4722421220717	HAM WATER CO.		472242	1220717	S	5247399	566295	500	M
174	22N/05E-25C0	4722131220714	SOWINSKY		472213	1220714	S	5246656	566780	448	M
175	22N/05E-25E0	4721581220713	BOCK		472158	1220713	S	5246354	566397	455	M
176	22N/05E-25J0	4720491220613	GERGEEN		472049	1220613	S	5245864	567846	370	M
177	22N/05E-25L0	4721211220640	KCWD 105 WELL 1		472151	1220640	S	5245850	567085	400	M
178	22N/05E-25L0	4721511220638	KCWD 105		472151	1220638	S	5245850	567132	400	M
179	22N/05E-25R0	4721391220611	WEBSTER		472139	1220611	S	5245476	567628	365	M
180	22N/05E-26A0	4722191220735	BURNS		472221	1220734	S	5246675	565926	435	M
181	22N/05E-26B0	4722211220742	SAMPSON R.M.		472221	1220742	S	5246716	565752	445	M
182	22N/05E-26D0	4722171220822	SCHWARTZ OLIVER		472220	1220824	S	5246687	564828	365	M
183	22N/05E-26D0	4722191220823			472219	1220823	S	5246589	565019	367	M
184	22N/05E-26G0	4722051220748	REIDTA		472205	1220748	S	5246125	565727	394	M
185	22N/05E-26H0	4722201220736	COBEAN MODEL		472220	1220736	S	5246000	565942	394	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
165	22N/05E-24E	STINNETT				41.50		D	48		PA
166	22N/05E-24E	MANNY R. J.		JOHNSON	150.00	150.00	1961		6	O	SA
167	22N/05E-24E	NELSON		DAVE SHILLIN		137.00	1932		5		SA
168	22N/05E-24G	LEARN RICHARD		JOHNSON	120.00	120.00	1979	A	6	O	SA
170	22N/05E-24J	CROCKER		JOHNSON		87.00	1961		6		SA
171	22N/05E-24J	JULIAN		JOHNSON		82.00	1958		6		SA
172	22N/05E-24J	ONEILL PHILLIP		JOHNSON DRIL	74.00	74.00	1959	C	6	P	SA
173	22N/05E-24M	HAM WATER CO.			109.00	109.00	1932	C	6	O	?
174	22N/05E-25C	SOWINSKY		MYRL JOHNSN		125.00			6		SA
175	22N/05E-25E	BOCK		MYRL JOHNSON		114.00	1958		6		SA
176	22N/05E-25J	GERGEEN		MYRL JOHNSON		55.00	1962		6		SA
177	22N/05E-25L	KCWD 105 WELL 1		JOHNSON	80.00	80.00	1963	C	8	P	SA
178	22N/05E-25L	KCWD 105		JOHNSON	101.00	101.00	1970	C	8	S	SA
179	22N/05E-25R	WEBSTER				17.00		D	24		SA
180	22N/05E-26A	BURNS		BELL	88.00	88.00	1945	C	6		SA
181	22N/05E-26B	SAMPSON R.M.		JOHNSON	108.00	108.00	1977	A	6	O	SA
182	22N/05E-26D	SCHWARTZ OLIVER		JOHNSON	67.00	67.00	1962	C	6	O	SA
183	22N/05E-26D			JOHNSON		65.00	1960		6		SA
184	22N/05E-26G	REIDTA				66.00	1950		8		SA
185	22N/05E-26H	COBEAN MODEL		DORSTEN		73.00	1952		6	O	SA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen G = Gravel Pack P = Perforations O = Open bottom

Completion Aquifer Codes: ? = Unknown NMA = North Meridian Aquifer PA = Perched Aquifer System DA = Deep Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
165	22N/05E-24E	STINNETT		41.50	0.00	.F.	4.99	04/05/62	0.50	
166	22N/05E-24E	MANNY R. J.		150.00	0.00	.F.	135.05	04/09/62		
167	22N/05E-24E	NELSON		137.00	0.00	.F.	129.83	04/05/62		
168	22N/05E-24G	LEARN RICHARD		120.00	0.00	.F.	69.00	05/21/79		
170	22N/05E-24J	CROCKER		87.00	0.00	.F.	38.00	/ /		
171	22N/05E-24J	JULIAN		82.00	0.00	.F.	56.73	04/10/62	0.50	
172	22N/05E-24J	ONEILL PHILLIP		64.00	74.00	.F.	66.00	03/03/59	-0.30	
173	22N/05E-24M	HAM WATER CO.		109.00	0.00	.F.	92.00	09/30/32	-0.20	
174	22N/05E-25C	SOWINSKY		125.00	0.00	.F.	0.00	/ /		
175	22N/05E-25E	BOCK		114.00	0.00	.F.	72.00	/ /		
176	22N/05E-25J	GERGEEN		55.00	0.00	.F.	33.00	/ /		
177	22N/05E-25L	KCWD 105 WELL 1		70.00	80.00	.F.	40.00	02/18/63		
178	22N/05E-25L	KCWD 105		91.00	101.00	.F.	68.00	07/06/70		
179	22N/05E-25R	WEBSTER		17.00	0.00	.F.	4.12	01/23/63		
180	22N/05E-26A	BURNS		88.00	0.00	.F.	0.00	/ /		
181	22N/05E-26B	SAMPSON R.M.		108.00	0.00	.F.	78.00	08/22/77		
182	22N/05E-26D	SCHWARTZ OLIVER		67.00	0.00	.F.	38.23	07/11/62	0.50	
183	22N/05E-26D			65.00	0.00	.F.	43.89	07/11/62	1.00	
184	22N/05E-26G	REIDTA		66.00	0.00	.F.	35.69	07/12/62	1.00	
185	22N/05E-26H	COBEAN MODEL		73.00	0.00	.F.	32.00	05/24/55	1.00	

	Local Number	Owner	Well Name	GPM	TEST RESULTS Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
165	22N/05E-24E	STINNETT								SKC DB, LUZIER	.F.	.F.	.F.	.F.
166	22N/05E-24E	MANNY R. J.		10						SKC DB, LUZIER	.T.	.F.	.F.	.F.
167	22N/05E-24E	NELSON		33						SKC DB, LUZIER	.F.	.F.	.F.	.F.
168	22N/05E-24G	LEARN RICHARD		25	36.00	4.00				SKC DATABASE	.T.	.F.	.F.	.F.
170	22N/05E-24J	CROCKER								SKC DB, LUZIER	.F.	.F.	.F.	.F.
171	22N/05E-24J	JULIAN		9						SKC DB, LUZIER	.F.	.F.	.F.	.F.
172	22N/05E-24J	ONEILL PHILLIP		18						SKC DATABASE	.T.	.F.	.F.	.F.
173	22N/05E-24M	HAM WATER CO.		10						SKC DB, LUZIER	.T.	.F.	.F.	.F.
174	22N/05E-25C	SOWINSKY								SKC DB, LUZIER	.F.	.F.	.F.	.F.
175	22N/05E-25E	BOCK		15						SKC DB, LUZIER	.F.	.F.	.F.	.F.
176	22N/05E-25J	GERGEEN								SKC DB, LUZIER	.F.	.F.	.F.	.F.
177	22N/05E-25L	KCWD 105 WELL 1		100	32.00	4.00				SKC DB, LUZIER	.T.	.F.	.F.	.F.
178	22N/05E-25L	KCWD 105		160	22.00	4.00				SKC DATABASE	.T.	.F.	.F.	.F.
179	22N/05E-25R	WEBSTER								SKC DB, LUZIER	.F.	.F.	.F.	.F.
180	22N/05E-26A	BURNS								SKC DB, LUZIER	.F.	.F.	.F.	.F.
181	22N/05E-26B	SAMPSON R.M.		4	20.00	3.00				SKC DATABASE	.T.	.F.	.F.	.F.
182	22N/05E-26D	SCHWARTZ OLIVER		18						SKC DB, LUZIER	.T.	.F.	.F.	.F.
183	22N/05E-26D									SKC DB, LUZIER	.F.	.F.	.F.	.F.
184	22N/05E-26G	REIDTA								SKC DB, LUZIER	.F.	.F.	.F.	.F.
185	22N/05E-26H	COBEAN MODEL								SKC DB, LUZIER	.F.	.F.	.F.	.F.

	Owner	Well Name	Remarks
165	STINNETT		OPENING DEPTH ASSUMED
166	MANNY R. J.		FINISH AND OPENING DEPTH ASSUMED
167	NELSON		OPENING DEPTH ASSUMED
168	LEARN RICHARD		
170	CROCKER		OPENING DEPTH ASSUMED
171	JULIAN		OPENING DEPTH ASSUMED
172	ONEILL PHILLIP		
173	HAM WATER CO.		FINISH AND OPENING DEPTH ASSUMED
174	SOWINSKY		OPENING DEPTH ASSUMED
175	BOCK		OPENING DEPTH ASSUMED
176	GERGEEN		OPENING DEPTH ASSUMED
177	KCWD 105 WELL 1		
178	KCWD 105		
179	WEBSTER		OPENING DEPTH ASSUMED
180	BURNS		OPENING DEPTH ASSUMED
181	SAMPSON R.M.		BAIL TEST
182	SCHWARTZ OLIVER		FINISH AND OPENING DEPTH ASSUMED
183			OPENING DEPTH ASSUMED
184	REIDTA		OPENING DEPTH ASSUMED
185	COBEAN MODEL		OPENING DEPTH ASSUMED

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	East	Elevation Data (ft. MSL) Elevation	Method
186	22N/05E-26J0	4721531220735	NEIGHBORS		472153	1220735	S	5245763	566210	426	M
187	22N/05E-26K0	4721541220740	JOHNSTON		472154	1220740	S	5245832	565501	328	M
188	22N/05E-26K0	4721561220741	STEELE		472156	1220741	S	5245695	565625	344	M
189	22N/05E-26M0	4721501220832	SISSON		472150	1220832	S	5245965	564881	375	M
190	22N/05E-26M0	4721561220832	ENGLAND HAROLD		472156	1220832	S	5245935	564763	390	M
191	22N/05E-26P0	4721391220026	CITY OF KENT		472139	1220026	S	5245391	565384	340	M
192	22N/05E-26Q0	4721371220752	AUCKLAND		472137	1220752	S	5245525	565695	346	M
193	22N/05E-26Q0	4721441220745	BARTOL GREG		472144	1220745	S	5245603	565790	350	M
194	22N/05E-27B0	4722181220904	KAY		472218	1220904	S	5246671	563933	440	M
195	22N/05E-27B0	4722201220905	CONE		472220	1220905	S	5246434	564183	440	M
196	22N/05E-27B0	4722221220906	WHAM		472222	1220906	S	5246695	564123	428	M
197	22N/05E-27C0	4722161220928	PETERSON		472216	1220928	S	5246367	563802	420	M
198	22N/05E-27C0	4722181220929	BURRELL		472218	1220929	S	5246672	563530	427	M
199	22N/05E-27D0	4722181220917	WILSON		472218	1220917	S	5246474	563420	400	M
200	22N/05E-27D0	4722191220939	MOORE FRED		472219	1220939	S	5246633	563332	410	M
201	22N/05E-27D0	4722151220950	SCHED S		472215	1220950	S	5246493	563091	410	M
202	22N/05E-27D0	4722121220932	SUNSET PARK & WATER CO.		472212	1220932	S	5246410	563484	390	M
203	22N/05E-27D0	4722121220933	SUNSET PARK & WATER CO.		472212	1220933	S	5246412	563446	390	M
204	22N/05E-27E0	4721591220949	BELERSIER HOWARD		472159	1220949		5246024	563105	440	M
205	22N/05E-27E0	4722031220937	ESPESETH MRS		472203	1220937	S	5246150	563241	430	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
186	22N/05E-26J	NEIGHBORS		MYRL JOHNSON		104.00			6		SA
187	22N/05E-26K	JOHNSTON				19.00	1942	D	36		SA
188	22N/05E-26K	STEELE				25.00		D	40		SA
189	22N/05E-26M	SISSON		JOHNSON		84.00			6		SA
190	22N/05E-26M	ENGLAND HAROLD		JOHNSON	101.00	101.00	1982	A	6	O	SA
191	22N/05E-26P	CITY OF KENT		RICHARDSON W		50.00	1968	C	16	P	SA
192	22N/05E-26Q	AUCKLAND				16.00		D	72		SA
193	22N/05E-26Q	BARTOL GREG			14.00	14.00	1978	D	0		SA
194	22N/05E-27B	KAY				72.00		D	48		PA
195	22N/05E-27B	CONE				70.00	1953	D	30		PA
196	22N/05E-27B	WHAM				80.00	1932	D	48		PA
197	22N/05E-27C	PETERSON		JOHNSON DRIL		80.00			6		PA
198	22N/05E-27C	BURRELL				56.00		D	60		PA
199	22N/05E-27D	WILSON		JOHNSON		118.00			8		SA
200	22N/05E-27D	MOORE FRED		EVERGREEN	125.00	124.00	1977	C	6	S	SA
201	22N/05E-27D	SCHED S		JOHNSON	200.00	200.00	1983	A	8	O	?
202	22N/05E-27D	SUNSET PARK &				110.00			0		SA
203	22N/05E-27D	SUNSET PARK &				125.00			0		SA
204	22N/05E-27E	BELERSIER		JOHNSON DRLL	88.00	88.00	1976	A	6	O	SA
205	22N/05E-27E	ESPESETH MRS				104.00	1910	D	36		SA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen G = Gravel Pack P = Perforations O = Open bottom

Completion Aquifer Codes: ? = Unknown NMA = North Meridian Aquifer PA = Perched Aquifer System DA = Deep Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
186	22N/05E-26J	NEIGHBORS		104.00	0.00	.F.	0.00	/ /		
187	22N/05E-26K	JOHNSTON		19.00	0.00	.F.	6.62	07/12/62	2.60	
188	22N/05E-26K	STEELE		25.00	0.00	.F.	9.44	07/12/62	1.23	
189	22N/05E-26M	SISSON		84.00	0.00	.F.	52.64	07/11/62		
190	22N/05E-26M	ENGLAND HAROLD		101.00	0.00	.F.	48.00	10/13/82		
191	22N/05E-26P	CITY OF KENT		50.00	0.00	.F.	4.00	01/01/68		
192	22N/05E-26Q	AUCKLAND		16.00	0.00	.F.	5.64	07/12/62	2.20	
193	22N/05E-26Q	BARTOL GREG		14.00	0.00	.F.	0.00	/ /	-1.60	
194	22N/05E-27B	KAY		72.00	0.00	.F.	55.00	/ /		
195	22N/05E-27B	CONE		70.00	0.00	.F.	63.27	07/10/62		
196	22N/05E-27B	WHAM		80.00	0.00	.F.	50.06	07/11/62	-7.00	
197	22N/05E-27C	PETERSON		80.00	0.00	.F.	50.00	/ /		
198	22N/05E-27C	BURRELL		56.00	0.00	.F.	24.07	07/07/62		
199	22N/05E-27D	WILSON		118.00	0.00	.F.	60.00	/ /		
200	22N/05E-27D	MOORE FRED		120.00	124.00	.F.	45.00	02/04/77	1.50	
201	22N/05E-27D	SCHED S		200.00	0.00	.F.	70.00	11/08/83	-0.70	
202	22N/05E-27D	SUNSET PARK &		110.00	0.00	.F.	0.00	/ /		
203	22N/05E-27D	SUNSET PARK &		125.00	0.00	.F.	0.00	/ /		
204	22N/05E-27E	BELERSIER		88.00	0.00	.F.	70.00	06/26/76		
205	22N/05E-27E	ESPESETH MRS		104.00	0.00	.F.	77.07	07/05/62		

	Local Number	Owner	Well Name	TEST RESULTS GPM	Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
186	22N/05E-26J	NEIGHBORS								SKC DB, LUZIER	.F.	.F.	.F.	.F.
187	22N/05E-26K	JOHNSTON								SKC DB, LUZIER	.F.	.F.	.F.	.F.
188	22N/05E-26K	STEELE								SKC DB, LUZIER	.F.	.F.	.F.	.F.
189	22N/05E-26M	SISSON		10						SKC DB, LUZIER	.F.	.F.	.F.	.F.
190	22N/05E-26M	ENGLAND HAROLD		20	20.00	2.00				SKC DATABASE	.T.	.F.	.F.	.F.
191	22N/05E-26P	CITY OF KENT		2941						SKC DATABASE	.F.	.F.	.F.	.F.
192	22N/05E-26Q	AUCKLAND								SKC DB, LUZIER	.F.	.F.	.F.	.F.
193	22N/05E-26Q	BARTOL GREG								SKC DATABASE	.F.	.F.	.F.	.F.
194	22N/05E-27B	KAY								SKC DB, LUZIER	.F.	.F.	.F.	.F.
195	22N/05E-27B	CONE								SKC DB, LUZIER	.F.	.F.	.F.	.F.
196	22N/05E-27B	WHAM								SKC DB, LUZIER	.F.	.F.	.F.	.F.
197	22N/05E-27C	PETERSON		5						SKC DB, LUZIER	.F.	.F.	.F.	.F.
198	22N/05E-27C	BURRELL								SKC DB, LUZIER	.F.	.F.	.F.	.F.
199	22N/05E-27D	WILSON								SKC DB, LUZIER	.F.	.F.	.F.	.F.
200	22N/05E-27D	MOORE FRED		10	12.00	2.00				SKC DATABASE	.T.	.F.	.F.	.F.
201	22N/05E-27D	SCHED S		100	70.00	3.00				SKC DATABASE	.T.	.F.	.F.	.F.
202	22N/05E-27D	SUNSET PARK &								SKC DATABASE	.F.	.F.	.F.	.F.
203	22N/05E-27D	SUNSET PARK &								SKC DATABASE	.F.	.F.	.F.	.F.
204	22N/05E-27E	BELERSIER		12	8.00	4.00				SKC DATABASE	.T.	.F.	.F.	.F.
205	22N/05E-27E	ESPESETH MRS								SKC DATABASE	.F.	.F.	.F.	.F.

	Owner	Well Name	Remarks
186	NEIGHBORS		OPENING DEPTH ASSUMED
187	JOHNSTON		OPENING DEPTH ASSUMED
188	STEELE		OPENING DEPTH ASSUMED
189	SISSON		OPENING DEPTH ASSUMED
190	ENGLAND HAROLD		BAIL TEST
191	CITY OF KENT		OPENING DEPTH ASSUMED
192	AUCKLAND		OPENING DEPTH ASSUMED
193	BARTOL GREG		OPENING DEPTH ASSUMED
194	KAY		OPENING DEPTH ASSUMED
195	CONE		OPENING DEPTH ASSUMED
196	WHAM		OPENING DEPTH ASSUMED
197	PETERSON		OPENING DEPTH ASSUMED
198	BURRELL		OPENING DEPTH ASSUMED
199	WILSON		OPENING DEPTH ASSUMED
200	MOORE FRED		BAIL TEST
201	SCHED S		AIR JET TEST
202	SUNSET PARK &		OPENING DEPTH ASSUMED
203	SUNSET PARK &		OPENING DEPTH ASSUMED
204	BELERSIER		BAIL TEST
205	ESPESETH MRS		OPENING DEPTH ASSUMED

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	East	Elevation Data (ft. MSL) Elevation	Method
206	22N/05E-27F0	4722051220917	SPOWART		472205	1220917	S	5246112	563868	378	M
207	22N/05E-27G0	4722001220902	RICHARDSON		472200	1220902	S	5246221	564164	414	M
208	22N/05E-27H0	4721591220843	MICHELSEN		472158	1220836	S	5246036	564626	425	M
209	22N/05E-27M0	4721411220938	BIG FIVE WATER		472153	1220945	S	5245923	563136	435	M
210	22N/05E-27M0	4721431220939	SORTUN		472143	1220939	S	5245582	563206	410	M
211	22N/05E-27N0	4721401220940	MOORY		472140	1220940	S	5245285	563126	388	M
212	22N/05E-27Q0	4721321220909	BARNETT RAY		472137	1220910	S	5245330	563932	375	M
213	22N/05E-28A0	4722171221003	WAXDAL		472217	1221003	S	5246659	562741	476	M
214	22N/05E-28A0	4722181221004	MCKINNEY		472218	1221004	S	5246699	562898	456	M
215	22N/05E-28A0	4722191221005	HOUGARDY		472219	1221005	S	5246656	563009	430	M
216	22N/05E-28A0	4722201221005	CROSBY		472220	1221005	S	5246458	562902	460	M
217	22N/05E-28B0	4722181221020	BERG		472218	1221020	S	5246683	562625	479	M
218	22N/05E-28C0	4722201221036	VALLEY VIEW CHRISTIAN CHUR		472220	1221036	S	5246643	562156	440	M
219	22N/05E-28D0	4722181221052	SEIM		472218	1221052	S	5246379	561524	443	M
220	22N/05E-28D0	4722191221053	BECVAR		472219	1221053	S	5246700	561587	463	M
221	22N/05E-28D0	4722201221054	MYERS		472220	1221054	S	5246432	561526	443	M
222	22N/05E-28E0	4721541221051	CITY OF KENT	SOOS CREEK WELL	472154	1221051	S	5246100	561664	406	L
223	22N/05E-28F0	4721591221043	HANSEN MRS		472159	1221043	S	5246090	562175	435	M
224	22N/05E-28F0	4722031221035	FINNEY ANN		472203	1221035	S	5246121	562154	435	M
225	22N/05E-28F0	4722061221031	MULDER NICHOLAS		472206	1221031	S	5246214	562242	425	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds
F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter
L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
206	22N/05E-27F	SPOWART		JOHNSON		83.00	1959		6	O	?
207	22N/05E-27G	RICHARDSON				85.00			6		SA
208	22N/05E-27H	MICHELSEN		JOHNSON	150.00	150.00			6	O	SA
209	22N/05E-27M	BIG FIVE WATER		MAXWELL	94.00	94.00	1947	C	6	P	PA
210	22N/05E-27M	SORTUN		JOHNSON DRIL		95.00	1960		6	O	SA
211	22N/05E-27N	MOORY				26.00			60		PA
212	22N/05E-27Q	BARNETT RAY		JOHNSON	73.00	73.00	1975	C	6	F	SA
213	22N/05E-28A	WAXDAL				20.00		D	36		PA
214	22N/05E-28A	MCKINNEY		SCHILLING		153.00	1947		6		SA
215	22N/05E-28A	HOUGARDY		JOHNSON		156.00			6		SA
216	22N/05E-28A	CROSBY		JOHNSON		189.00	1961		6	O	SA
217	22N/05E-28B	BERG				90.00		D	28		PA
218	22N/05E-28C	VALLEY VIEW		JOHNSON	237.00	237.00	1980	A	6	O	DA
219	22N/05E-28D	SEIM		JOHNSON		163.00	1950		6		SA
220	22N/05E-28D	BECVAR		KNAPSTEAD		142.00	1927		6		SA
221	22N/05E-28D	MYERS		MAXWELL		130.00	1951		8		SA
222	22N/05E-28E	CITY OF KENT	SOOS CREEK WELL	BURT	431.00	431.00	1981	C	16	G	DA
223	22N/05E-28F	HANSEN MRS		SCHILLING		185.00			6		?
224	22N/05E-28F	FINNEY ANN		JOHNSON		102.00	1973		6		?
225	22N/05E-28F	MULDER NICHOLAS				100.00	1973		0		PA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen P = Perforations O = Open bottom G = Gravel Pack

Completion Aquifer Codes: ? = Unknown PA = Perched Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer NMA = North Meridian Aquifer DA = Deep Aquifer System

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
206	22N/05E-27F	SPOWART		83.00	0.00	.F.	74.35	07/10/62	-4.00	
207	22N/05E-27G	RICHARDSON		85.00	0.00	.F.	47.88	07/10/62	-2.25	
208	22N/05E-27H	MICHELSEN		150.00	0.00	.F.	70.61	07/10/62	0.50	
209	22N/05E-27M	BIG FIVE WATER		89.00	94.00	.F.	53.00	03/01/47	-0.50	
210	22N/05E-27M	SORTUN		95.00	0.00	.F.	39.89	07/07/62	0.50	
211	22N/05E-27N	MOORY		26.00	0.00	.F.	14.19	07/07/62		
212	22N/05E-27Q	BARNETT RAY		63.00	73.00	.F.	17.00	07/07/75	0.50	
213	22N/05E-28A	WAXDAL		20.00	0.00	.F.	0.00	/ /		
214	22N/05E-28A	MCKINNEY		153.00	0.00	.F.	0.00	/ /		
215	22N/05E-28A	HOUGARDY		156.00	0.00	.F.	62.00	07/05/62		
216	22N/05E-28A	CROSBY		189.00	0.00	.F.	114.00	12/03/62		
217	22N/05E-28B	BERG		90.00	0.00	.F.	36.38	07/03/62		
218	22N/05E-28C	VALLEY VIEW		237.00	0.00	.F.	195.00	05/23/80	-0.50	
219	22N/05E-28D	SEIM		163.00	0.00	.F.	0.00	/ /		
220	22N/05E-28D	BECVAR		142.00	0.00	.F.	124.82	07/02/62	-1.25	
221	22N/05E-28D	MYERS		130.00	0.00	.F.	109.00	07/03/62		
222	22N/05E-28E	CITY OF KENT	SOOS CREEK WELL	373.00	410.00	.T.	184.00	02/19/81	1.33	TOP OF CASING
223	22N/05E-28F	HANSEN MRS		185.00	0.00	.F.	170.00	/ /		
224	22N/05E-28F	FINNEY ANN		102.00	0.00	.F.	0.00	/ /		
225	22N/05E-28F	MULDER NICHOLAS		100.00	0.00	.F.	55.00	08/22/86		

	Local Number	Owner	Well Name	TEST RESULTS GPM	Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
206	22N/05E-27F	SPOWART		9						SKC DB, LUZIER	.T.	.F.	.F.	.F.
207	22N/05E-27G	RICHARDSON								SKC DB, LUZIER	.F.	.F.	.F.	.F.
208	22N/05E-27H	MICHELSEN		18						SKC DB, LUZIER	.T.	.F.	.F.	.F.
209	22N/05E-27M	BIG FIVE WATER		15	30.00	4.00				SKC DB, LUZIER	.T.	.F.	.F.	.F.
210	22N/05E-27M	SORTUN		12						SKC DB, LUZIER	.T.	.F.	.F.	.F.
211	22N/05E-27N	MOORY								SKC DB, LUZIER	.F.	.F.	.F.	.F.
212	22N/05E-27Q	BARNETT RAY		12	8.00	5.00				SKC DATABASE	.T.	.F.	.F.	.F.
213	22N/05E-28A	WAXDAL								SKC DB, LUZIER	.F.	.F.	.F.	.F.
214	22N/05E-28A	MCKINNEY								SKC DB, LUZIER	.F.	.F.	.F.	.F.
215	22N/05E-28A	HOUGARDY								SKC DB, LUZIER	.F.	.F.	.F.	.F.
216	22N/05E-28A	CROSBY		30						SKC DB, LUZIER	.T.	.F.	.F.	.F.
217	22N/05E-28B	BERG								SKC DB, LUZIER	.F.	.F.	.F.	.F.
218	22N/05E-28C	VALLEY VIEW		11	20.00	4.50				SKC DATABASE	.T.	.F.	.F.	.F.
219	22N/05E-28D	SEIM								SKC DB, LUZIER	.F.	.F.	.F.	.F.
220	22N/05E-28D	BECVAR								SKC DB, LUZIER	.F.	.F.	.F.	.F.
221	22N/05E-28D	MYERS								SKC DB, LUZIER	.F.	.F.	.F.	.F.
222	22N/05E-28E	CITY OF KENT	SOOS CREEK WELL	1000	126.00	3.00	0.0002600	19000		SKC DB, R&N	.T.	.F.	.F.	.T.
223	22N/05E-28F	HANSEN MRS								SKC DB, LUZIER	.F.	.F.	.F.	.F.
224	22N/05E-28F	FINNEY ANN								SKC DATABASE	.F.	.F.	.F.	.F.
225	22N/05E-28F	MULDER NICHOLAS								SKC DATABASE	.F.	.F.	.F.	.F.

	Owner	Well Name	Remarks
206	SPOWART		FINISH AND OPENING DEPTH ASSUMED
207	RICHARDSON		OPENING DEPTH ASSUMED
208	MICHELSEN		WELL HAS GASSY SMELL; FINISH AND OPENING DEPTH ASSUMED
209	BIG FIVE WATER		
210	SORTUN		FINISH AND OPENING DEPTH ASSUMED
211	MOORY		OPENING DEPTH ASSUMED
212	BARNETT RAY		BAIL TEST
213	WAXDAL		OPENING DEPTH ASSUMED
214	MCKINNEY		OPENING DEPTH ASSUMED
215	HOUGARDY		OPENING DEPTH ASSUMED
216	CROSBY		FINISH AND OPENING DEPTH ASSUMED
217	BERG		OPENING DEPTH ASSUMED
218	VALLEY VIEW		BAIL TEST
219	SEIM		OPENING DEPTH ASSUMED
220	BECVAR		OPENING DEPTH ASSUMED
221	MYERS		OPENING DEPTH ASSUMED
222	CITY OF KENT	SOOS CREEK	
223	HANSEN MRS		OPENING DEPTH ASSUMED
224	FINNEY ANN		MODERATE IRON; OPENING DEPTH ASSUMED
225	MULDER NICHOLAS		OPENING DEPTH ASSUMED

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	UTM Coordinates East	Elevation Data (ft. MSL) Elevation	Elevation Data (ft. MSL) Method
226	22N/05E-28G0	4722001221014	ANDERSON		472200	1221014	S	5246305	562452	411	M
227	22N/05E-28G0	4722021221015	BOLIACH		472202	1221015	S	5246064	562323	425	M
228	22N/05E-28G0	4721591221013	BURROWS		472159	1221013	S	5245950	562640	425	M
229	22N/05E-28H0	4721581221008	SALTER		472158	1221008	S	5246262	563006	450	M
230	22N/05E-28H0	4721591221009	TORSTENSON		472159	1221009	S	5246170	563004	450	M
231	22N/05E-28H0	4722001221010	RAGEN		472200	1221010	S	5246100	562931	440	M
232	22N/05E-28J0	4722031220959	WICK		472203	1220959	S	5245636	563006	412	M
233	22N/05E-28J0	4722011220958	TRAINE		472201	1220958	S	5245825	563025	428	M
234	22N/05E-28J0	4721511221047	DOWNEY WATER SYSTEM		472151	1221047	S	5245765	561910	390	M
235	22N/05E-28K0	4721501221019	STREDICKE		472151	1221024	S	5245754	562354	405	M
236	22N/05E-28N0	4721351221100	DETWILER		472135	1221100	S	5245292	561605	470	M
237	22N/05E-28N0	4721371221101	HAGEN		472137	1221101	S	5245327	561590	440	M
238	22N/05E-28P0	4721341221035	LAPINSKI		472134	1221035	S	5245253	562159	410	M
239	22N/05E-09B1		F.D. WILSON		0	0		5251446	562398	510	M
240	22N/05E-09N1		J. MIHALCIK		0	0		5249928	561568	435	M
241	22N/05E-14F1		R. SMITH		0	0		5249231	565440	560	M
242	22N/05E-21B2		R. MILLER		0	0		5248242	562644	485	M
243	22N/05E-21R4		ZION LUTHERN CHURCH		0	0		5247100	562963	452	M
244	22N/05E-22A2		R.D. SOELTER		0	0		5248004	564321	505	M
245	22N/05E-24D1		G. FRINK		0	0		5248332	566635	505	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
226	22N/05E-28G	ANDERSON				38.00		D	36		PA
227	22N/05E-28G	BOLIACH		JOHNSON CO		82.00	1961		6		PA
228	22N/05E-28G	BURROWS		JOHNSN DRILL		85.00	1974	C	6	P	PA
229	22N/05E-28H	SALTER		JOHNSON		127.00			6	O	SA
230	22N/05E-28H	TORSTENSON		JOHNSON		80.00	1958		6	O	PA
231	22N/05E-28H	RAGEN				32.00		D	36		PA
232	22N/05E-28J	WICK				26.00		D	72		PA
233	22N/05E-28J	TRAINE		J C MAXWELL		108.00	1949		6		?
234	22N/05E-28J	DOWNEY WATER		JOHNSON	230.00	157.00	1984	A	6	P	PA
235	22N/05E-28K	STREDICKE		JOHNSON DRLG	75.00	75.00	1958	C	6	P	PA
236	22N/05E-28N	DETWILER		JERRYS DRILL		176.00		C	0	Z	SA
237	22N/05E-28N	HAGEN				175.00		B	6	O	?
238	22N/05E-28P	LAPINSKI		MAXWELLS PIO		113.00	1959	C	6		SA
239	22N/05E-09B	F.D. WILSON				160.00		C	6		SA
240	22N/05E-09N	J. MIHALCIK				68.00		D	48		SA
241	22N/05E-14F	R. SMITH				144.00		C	6	P	PA
242	22N/05E-21B	R. MILLER				30.00		D	42		PA
243	22N/05E-21R	ZION LUTHERN				180.00		C	6		NMA
244	22N/05E-22A	R.D. SOELTER				19.00		D	24		PA
245	22N/05E-24D	G. FRINK		JOHNSON	111.00	111.00	1960	C	6	O	SA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen G = Gravel Pack P = Perforations O = Open bottom

Completion Aquifer Codes: ? = Unknown NMA = North Meridian Aquifer PA = Perched Aquifer System DA = Deep Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
226	22N/05E-28G	ANDERSON		38.00	0.00	.F.	11.61	07/03/62	1.00	
227	22N/05E-28G	BOLIACH		82.00	0.00	.F.	70.00	/ /		
228	22N/05E-28G	BURROWS		75.00	85.00	.F.	53.00	05/18/74		
229	22N/05E-28H	SALTER		127.00	0.00	.F.	92.00	/ /		
230	22N/05E-28H	TORSTENSON		80.00	0.00	.F.	61.32	07/05/62		
231	22N/05E-28H	RAGEN		32.00	0.00	.F.	5.51	07/05/62		
232	22N/05E-28J	WICK		26.00	0.00	.F.	4.71	07/07/62		
233	22N/05E-28J	TRAINE		108.00	0.00	.F.	54.00	/ /		
234	22N/05E-28J	DOWNEY WATER		32.00	52.00	.F.	5.00	07/17/84		
235	22N/05E-28K	STREDICKE		65.00	75.00	.F.	37.00	04/09/58		
236	22N/05E-28N	DETWILER		176.00	0.00	.F.	140.00	/ /		
237	22N/05E-28N	HAGEN		171.00	0.00	.F.	75.00	08/01/64		
238	22N/05E-28P	LAPINSKI		113.00	0.00	.F.	95.00	07/29/59		
239	22N/05E-09B	F.D. WILSON		160.00	0.00	.F.	132.53	06/28/62		
240	22N/05E-09N	J. MIHALCIK		68.00	0.00	.F.	58.45	06/21/62		
241	22N/05E-14F	R. SMITH		136.00	143.00	.F.	118.69	05/27/62		
242	22N/05E-21B	R. MILLER		30.00	0.00	.F.	10.62	10/03/61		
243	22N/05E-21R	ZION LUTHERN		180.00	0.00	.F.	63.50	10/13/61		
244	22N/05E-22A	R.D. SOELTER		19.00	0.00	.F.	15.53	10/13/61		
245	22N/05E-24D	G. FRINK		111.00	0.00	.F.	97.27	04/03/62		

	Local Number	Owner	Well Name	TEST RESULTS GPM	Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
226	22N/05E-28G	ANDERSON								SKC DB, LUZIER	.F.	.F.	.F.	.F.
227	22N/05E-28G	BOLIACH								SKC DB, LUZIER	.F.	.F.	.F.	.F.
228	22N/05E-28G	BURROWS		15	6.00	3.00				SKC DATABASE	.T.	.F.	.F.	.F.
229	22N/05E-28H	SALTER		18						SKC DB, LUZIER	.T.	.F.	.F.	.F.
230	22N/05E-28H	TORSTENSON		10						SKC DB, LUZIER	.T.	.F.	.F.	.F.
231	22N/05E-28H	RAGEN								SKC DB, LUZIER	.F.	.F.	.F.	.F.
232	22N/05E-28J	WICK								SKC DB, LUZIER	.F.	.F.	.F.	.F.
233	22N/05E-28J	TRAINE		20						SKC DB, LUZIER	.F.	.F.	.F.	.F.
234	22N/05E-28J	DOWNEY WATER		22	11.00	3.00				SKC DATABASE	.T.	.F.	.F.	.F.
235	22N/05E-28K	STREDICKE		35	12.00	4.00				SKC DATABASE	.T.	.F.	.F.	.F.
236	22N/05E-28N	DETWILER								SKC DATABASE	.T.	.F.	.F.	.F.
237	22N/05E-28N	HAGEN		16	1.00	1.00				SKC DATABASE	.T.	.F.	.F.	.F.
238	22N/05E-28P	LAPINSKI		15						SKC DATABASE	.T.	.F.	.F.	.F.
239	22N/05E-09B	F.D. WILSON								LUZIER, 1969	.F.	.F.	.F.	.F.
240	22N/05E-09N	J. MIHALCIK								LUZIER, 1969	.F.	.F.	.F.	.F.
241	22N/05E-14F	R. SMITH		12						LUZIER, 1969	.T.	.F.	.F.	.F.
242	22N/05E-21B	R. MILLER								LUZIER, 1969	.F.	.F.	.F.	.F.
243	22N/05E-21R	ZION LUTHERN								LUZIER, 1969	.F.	.F.	.F.	.F.
244	22N/05E-22A	R.D. SOELTER								LUZIER, 1969	.F.	.F.	.F.	.F.
245	22N/05E-24D	G. FRINK								LUZIER, 1969	.T.	.F.	.F.	.F.

	Owner	Well Name	Remarks
226	ANDERSON		OPENING DEPTH ASSUMED
227	BOLIACH		OPENING DEPTH ASSUMED
228	BURROWS		BAIL TEST; SEAL IS AQUA JEL AND CLAY
229	SALTER		FINISH AND OPENING DEPTH ASSUMED
230	TORSTENSON		FINISH AND OPENING DEPTH ASSUMED
231	RAGEN		OPENING DEPTH ASSUMED
232	WICK		OPENING DEPTH ASSUMED
233	TRAINE		OPENING DEPTH ASSUMED
234	DOWNEY WATER		AIR JET TEST
235	STREDICKE		
236	DETWILER		30 FEET OF GRAVEL PLACED IN CASING
237	HAGEN		BAIL TEST; 1 FOOT DRAWDOWN ASSUMED (0 FEET LISTED ON DOE WELL LOG)
238	LAPINSKI		OPENING DEPTH ASSUMED
239	F.D. WILSON		OPENING DEPTH ASSUMED
240	J. MIHALCIK		OPENING DEPTH ASSUMED
241	R. SMITH		IRON CONTENT
242	R. MILLER		OPENING DEPTH ASSUMED
243	ZION LUTHERN		OPENING DEPTH ASSUMED
244	R.D. SOELTER		OPENING DEPTH ASSUMED
245	G. FRINK		FINISH AND OPENING DEPTH ASSUMED

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	UTM Coordinates East	Elevation Data (ft. MSL) Elevation	Elevation Data (ft. MSL) Method
246	22N/05E-25H1		STATEWIDE DEVELOPMENT CO		0	0		5246204	567786	384	M
247	22N/05E-26B1		W. DAYTON		0	0		5246695	565798	439	M
248	22N/05E-27B2		G. WAHL		0	0		5246548	563998	433	M
249	22N/05E-27C1		A. CARTER		0	0		5246436	563784	420	M
250	22N/05E-27G1		I.R. ROBINSON		0	0		5246316	564198	425	M
251	22N/05E-27H1		J. KECK		0	0		5246024	564461	425	M
252	22N/05E-28E1		F.M. JACKSON		0	0		5246106	561714	395	M
253	22N/05E-09L		BOB TAYLOR		0	0		5250406	562133	476	M
254	22N/05E-09Q		GARY STANDLEMAN		0	0		5249999	562631	459	M
255	22N/05E-10A		GARY HAAS		0	0		5251412	564328	475	M
256	22N/05E-10E		PERRY PEARSON		0	0		5250752	563189	377	M
257	22N/05E-10F		EARL PIEL		0	0		5250777	563721	361	M
258	22N/05E-10G		PATRICK BRAZIL		0	0		5251057	563896	492	M
259	22N/05E-10H		FRED SCHRAG		0	0		5250953	564477	515	M
260	22N/05E-10G		CON BUTENKO		0	0		5250769	563996	508	M
261	22N/05E-10H		JOY ELLS		0	0		5250920	564630	485	M
262	22N/05E-10J		WILMA CLARK		0	0		5250437	564385	530	M
263	22N/05E-10J		ROBERT MOORE		0	0		5250557	564648	520	M
264	22N/05E-10J		MARK MUSTACICH		0	0		5250603	564649	520	M
265	22N/05E-10J		MARK MACCONAGHY		0	0		5250388	564394	525	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
246	22N/05E-25H	STATEWIDE		JOHNSON	72.00	72.00	1964	C	8	P	SA
247	22N/05E-26B	W. DAYTON						C	6		PA
248	22N/05E-27B	G. WAHL				50.00		D	48		PA
249	22N/05E-27C	A. CARTER				26.00		D	36		PA
250	22N/05E-27G	I.R. ROBINSON				93.00		C	6		SA
251	22N/05E-27H	J. KECK				76.00		C	6		PA
252	22N/05E-28E	F.M. JACKSON				181.00		C	6		DA
253	22N/05E-09L	BOB TAYLOR		JOHNSON	113.00	113.00	1975	C	6	P	SA
254	22N/05E-09Q	GARY STANDLEMAN		MUELLER	140.00	135.00	1982	C	6	S	SA
255	22N/05E-10A	GARY HAAS		JOHNSON	114.00	114.00	1989	A	6	O	SA
256	22N/05E-10E	PERRY PEARSON		JOHNSON	117.00	117.00	1984	A	6	O	SA
257	22N/05E-10F	EARL PIEL		NORTHWEST	60.00	60.00	1979	A	6	O	SA
258	22N/05E-10G	PATRICK BRAZIL		JOHNSON	100.00	100.00	1983	A	6	O	PA
259	22N/05E-10H	FRED SCHRAG		JOHNSON	103.00	103.00	1989	A	6	O	PA
260	22N/05E-10G	CON BUTENKO		JOHNSON	151.00	151.00	1973	C	6	P	SA
261	22N/05E-10H	JOY ELLS		JOHNSON	98.00	98.00	1988	A	6	O	PA
262	22N/05E-10J	WILMA CLARK		JOHNSON	112.00	112.00	1991	A	6	O	SA
263	22N/05E-10J	ROBERT MOORE		JOHNSON	140.00	135.00	1987	A	6	S	SA
264	22N/05E-10J	MARK MUSTACICH		JOHNSON	142.00	137.00	1990	A	6	O	SA
265	22N/05E-10J	MARK MACCONAGHY		JOHNSON	138.00	138.00	1993	A	6	O	SA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen G = Gravel Pack P = Perforations O = Open bottom

Completion Aquifer Codes: ? = Unknown NMA = North Meridian Aquifer PA = Perched Aquifer System DA = Deep Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
246	22N/05E-25H	STATEWIDE		62.00	72.00	.F.	40.00	08/02/63		
247	22N/05E-26B	W. DAYTON		0.00	0.00	.F.	22.26	07/13/62		
248	22N/05E-27B	G. WAHL		50.00	0.00	.F.	34.14	07/09/62		
249	22N/05E-27C	A. CARTER		26.00	0.00	.F.	5.23	07/10/62		
250	22N/05E-27G	I.R. ROBINSON		93.00	0.00	.F.	66.00	/ /		
251	22N/05E-27H	J. KECK		76.00	0.00	.F.	37.29	07/10/62		
252	22N/05E-28E	F.M. JACKSON		181.00	0.00	.F.	135.72	07/13/62		
253	22N/05E-09L	BOB TAYLOR		103.00	113.00	.F.	76.00	06/11/75		
254	22N/05E-09Q	GARY STANDLEMAN		135.00	140.00	.F.	96.00	03/05/82		
255	22N/05E-10A	GARY HAAS		114.00	0.00	.F.	54.00	09/09/89		
256	22N/05E-10E	PERRY PEARSON		117.00	0.00	.F.	2.00	05/15/84		
257	22N/05E-10F	EARL PIEL		60.00	0.00	.F.	-1.00	08/14/79		
258	22N/05E-10G	PATRICK BRAZIL		100.00	0.00	.F.	-1.00	01/21/83		
259	22N/05E-10H	FRED SCHRAG		103.00	0.00	.F.	70.00	06/20/89		
260	22N/05E-10G	CON BUTENKO		141.00	151.00	.F.	138.00	07/31/73		
261	22N/05E-10H	JOY ELLS		98.00	0.00	.F.	55.00	04/28/88		
262	22N/05E-10J	WILMA CLARK		112.00	0.00	.F.	92.00	07/15/91		
263	22N/05E-10J	ROBERT MOORE		135.00	140.00	.F.	105.00	07/20/87		
264	22N/05E-10J	MARK MUSTACICH		137.00	0.00	.F.	110.00	07/20/90		
265	22N/05E-10J	MARK MACCONAGHY		138.00	0.00	.F.	100.00	03/11/93	-3.00	TOC

	Local Number	Owner	Well Name	TEST RESULTS GPM	Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
246	22N/05E-25H	STATEWIDE								LUZIER, 1969	.T.	.F.	.F.	.F.
247	22N/05E-26B	W. DAYTON								LUZIER, 1969	.F.	.F.	.F.	.F.
248	22N/05E-27B	G. WAHL								LUZIER, 1969	.F.	.F.	.F.	.F.
249	22N/05E-27C	A. CARTER								LUZIER, 1969	.F.	.F.	.F.	.F.
250	22N/05E-27G	I.R. ROBINSON								LUZIER, 1969	.F.	.F.	.F.	.F.
251	22N/05E-27H	J. KECK								LUZIER, 1969	.F.	.F.	.F.	.F.
252	22N/05E-28E	F.M. JACKSON								LUZIER, 1969	.F.	.F.	.F.	.F.
253	22N/05E-09L	BOB TAYLOR		10	7.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
254	22N/05E-09Q	GARY STANDLEMAN		30	10.00	2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
255	22N/05E-10A	GARY HAAS		15	55.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
256	22N/05E-10E	PERRY PEARSON		100	60.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
257	22N/05E-10F	EARL PIEL		20	10.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
258	22N/05E-10G	PATRICK BRAZIL		100	40.00	2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
259	22N/05E-10H	FRED SCHRAG		20	15.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
260	22N/05E-10G	CON BUTENKO		11	4.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
261	22N/05E-10H	JOY ELLS		12	38.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
262	22N/05E-10J	WILMA CLARK		10	16.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
263	22N/05E-10J	ROBERT MOORE		8	20.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
264	22N/05E-10J	MARK MUSTACICH		8	25.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
265	22N/05E-10J	MARK MACCONAGHY		12	31.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.

	Owner	Well Name	Remarks
246	STATEWIDE		
247	W. DAYTON		
248	G. WAHL		OPENING DEPTH ASSUMED
249	A. CARTER		OPENING DEPTH ASSUMED
250	I.R. ROBINSON		OPENING DEPTH ASSUMED
251	J. KECK		IRON CONTENT; OPENING DEPTH ASSUMED
252	F.M. JACKSON		OPENING DEPTH ASSUMED
253	BOB TAYLOR		BAIL TEST
254	GARY STANDLEMAN		BAIL TEST
255	GARY HAAS		AIR TEST, STEM AT 109'; COMPLETE DRAWDOWN ASSUMED
256	PERRY PEARSON		AIR JET TEST
257	EARL PIEL		FLOWS AT 5 GPM; SWL ESTIMATED; BAIL TEST
258	PATRICK BRAZIL		FLOWS AT 28 GPM; SWL ESTIMATED; BAIL TEST
259	FRED SCHRAG		AIR JET TEST
260	CON BUTENKO		BAIL TEST
261	JOY ELLS		AIR TEST, STEM AT 93'; COMPLETE DRAWDOWN ASSUMED
262	WILMA CLARK		AIR TEST, STEM AT 108'; COMPLETE DRAWDOWN ASSUMED
263	ROBERT MOORE		AIR JET TEST
264	MARK MUSTACICH		AIR TEST, STEM @ 135'; COMPLETE DRAWDOWN ASSUMED
265	MARK MACCONAGHY		AIR TEST, STEM @ 131'; COMPLETE DRAWDOWN ASSUMED

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	East	Elevation Data (ft. MSL) Elevation	Method
266	22N/05E-10J		C.E. ELLIOT		0	0		5250360	564510	531	M
267	22N/05E-10J		RAY WHITELEY		0	0		5250731	564651	508	M
268	22N/05E-10J		DAVE ALVIS		0	0		5250392	564353	525	M
269	22N/05E-10P		DALE KLAPPERICH		0	0		5249968	563927	367	M
270	22N/05E-10N		RICHARD BROWER		0	0		5250068	563378	394	M
271	22N/05E-10R		DON SYBIL		0	0		5250302	564640	530	M
272	22N/05E-10R		LARRY WANDREY		0	0		5250018	564643	510	M
273	22N/05E-10R		GUENTEN PEHLKE		0	0		5250140	564641	525	M
274	22N/05E-11E		GEORGE FITZSIMMONS		0	0		5250909	564679	475	M
275	22N/05E-11Q		JAMES KEMP		0	0		5249996	565891	490	M
276	22N/05E-14K		LARRY PITTS		0	0		5248855	565531	495	M
277	22N/05E-14J		GEORGE CHIFTIS		0	0		5248692	565860	508	M
278	22N/05E-14R		JACK NICHOLAS		0	0		5248630	565853	495	M
279	22N/05E-14A		HUB UNGER		0	0		5249893	566214	482	M
280	22N/05E-14A		AUTHOR HANSEN-COATES		0	0		5249942	566058	479	M
281	22N/05E-14A		PARKER VAN		0	0		5249840	565899	505	M
282	22N/05E-14B		CHRIS ROBINSON		0	0		5249770	565495	564	M
283	22N/05E-14C		LOE BRAUNSCHWEIG		0	0		5249928	565356	581	M
284	22N/05E-14C		RICH FERRELL		0	0		5249932	565394	574	M
285	22N/05E-14C		ART STABEN		0	0		5249937	565306	591	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds
F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter
L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
266	22N/05E-10J	C.E. ELLIOT		NORTHWEST	156.00	156.00	1982	A	6	O	SA
267	22N/05E-10J	RAY WHITELEY		JOHNSON	136.00	125.00	1974	C	6	P	SA
268	22N/05E-10J	DAVE ALVIS		JOHNSON	48.00	48.00	1984	A	6	O	PA
269	22N/05E-10P	DALE KLAPPERICH		MORRIS	91.00	90.00	1991	C	6	O	SA
270	22N/05E-10N	RICHARD BROWER		JOHNSON	52.00	52.00	1981	A	6	O	SA
271	22N/05E-10R	DON SYBIL		JOHNSON	99.00	99.00	1986	A	6	O	PA
272	22N/05E-10R	LARRY WANDREY		NORTHWEST	133.00	133.00	1978	A	6	O	SA
273	22N/05E-10R	GUENTEN PEHLKE		JOHNSON	98.00	98.00	1977	A	6	P	PA
274	22N/05E-11E	GEORGE		KOHNSON	85.00	85.00	1979	A	6	O	SA
275	22N/05E-11Q	JAMES KEMP		JOHNSON	74.00	74.00	1982	A	6	O	SA
276	22N/05E-14K	LARRY PITTS		JOHNSON	109.00	109.00	1983	A	6	O	SA
277	22N/05E-14J	GEORGE CHIFTIS		JOHNSON	131.00	131.00	1982	A	6	O	SA
278	22N/05E-14R	JACK NICHOLAS		JOHNSON	60.00	60.00	1983	A	6	O	PA
279	22N/05E-14A	HUB UNGER		JOHNSON	125.00	125.00	1992	A	6	O	SA
280	22N/05E-14A	AUTHOR		B&J DRILLING	88.00	88.00	1989	A C	6	O	SA
281	22N/05E-14A	PARKER VAN		RICHARDSON	124.00	124.00	1989	A	6	O	SA
282	22N/05E-14B	CHRIS ROBINSON		JOHNSON	143.00	143.00	1990	A	6	O	PA
283	22N/05E-14C	LOE		JOHNSON	190.00	190.00	1989	A	6	O	SA
284	22N/05E-14C	RICH FERRELL		NORTHERN	140.00	140.00	1987	C	6	S	PA
285	22N/05E-14C	ART STABEN		NORTHWEST	177.00	177.00	1984	A	6	O	SA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen G = Gravel Pack P = Perforations O = Open bottom

Completion Aquifer Codes: ? = Unknown NMA = North Meridian Aquifer PA = Perched Aquifer System DA = Deep Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
266	22N/05E-10J	C.E. ELLIOT		156.00	0.00	.F.	95.00	05/13/82		
267	22N/05E-10J	RAY WHITELEY		114.00	124.00	.F.	88.00	05/26/74		
268	22N/05E-10J	DAVE ALVIS		48.00	0.00	.F.	20.00	08/13/84		
269	22N/05E-10P	DALE KLAPPERICH		90.00	0.00	.F.	-17.00	10/25/91		
270	22N/05E-10N	RICHARD BROWER		52.00	0.00	.F.	29.00	01/26/81		
271	22N/05E-10R	DON SYBIL		99.00	0.00	.F.	70.00	07/09/86	-2.00	TOC
272	22N/05E-10R	LARRY WANDREY		133.00	0.00	.F.	83.00	11/17/78		
273	22N/05E-10R	GUENTEN PEHLKE		88.00	98.00	.F.	68.00	06/10/77		
274	22N/05E-11E	GEORGE		85.00	0.00	.F.	60.00	07/13/79		
275	22N/05E-11Q	JAMES KEMP		74.00	0.00	.F.	40.00	04/15/82		
276	22N/05E-14K	LARRY PITTS		109.00	0.00	.F.	70.00	05/25/83		
277	22N/05E-14J	GEORGE CHIFTIS		131.00	0.00	.F.	84.00	12/14/83		
278	22N/05E-14R	JACK NICHOLAS		60.00	0.00	.F.	45.00	07/12/83		
279	22N/05E-14A	HUB UNGER		125.00	0.00	.F.	50.00	04/25/92		
280	22N/05E-14A	AUTHOR		88.00	0.00	.F.	45.00	09/01/89	-1.00	TOC
281	22N/05E-14A	PARKER VAN		124.00	124.00	.F.	92.00	06/28/89		
282	22N/05E-14B	CHRIS ROBINSON		143.00	0.00	.F.	113.00	12/18/90		
283	22N/05E-14C	LOE		190.00	0.00	.F.	175.00	10/26/89		
284	22N/05E-14C	RICH FERRELL		137.00	140.00	.F.	124.00	06/24/87		
285	22N/05E-14C	ART STABEN		177.00	0.00	.F.	150.00	06/12/84		

	Local Number	Owner	Well Name	GPM	TEST RESULTS Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
266	22N/05E-10J	C.E. ELLIOT		50	20.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
267	22N/05E-10J	RAY WHITELEY		18	20.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
268	22N/05E-10J	DAVE ALVIS		10	16.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
269	22N/05E-10P	DALE KLAPPERICH		6	77.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
270	22N/05E-10N	RICHARD BROWER		30	11.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
271	22N/05E-10R	DON SYBIL		12	16.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
272	22N/05E-10R	LARRY WANDREY		40	10.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
273	22N/05E-10R	GUENTEN PEHLKE		18	10.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
274	22N/05E-11E	GEORGE		20	15.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
275	22N/05E-11Q	JAMES KEMP		25	20.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
276	22N/05E-14K	LARRY PITTS		17	20.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
277	22N/05E-14J	GEORGE CHIFTIS		50	25.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
278	22N/05E-14R	JACK NICHOLAS		20	25.00	3.50				DOE WELL LOG	.T.	.F.	.F.	.F.
279	22N/05E-14A	HUB UNGER		45	70.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
280	22N/05E-14A	AUTHOR		15	20.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
281	22N/05E-14A	PARKER VAN		30	28.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
282	22N/05E-14B	CHRIS ROBINSON		15	24.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
283	22N/05E-14C	LOE		10	15.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
284	22N/05E-14C	RICH FERRELL		10	3.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
285	22N/05E-14C	ART STABEN		14	10.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.

	Owner	Well Name	Remarks
266	C.E. ELLIOT		BAIL TEST
267	RAY WHITELEY		BAIL TEST
268	DAVE ALVIS		AIR JET TEST
269	DALE KLAPPERICH		FLOWS AT 1.5 GPM; SWL ESTIMATED; BAIL TEST; LOCATION FIELD CHECKED.
270	RICHARD BROWER		BAIL TEST; LOCATION FIELD CHECKED.
271	DON SYBIL		AIR JET TEST
272	LARRY WANDREY		BAIL TEST
273	GUENTEN PEHLKE		BAIL TEST
274	GEORGE		BAIL TEST
275	JAMES KEMP		BAIL TEST
276	LARRY PITTS		AIR JET TEST
277	GEORGE CHIFTIS		BAIL TEST
278	JACK NICHOLAS		AIR JET TEST
279	HUB UNGER		AIR TEST, STEM @ 120'; COMPLETE DRAWDOWN ASSUMED
280	AUTHOR		BAIL TEST
281	PARKER VAN		AIR TEST, STEM @ 120'; COMPLETE DRAWDOWN ASSUMED
282	CHRIS ROBINSON		AIR TEST, STEM @ 137'; COMPLETE DRAWDOWN ASSUMED
283	LOE		AIR TEST, STEM @ 190'; COMPLETE DRAWDOWN ASSUMED
284	RICH FERRELL		BAIL TEST
285	ART STABEN		BAIL TEST

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	UTM Coordinates East	Elevation Data (ft. MSL) Elevation	Method
286	22N/05E-14C		MIKE GATEWOOD		0	0		5249937	565143	600	M
287	22N/05E-14C		EARL WEAVER		0	0		5249939	565462	564	M
288	22N/05E-14D		JOHN BOYNTON		0	0		5249930	564849	548	M
289	22N/05E-14E		JOHNSON/YOUNG		0	0		5249263	564712	417	M
290	22N/05E-14E		JERRY PARISI		0	0		5249331	564708	420	M
291	22N/05E-14E		TED TOLBECK		0	0		5249406	564691	413	M
292	22N/05E-14F		LUDVICK STRIBRNY		0	0		5249381	565311	560	M
293	22N/05E-14G		MEL KLEWENO		0	0		5249171	565581	558	M
294	22N/05E-14G		DANIAL BIRKLID		0	0		5249477	565512	568	M
295	22N/05E-14G		RICK NEWBERG		0	0		5249221	565497	561	M
296	22N/05E-14G		RICHARD PAHL		0	0		5249178	565704	548	M
297	22N/05E-14H		FREDERICK MULLEY		0	0		5249559	566221	472	M
298	22N/05E-14H		RON LARSON		0	0		5249455	566200	476	M
299	22N/05E-14H		ROLAND MCLAUGHLIN		0	0		5249446	566239	472	M
300	22N/05E-14H		DON BARTLETT		0	0		5249472	566042	540	M
301	22N/05E-14H		CHALES ALBIN		0	0		5249285	566122	505	M
302	22N/05E-14H		FRANK VAUGHN		0	0		5249358	566186	515	M
303	22N/05E-14H		RICHARD SMITH		0	0		5249529	566248	472	M
304	22N/05E-14J		MIKE SCARFF		0	0		5249150	565914	531	M
305	22N/05E-14J		VERDI QUERIN		0	0		5248964	565906	525	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
286	22N/05E-14C	MIKE GATEWOOD		JOHNSON	203.00	203.00	1990	A	6	O	SA
287	22N/05E-14C	EARL WEAVER		JOHNSON	186.00	186.00	1989	A	6	O	SA
288	22N/05E-14D	JOHN BOYNTON		JOHNSON	133.00	133.00	1980	A	6	O	SA
289	22N/05E-14E	JOHNSON/YOUNG		JOHNSON	80.00	80.00	1978	A	6	O	SA
290	22N/05E-14E	JERRY PARISI		JOHNSON	100.00	100.00	1978	A	6	O	SA
291	22N/05E-14E	TED TOLBECK		JOHNSON	44.00	44.00	1975	C	6	P	SA
292	22N/05E-14F	LUDVICK		KRING	204.00	190.00	1989	A	6	S	?
293	22N/05E-14G	MEL KLEWENO		JOHNSON	160.00	160.00	1981	A	6	O	SA
294	22N/05E-14G	DANIAL BIRKLID		JOHNSON	149.00	149.00	1985	A	6	O	SA
295	22N/05E-14G	RICK NEWBERG		JOHNSON	158.00	158.00	1979	A	6	O	SA
296	22N/05E-14G	RICHARD PAHL		JOHNSON	140.00	140.00	1978	A	6	O	SA
297	22N/05E-14H	FREDERICK		JOHNSON	139.00	139.00	1988	A	6	O	SA
298	22N/05E-14H	RON LARSON		JOHNSON	94.00	94.00	1985	A	6	O	SA
299	22N/05E-14H	ROLAND		JOHNSON	129.00	129.00	1978	A	6	O	SA
300	22N/05E-14H	DON BARTLETT		JOHNSON	155.00	155.00	1980	A	6	O	SA
301	22N/05E-14H	CHALES ALBIN		JOHNSON	120.00	120.00	1980	A	6	O	SA
302	22N/05E-14H	FRANK VAUGHN		JOHNSON	123.00	123.00	1991	C	6	P	SA
303	22N/05E-14H	RICHARD SMITH		JOHNSON	80.00	80.00	1979	A	6	O	SA
304	22N/05E-14J	MIKE SCARFF		JOHNSON	114.00	114.00	1988	A	6	O	PA
305	22N/05E-14J	VERDI QUERIN		JOHNSON	130.00	130.00	1987	A	6	O	SA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen G = Gravel Pack P = Perforations O = Open bottom

Completion Aquifer Codes: ? = Unknown NMA = North Meridian Aquifer PA = Perched Aquifer System DA = Deep Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
286	22N/05E-14C	MIKE GATEWOOD		203.00	0.00	.F.	160.00	02/26/90		
287	22N/05E-14C	EARL WEAVER		186.00	0.00	.F.	145.00	12/06/89		
288	22N/05E-14D	JOHN BOYNTON		133.00	0.00	.F.	105.00	02/11/80		
289	22N/05E-14E	JOHNSON/YOUNG		80.00	0.00	.F.	5.00	12/04/78		
290	22N/05E-14E	JERRY PARISI		100.00	0.00	.F.	43.00	11/03/78		
291	22N/05E-14E	TED TOLBECK		34.00	44.00	.F.	3.00	05/20/75		
292	22N/05E-14F	LUDVICK		186.60	192.00	.F.	75.00	09/20/89	-3.00	TOC
293	22N/05E-14G	MEL KLEWENO		160.00	0.00	.F.	115.00	06/09/81		
294	22N/05E-14G	DANIAL BIRKLID		149.00	0.00	.F.	120.00	08/15/85		
295	22N/05E-14G	RICK NEWBERG		158.00	0.00	.F.	128.00	03/23/79		
296	22N/05E-14G	RICHARD PAHL		140.00	0.00	.F.	107.00	04/18/78		
297	22N/05E-14H	FREDERICK		139.00	0.00	.F.	59.00	10/01/88		
298	22N/05E-14H	RON LARSON		94.00	0.00	.F.	65.00	11/14/85		
299	22N/05E-14H	ROLAND		129.00	0.00	.F.	99.00	09/11/78		
300	22N/05E-14H	DON BARTLETT		155.00	0.00	.F.	127.00	04/16/80		
301	22N/05E-14H	CHALES ALBIN		120.00	0.00	.F.	82.00	07/08/80		
302	22N/05E-14H	FRANK VAUGHN		113.00	123.00	.F.	109.00	11/25/91		
303	22N/05E-14H	RICHARD SMITH		80.00	0.00	.F.	50.00	02/05/79		
304	22N/05E-14J	MIKE SCARFF		114.00	0.00	.F.	90.00	03/24/88		
305	22N/05E-14J	VERDI QUERIN		130.00	0.00	.F.	97.00	09/10/87		

	Local Number	Owner	Well Name	TEST RESULTS GPM	Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
286	22N/05E-14C	MIKE GATEWOOD		10	38.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
287	22N/05E-14C	EARL WEAVER		15		2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
288	22N/05E-14D	JOHN BOYNTON		15	16.00	3.50				DOE WELL LOG	.T.	.F.	.F.	.F.
289	22N/05E-14E	JOHNSON/YOUNG		30	30.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
290	22N/05E-14E	JERRY PARISI		20	30.00	3.50				DOE WELL LOG	.T.	.F.	.F.	.F.
291	22N/05E-14E	TED TOLBECK		8	29.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
292	22N/05E-14F	LUDVICK		50	105.00	2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
293	22N/05E-14G	MEL KLEWENO		20	25.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
294	22N/05E-14G	DANIAL BIRKLID		18	11.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
295	22N/05E-14G	RICK NEWBERG		10	15.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
296	22N/05E-14G	RICHARD PAHL		20	13.00	3.50				DOE WELL LOG	.T.	.F.	.F.	.F.
297	22N/05E-14H	FREDERICK		40	77.00	2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
298	22N/05E-14H	RON LARSON		25	13.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
299	22N/05E-14H	ROLAND		14	10.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
300	22N/05E-14H	DON BARTLETT		25	13.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
301	22N/05E-14H	CHALES ALBIN		30	18.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
302	22N/05E-14H	FRANK VAUGHN		7	4.00	2.00				DOE WELL LOG	.F.	.F.	.F.	.F.
303	22N/05E-14H	RICHARD SMITH		20	17.00	3.50				DOE WELL LOG	.T.	.F.	.F.	.F.
304	22N/05E-14J	MIKE SCARFF		18	20.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
305	22N/05E-14J	VERDI QUERIN		15	18.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.

	Owner	Well Name	Remarks	
286	MIKE GATEWOOD		AIR TEST, STEM @ 198'; COMPLETE DRAWDOWN ASSUMED	
287	EARL WEAVER		ATE TEST, STEM @ 180'	
288	JOHN BOYNTON		BAIL TEST	
289	JOHNSON/YOUNG		BAIL TEST	
290	JERRY PARISI		BAIL TEST	
291	TED TOLBECK		BAIL TEST	
292	LUDVICK		AIR TEST, STEM AT 180'; COMPLETE DRAWDOWN ASSUMED	
293	MEL KLEWENO		BAIL TEST	
294	DANIAL BIRKLID		AIR JET TEST	
295	RICK NEWBERG		BAIL TEST; LOCATION FIELD CHECKED.	
296	RICHARD PAHL		BAIL TEST	
297	FREDERICK		DEEPENED FROM 59'; AIR TEST, STEM AT 136'; COMPLETE DRAWDOWN ASSUMED	AIR TEST, STEM @ 136'
298	RON LARSON		AIR JET TEST	
299	ROLAND		BAIL TEST	
300	DON BARTLETT		BAIL TEST	
301	CHALES ALBIN		BAIL TEST	
302	FRANK VAUGHN		BAIL TEST	
303	RICHARD SMITH		BAIL TEST	
304	MIKE SCARFF		AIR TEST, STEM @ 110'; COMPLETE DRAWDOWN ASSUMED	
305	VERDI QUERIN		AIR JET TEST	

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	East	Elevation Data (ft. MSL) Elevation	Method
306	22N/05E-14J		STEVEN HENDERSON		0	0		5249103	566195	510	M
307	22N/05E-14J		N.A. WETTSTEIN		0	0		5249091	565889	535	M
308	22N/05E-14K		LARRY LANE		0	0		5248896	565838	525	M
309	22N/05E-14K		DOUG MERGANTHALER		0	0		5249051	565848	535	M
310	22N/05E-14K		MICHAEL MILLER		0	0		5249112	565716	548	M
311	22N/05E-14L		LEONARD SODENKAMP		0	0		5248925	565392	508	M
312	22N/05E-14M		PAUL HIRSHFIELD		0	0		5248856	564731	425	M
313	22N/05E-14M		PAUL HIRSHFIELD		0	0		5248854	564735	425	M
314	22N/05E-14M		LEONARD HALBERT		0	0		5249062	564863	425	M
315	22N/05E-14M		DOUG WESTON		0	0		5248525	564704	375	M
316	22N/05E-14N		HARVEY WAGNER		0	0		5248479	565056	476	M
317	22N/05E-14N		HARVEY WAGNER		0	0		5248479	565058	476	M
318	22N/05E-14N		LARRY CLAAR		0	0		5248548	565054	476	M
319	22N/05E-14N		M.O. CONGLETON		0	0		5248373	564809	344	M
320	22N/05E-14P		MIKE VATNE		0	0		5248417	565444	505	M
321	22N/05E-14P		ERNEST HUMPHREY		0	0		5248622	565449	508	M
322	22N/05E-14Q		EDOMNDO ALVAREZ		0	0		5248701	565820	492	M
323	22N/05E-14P		DARRELL TEMPLETON		0	0		5248659	565457	508	M
324	22N/05E-14P		ROBERT KING		0	0		5248397	565370	492	M
325	22N/05E-14G		CHARLES MAYES		0	0		5249422	565498	564	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds
F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter
L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
306	22N/05E-14J	STEVEN		JOHNSON	110.00	100.00	1986	A	6	O	SA
307	22N/05E-14J	N.A. WETTSTEIN		JOHNSON	127.00	127.00	1986	A	6	O	PA
308	22N/05E-14K	LARRY LANE		JOHNSON	136.00	136.00	1983	A	6	O	SA
309	22N/05E-14K	DOUG		JOHNSON	160.00	160.00	1987	A	6	O	SA
310	22N/05E-14K	MICHAEL MILLER		JOHNSON	134.00	134.00	1980	A	6	O	SA
311	22N/05E-14L	LEONARD		NORTHWEST	127.00	127.00	1971	C	6	O	SA
312	22N/05E-14M	PAUL HIRSHFIELD		JOHNSON	99.00	99.00	1983	A	6	O	NMA
313	22N/05E-14M	PAUL HIRSHFIELD		JOHNSON	133.00	133.00	1983	A	6	O	NMA
314	22N/05E-14M	LEONARD HALBERT		JOHNSON	80.00	80.00	1978	A	6	O	SA
315	22N/05E-14M	DOUG WESTON		JOHNSON	39.00	39.00	1989	A	6	O	SA
316	22N/05E-14N	HARVEY WAGNER		MUELLER	97.00	97.00	1984	C	6	S	SA
317	22N/05E-14N	HARVEY WAGNER		MUELLER	118.00	118.00	1992	C	6	S	SA
318	22N/05E-14N	LARRY CLAAR		JOHNSON	96.00	96.00	1984	A	6	O	SA
319	22N/05E-14N	M.O. CONGLETON		NORTHWEST	80.00	80.00	1977	A	6	O	?
320	22N/05E-14P	MIKE VATNE		JOHNSON	144.00	144.00	1993	A	6	O	SA
321	22N/05E-14P	ERNEST HUMPHREY		JOHNSON	137.00	137.00	1984	A	6	O	SA
322	22N/05E-14Q	EDOMNDO ALVAREZ		JOHNSON	92.00	92.00	1984	A	6	O	SA
323	22N/05E-14P	DARRELL		JOHNSON	125.00	125.00	1978	A	6	O	SA
324	22N/05E-14P	ROBERT KING		JOHNSON	98.00	98.00	1987	A	6	O	SA
325	22N/05E-14G	CHARLES MAYES		JOHNSON	102.00	102.00	1989	A	6	O	PA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen G = Gravel Pack P = Perforations O = Open bottom

Completion Aquifer Codes: ? = Unknown NMA = North Meridian Aquifer PA = Perched Aquifer System DA = Deep Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
306	22N/05E-14J	STEVEN		110.00	0.00	.F.	85.00	08/12/86		
307	22N/05E-14J	N.A. WETTSTEIN		127.00	0.00	.F.	92.00	07/23/86		
308	22N/05E-14K	LARRY LANE		136.00	0.00	.F.	92.00	04/07/83		
309	22N/05E-14K	DOUG		160.00	0.00	.F.	120.00	11/21/87		
310	22N/05E-14K	MICHAEL MILLER		134.00	0.00	.F.	110.00	07/21/80		
311	22N/05E-14L	LEONARD		127.00	0.00	.F.	102.00	06/12/71		
312	22N/05E-14M	PAUL HIRSHFIELD		99.00	0.00	.F.	15.00	04/29/83		
313	22N/05E-14M	PAUL HIRSHFIELD		133.00	0.00	.F.	21.00	11/01/83		
314	22N/05E-14M	LEONARD HALBERT		80.00	0.00	.F.	20.00	02/20/78		
315	22N/05E-14M	DOUG WESTON		39.00	0.00	.F.	-1.00	11/17/89	-2.00	TOC
316	22N/05E-14N	HARVEY WAGNER		93.00	97.00	.F.	72.00	08/24/84		
317	22N/05E-14N	HARVEY WAGNER		108.00	118.00	.F.	68.00	04/21/92	-1.00	TOC
318	22N/05E-14N	LARRY CLAAR		96.00	0.00	.F.	55.00	08/10/84		
319	22N/05E-14N	M.O. CONGLETON		80.00	0.00	.F.	37.00	06/22/77		
320	22N/05E-14P	MIKE VATNE		144.00	0.00	.F.	95.00	04/21/93		
321	22N/05E-14P	ERNEST HUMPHREY		137.00	0.00	.F.	89.00	11/09/84	-2.00	TOC
322	22N/05E-14Q	EDOMNDO ALVAREZ		92.00	0.00	.F.	82.00	02/15/84	-2.00	TOC
323	22N/05E-14P	DARRELL		125.00	0.00	.F.	90.00	11/15/78		
324	22N/05E-14P	ROBERT KING		98.00	0.00	.F.	68.00	05/06/87		
325	22N/05E-14G	CHARLES MAYES		102.00	0.00	.F.	60.00	05/22/89		

	Local Number	Owner	Well Name	GPM	TEST RESULTS Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
306	22N/05E-14J	STEVEN		22	12.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
307	22N/05E-14J	N.A. WETTSTEIN		25	18.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
308	22N/05E-14K	LARRY LANE		30	20.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
309	22N/05E-14K	DOUG		30	20.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
310	22N/05E-14K	MICHAEL MILLER		13	11.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
311	22N/05E-14L	LEONARD		20	11.00	2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
312	22N/05E-14M	PAUL HIRSHFIELD		100	30.00	2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
313	22N/05E-14M	PAUL HIRSHFIELD		100	40.00	1.50				DOE WELL LOG	.T.	.F.	.F.	.F.
314	22N/05E-14M	LEONARD HALBERT		50	30.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
315	22N/05E-14M	DOUG WESTON		30	32.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
316	22N/05E-14N	HARVEY WAGNER		8	10.00	0.50				DOE WELL LOG	.T.	.F.	.F.	.F.
317	22N/05E-14N	HARVEY WAGNER		30	20.00	2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
318	22N/05E-14N	LARRY CLAAR		50	20.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
319	22N/05E-14N	M.O. CONGLETON		25	21.00	2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
320	22N/05E-14P	MIKE VATNE		12	45.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
321	22N/05E-14P	ERNEST HUMPHREY		10	20.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
322	22N/05E-14Q	EDOMNDO ALVAREZ		15	4.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
323	22N/05E-14P	DARRELL		8	22.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
324	22N/05E-14P	ROBERT KING		9	15.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
325	22N/05E-14G	CHARLES MAYES		18	36.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.

	Owner	Well Name	Remarks
306	STEVEN		AIR JET TEST
307	N.A. WETTSTEIN		AIR JET TEST
308	LARRY LANE		AIR JET TEST
309	DOUG		AIR JET TEST
310	MICHAEL MILLER		BAIL TEST
311	LEONARD		
312	PAUL HIRSHFIELD		AIR JET TEST
313	PAUL HIRSHFIELD		DEEPENED REF NO 312; AIR JET TEST
314	LEONARD HALBERT		BAIL TEST
315	DOUG WESTON		FLOWS AT 5 GPM; SWL ESTIMATED; AIR TEST, STEM AT 32'; COMPLETE DRAWDOWN ASSUMED
316	HARVEY WAGNER		BAIL TEST
317	HARVEY WAGNER		DEEPENED REF NO. 316; BAIL TEST
318	LARRY CLAAR		AIR JET TEST
319	M.O. CONGLETON		BAIL TEST
320	MIKE VATNE		AIR TEST, STEM @ 140'; COMPLETE DRAWDOWN ASSUMED
321	ERNEST HUMPHREY		AIR JET TEST
322	EDOMNDO ALVAREZ		AIR JET TEST
323	DARRELL		BAIL TEST
324	ROBERT KING		AIR JET TEST; LOCATION FIELD CHECKED.
325	CHARLES MAYES		AIR TEST, STEM AT 96'; COMPLETE DRAWDOWN ASSUMED

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	East	Elevation Data (ft. MSL) Elevation	Method
326	22N/05E-14Q		WALTER NESS		0	0		5248438	565508	492	M
327	22N/05E-14R		DAVE HOUSE		0	0		5248412	565887	492	M
328	22N/05E-14R		H.S. WALIA		0	0		5248455	565887	500	M
329	22N/05E-14R		DON CRAWFORD		0	0		5248380	566073	492	M
330	22N/05E-15C		FRED SODENKAMP		0	0		5249592	563923	425	M
331	22N/05E-15A		P.J. LEW		0	0		5249934	564492	426	M
332	22N/05E-15B		RALPH ARNTS		0	0		5249802	564028	395	M
333	22N/05E-15B		KEN KRAFT		0	0		5249937	563933	370	M
334	22N/05E-15D		ALLEN THORSETT		0	0		5249733	563376	525	M
335	22N/05E-15D		HUBER		0	0		5249702	563202	535	M
336	22N/05E-15D		AL THORSETT		0	0		5249749	563083	528	M
337	22N/05E-15G		JERRY SPRING		0	0		5249521	564226	413	M
338	22N/05E-15G		JAMES BUCK		0	0		5249287	564173	415	M
339	22N/05E-15G		GARY WHITTLESEY		0	0		5249470	564229	413	M
340	22N/05E-15H		VIRGINIA KOBE		0	0		5249191	564341	420	M
341	22N/05E-15G		HOWARD HORNRAICH		0	0		5249377	564314	420	M
342	22N/05E-15J		GARY COBB		0	0		5249117	564479	430	M
343	22N/05E-15J		J.B. PIPITONE		0	0		5249107	564619	426	M
344	22N/05E-15M		STEVE DEWATER		0	0		5248900	563238	430	M
345	22N/05E-15M		BRUCE DEWATER		0	0		5248770	563420	443	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
326	22N/05E-14Q	WALTER NESS		RICHARDSON	116.00	116.00	1984	A	6	O	?
327	22N/05E-14R	DAVE HOUSE		JOHNSON	146.00	146.00	1990	A	6	O	SA
328	22N/05E-14R	H.S. WALIA		JOHNSON	97.00	97.00	1987	A	6	S	PA
329	22N/05E-14R	DON CRAWFORD		JOHNSON	74.00	74.00	1985	A	6	O	PA
330	22N/05E-15C	FRED SODENKAMP		JOHNSON	160.00	160.00	1980	A	6	O	NMA
331	22N/05E-15A	P.J. LEW		JOHNSON	85.00	85.00	1980	A	6	O	SA
332	22N/05E-15B	RALPH ARNTS		NORTHWEST	80.00	80.00	1982	A	6	O	NMA
333	22N/05E-15B	KEN KRAFT		MUELLER	75.00	75.00	1986	A	6	S	SA
334	22N/05E-15D	ALLEN THORSETT		OELKE	53.00	52.00	1992	A	6	S	PA
335	22N/05E-15D	HUBER		NORTHWEST	150.00	150.00	1973	C	6	O	PA
336	22N/05E-15D	AL THORSETT		JOHNSON	80.00	52.00	1981	A	6	O	PA
337	22N/05E-15G	JERRY SPRING		NORTHWEST	80.00	80.00	1984	A	6	O	NMA
338	22N/05E-15G	JAMES BUCK		NORTHWEST	110.00	110.00	1984	A	6	O	NMA
339	22N/05E-15G	GARY WHITTLESEY		JOHNSON	50.00	50.00	1982	A	6	O	NMA
340	22N/05E-15H	VIRGINIA KOBE		JOHNSON	100.00	100.00	1989	A	6	O	NMA
341	22N/05E-15G	HOWARD		JOHNSON	98.00	98.00	1990	A	6	O	NMA
342	22N/05E-15J	GARY COBB		NORTHWEST	132.00	132.00	1988	A	6	O	NMA
343	22N/05E-15J	J.B. PIPITONE		JOHNSON	120.00	120.00	1978	A	6	O	SA
344	22N/05E-15M	STEVE DEWATER		JOHNSON	131.00	131.00	1990	A	6	O	SA
345	22N/05E-15M	BRUCE DEWATER		JOHNSON	140.00	140.00	1987	A	6	O	SA

Construction Method Code: C = Cable-tool D = Dug, A = Air rotary, H = Hydraulic (mud)

Well Completion Codes: S = Screen, G = Gravel Pack, P = Perforations, O = Open bottom

Completion Aquifer Codes: ? = Unknown, NMA = North Meridian Aquifer, PA = Perched Aquifer System, DA = Deep Aquifer System, SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
326	22N/05E-14Q	WALTER NESS		116.00	0.00	.F.	61.00	11/16/84		
327	22N/05E-14R	DAVE HOUSE		146.00	0.00	.F.	80.00	08/01/90		
328	22N/05E-14R	H.S. WALIA		87.00	97.00	.F.	55.00	02/03/87		
329	22N/05E-14R	DON CRAWFORD		74.00	0.00	.F.	50.00	08/19/85		
330	22N/05E-15C	FRED SODENKAMP		160.00	0.00	.F.	60.00	08/04/80		
331	22N/05E-15A	P.J. LEW		85.00	0.00	.F.	26.00	01/14/80		
332	22N/05E-15B	RALPH ARNTS		80.00	0.00	.F.	30.00	10/19/82		
333	22N/05E-15B	KEN KRAFT		70.00	75.00	.F.	-11.50	07/11/86		
334	22N/05E-15D	ALLEN THORSETT		38.00	52.00	.F.	16.00	05/13/92	-1.00	TOC
335	22N/05E-15D	HUBER		150.00	0.00	.F.	1.00	07/04/73		
336	22N/05E-15D	AL THORSETT		52.00	0.00	.F.	18.00	05/14/81		
337	22N/05E-15G	JERRY SPRING		80.00	0.00	.F.	31.00	05/18/84		
338	22N/05E-15G	JAMES BUCK		110.00	0.00	.F.	38.00	10/16/84		
339	22N/05E-15G	GARY WHITTLESEY		50.00	0.00	.F.	29.00	05/19/82		
340	22N/05E-15H	VIRGINIA KOBE		100.00	0.00	.F.	50.00	11/14/89		
341	22N/05E-15G	HOWARD		98.00	0.00	.F.	35.00	10/20/90		
342	22N/05E-15J	GARY COBB		132.00	0.00	.F.	61.00	10/31/88		
343	22N/05E-15J	J.B. PIPITONE		120.00	0.00	.F.	26.00	08/24/78		
344	22N/05E-15M	STEVE DEWATER		131.00	0.00	.F.	60.00	07/27/90		
345	22N/05E-15M	BRUCE DEWATER		140.00	0.00	.F.	80.00	12/08/87		

	Local Number	Owner	Well Name	GPM	TEST RESULTS Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
326	22N/05E-14Q	WALTER NESS		20	1.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
327	22N/05E-14R	DAVE HOUSE		20	50.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
328	22N/05E-14R	H.S. WALIA		60	20.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
329	22N/05E-14R	DON CRAWFORD		14	10.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
330	22N/05E-15C	FRED SODENKAMP		75	60.00	3.50				DOE WELL LOG	.T.	.F.	.F.	.F.
331	22N/05E-15A	P.J. LEW		50	24.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
332	22N/05E-15B	RALPH ARNTS		75	12.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
333	22N/05E-15B	KEN KRAFT		40						DOE WELL LOG	.T.	.F.	.F.	.F.
334	22N/05E-15D	ALLEN THORSETT		15	36.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
335	22N/05E-15D	HUBER		24	59.00	2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
336	22N/05E-15D	AL THORSETT		9	25.00	2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
337	22N/05E-15G	JERRY SPRING		100	10.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
338	22N/05E-15G	JAMES BUCK		40	22.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
339	22N/05E-15G	GARY WHITTLESEY		30	10.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
340	22N/05E-15H	VIRGINIA KOBE		15	40.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
341	22N/05E-15G	HOWARD		50	56.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
342	22N/05E-15J	GARY COBB		12	69.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
343	22N/05E-15J	J.B. PIPITONE		20	60.00	3.50				DOE WELL LOG	.T.	.F.	.F.	.F.
344	22N/05E-15M	STEVE DEWATER		25	60.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
345	22N/05E-15M	BRUCE DEWATER		15	40.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.

	Owner	Well Name	Remarks
326	WALTER NESS		BAIL TEST, 1 FOOT DRAWDOWN ASSUMED (0 FEET LISTED ON DOE WELL LOG)
327	DAVE HOUSE		AIR TEST, STEM AT 130'; COMPLETE DRAWDOWN ASSUMED
328	H.S. WALIA		AIR JET TEST
329	DON CRAWFORD		AIR JET TEST
330	FRED SODENKAMP		BAIL TEST
331	P.J. LEW		BAIL TEST
332	RALPH ARNTS		BAIL TEST
333	KEN KRAFT		FLOWS 2 GPM; BAIL TEST
334	ALLEN THORSETT		AIR TEST, STEM AT 52'; COMPLETE DRAWDOWN ASSUMED
335	HUBER		
336	AL THORSETT		BAIL TEST
337	JERRY SPRING		BAIL TEST
338	JAMES BUCK		BAIL TEST
339	GARY WHITTLESEY		BAIL TEST
340	VIRGINIA KOBE		AIR TEST, STEM AT 90'; COMPLETE DRAWDOWN ASSUMED
341	HOWARD		AIR TEST, STEM AT 91'; COMPLETE DRAWDOWN ASSUMED
342	GARY COBB		AIR TEST, STEM AT 130'; COMPLETE DRAWDOWN ASSUMED
343	J.B. PIPITONE		BAIL TEST
344	STEVE DEWATER		AIR TEST, STEM AT 120'; COMPLETE DRAWDOWN ASSUMED
345	BRUCE DEWATER		AIR JET TEST; LOCATION FIELD CHECKED.

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	UTM Coordinates East	Elevation Data (ft. MSL) Elevation	Elevation Data (ft. MSL) Method
346	22N/05E-15M		EUGENE LEHMANN		0	0		5248889	563192	435	M
347	22N/05E-15M		EUGENE LOTT		0	0		5248762	563174	415	M
348	22N/05E-15N		JOE FREEZON		0	0		5248513	563140	400	M
349	22N/05E-15R		DONALD PFEIFFER		0	0		5248547	564570	375	M
350	22N/05E-16E		WILLIAM GUY		0	0		5249391	561642	508	M
351	22N/05E-21A		GLEN WILLIAMS		0	0		5248303	562716	459	M
352	22N/05E-21B		MELVIN LAKE		0	0		5248298	562496	430	M
353	22N/05E-21B		MELVIN LAKE		0	0		5248297	562497	430	M
354	22N/05E-21B		KAREN LAKE		0	0		5248299	562497	430	M
355	22N/05E-21B		BOB MILLER		0	0		5248256	562561	459	M
356	22N/05E-21B		MELVIN LAKE		0	0		5248295	562501	430	M
357	22N/05E-21E		LEWIS STRENGE		0	0		5247538	561501	486	M
358	22N/05E-21L		KEN KRIDER		0	0		5247476	562171	476	M
359	22N/05E-22A		JOHNSON & SPASOFF		0	0		5248185	564595	426	M
360	22N/05E-22A		JOHN SPASOFF		0	0		5248187	564597	426	M
361	22N/05E-22M		ERNEST FLEMING		0	0		5247216	563097	459	M
362	22N/05E-22P		RICHARD SMITH		0	0		5247101	563521	466	M
363	22N/05E-23A		GUY SYKES		0	0		5248324	566043	495	M
364	22N/05E-23B		BILL TOOKER		0	0		5248331	565623	485	M
365	22N/05E-23B		DOUG MERGENTHALER		0	0		5248159	565497	508	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds
F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter
L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
346	22N/05E-15M	EUGENE LEHMANN		JOHNSON	144.00	144.00	1988	A	6	S	SA
347	22N/05E-15M	EUGENE LOTT		JOHNSON	135.00	135.00	1979	A	6	O	SA
348	22N/05E-15N	JOE FREEZON		BURAAS	63.00	63.00	1981	C	6	S	?
349	22N/05E-15R	DONALD PFEIFFER		JOHNSON	52.00	52.00	1977	A	6	O	NMA
350	22N/05E-16E	WILLIAM GUY		JOHNSON	155.00	155.00	1982	A	6	O	PA
351	22N/05E-21A	GLEN WILLIAMS		JOHNSON	97.00	97.00	1978	A	6	O	PA
352	22N/05E-21B	MELVIN LAKE		JOHNSON	120.00	97.00	1991	A	6	O	SA
353	22N/05E-21B	MELVIN LAKE		JOHNSON	310.00	250.00	1991	A	6	P	SA
354	22N/05E-21B	KAREN LAKE		JOHNSON	96.00	96.00	1988	A	6	O	SA
355	22N/05E-21B	BOB MILLER		NORTHWEST	96.00	96.00	1988	A	6	S	SA
356	22N/05E-21B	MELVIN LAKE		JOHNSON	89.00	89.00	1977	A	6	O	SA
357	22N/05E-21E	LEWIS STRENGE		JOHNSON	324.00	324.00	1982	A	6	O	DA
358	22N/05E-21L	KEN KRIDER		JOHNSON	72.00	72.00	1978	A	6	O	PA
359	22N/05E-22A	JOHNSON &		JOHNSON	152.00	152.00	1978	A	6	O	?
360	22N/05E-22A	JOHN SPASOFF		NORTHWEST	123.00	123.00	1980	A	6	S	NMA
361	22N/05E-22M	ERNEST FLEMING		JOHNSON	140.00	140.00	1959	C	6	P	NMA
362	22N/05E-22P	RICHARD SMITH		JOHNSON	143.00	143.00	1977	A	6	O	PA
363	22N/05E-23A	GUY SYKES		JOHNSON	117.00	117.00	1989	A	6	O	SA
364	22N/05E-23B	BILL TOOKER		NORTHWEST	95.00	59.00	1981	A	6	O	SA
365	22N/05E-23B	DOUG		JOHNSON	119.00	119.00	1979	A	6	O	SA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen G = Gravel Pack P = Perforations O = Open bottom

Completion Aquifer Codes: ? = Unknown NMA = North Meridian Aquifer PA = Perched Aquifer System DA = Deep Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
346	22N/05E-15M	EUGENE LEHMANN		136.00	141.00	.F.	80.00	11/07/88		
347	22N/05E-15M	EUGENE LOTT		135.00	0.00	.F.	55.00	02/02/79		
348	22N/05E-15N	JOE FREEZON		58.00	63.00	.F.	9.00	08/16/81	-1.00	TOC
349	22N/05E-15R	DONALD PFEIFFER		52.00	0.00	.F.	23.00	06/07/77		
350	22N/05E-16E	WILLIAM GUY		155.00	0.00	.F.	135.00	03/10/82		
351	22N/05E-21A	GLEN WILLIAMS		97.00	0.00	.F.	72.00	02/15/78		
352	22N/05E-21B	MELVIN LAKE		97.00	0.00	.F.	75.00	05/10/91		
353	22N/05E-21B	MELVIN LAKE		80.00	89.00	.F.	74.00	05/07/91		
354	22N/05E-21B	KAREN LAKE		96.00	0.00	.F.	70.00	01/06/88		
355	22N/05E-21B	BOB MILLER		91.00	96.00	.F.	70.00	11/04/88		
356	22N/05E-21B	MELVIN LAKE		89.00	0.00	.F.	72.00	12/28/77		
357	22N/05E-21E	LEWIS STRENGE		324.00	0.00	.F.	260.00	06/16/82		
358	22N/05E-21L	KEN KRIDER		72.00	0.00	.F.	23.00	11/09/78		
359	22N/05E-22A	JOHNSON &		152.00	0.00	.F.	112.00	08/30/78		
360	22N/05E-22A	JOHN SPASOFF		116.00	123.00	.F.	86.00	11/10/80		
361	22N/05E-22M	ERNEST FLEMING		130.00	140.00	.F.	100.00	10/01/59		
362	22N/05E-22P	RICHARD SMITH		143.00	0.00	.F.	60.00	04/26/77		
363	22N/05E-23A	GUY SYKES		117.00	0.00	.F.	95.00	10/30/89		
364	22N/05E-23B	BILL TOOKER		95.00	0.00	.F.	68.00	09/30/81		
365	22N/05E-23B	DOUG		119.00	0.00	.F.	92.00	01/09/79		

	Local Number	Owner	Well Name	TEST RESULTS GPM	Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
346	22N/05E-15M	EUGENE LEHMANN		18	52.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
347	22N/05E-15M	EUGENE LOTT		35	30.00	3.50				DOE WELL LOG	.T.	.F.	.F.	.F.
348	22N/05E-15N	JOE FREEZON		40	37.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
349	22N/05E-15R	DONALD PFEIFFER		20	7.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
350	22N/05E-16E	WILLIAM GUY		12	7.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
351	22N/05E-21A	GLEN WILLIAMS		10	8.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
352	22N/05E-21B	MELVIN LAKE		3	18.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
353	22N/05E-21B	MELVIN LAKE		4	15.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
354	22N/05E-21B	KAREN LAKE		9	24.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
355	22N/05E-21B	BOB MILLER		15	15.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
356	22N/05E-21B	MELVIN LAKE		6	7.00	3.50				DOE WELL LOG	.T.	.F.	.F.	.F.
357	22N/05E-21E	LEWIS STRENGE		14	30.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
358	22N/05E-21L	KEN KRIDER		7	30.00	3.50				DOE WELL LOG	.T.	.F.	.F.	.F.
359	22N/05E-22A	JOHNSON &		10	25.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
360	22N/05E-22A	JOHN SPASOFF		35	5.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
361	22N/05E-22M	ERNEST FLEMING		10	1.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
362	22N/05E-22P	RICHARD SMITH		10	42.00	2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
363	22N/05E-23A	GUY SYKES		15	18.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
364	22N/05E-23B	BILL TOOKER		20	6.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
365	22N/05E-23B	DOUG		8	17.00	3.50				DOE WELL LOG	.T.	.F.	.F.	.F.

	Owner	Well Name	Remarks
346	EUGENE LEHMANN		AIR TEST, STEM AT 132'; COMPLETE DRAWDOWN ASSUMED
347	EUGENE LOTT		BAIL TEST
348	JOE FREEZON		BAIL TEST
349	DONALD PFEIFFER		BAIL TEST
350	WILLIAM GUY		BAIL TEST
351	GLEN WILLIAMS		BAIL TEST
352	MELVIN LAKE		AIR TEST, STEM AT 93'; COMPLETE DRAWDOWN ASSUMED
353	MELVIN LAKE		AIR TEST, STEM AT 89'; COMPLETE DRAWDOWN ASSUMED; DEEPED REF. NO. 352
354	KAREN LAKE		AIR TEST, STEM AT 94'; COMPLETE DRAWDOWN ASSUMED
355	BOB MILLER		AIR TEST, STEM @ 85'; COMPLETE DRAWDOWN ASSUMED; LOCATION FIELD CHECKED.
356	MELVIN LAKE		BAIL TEST
357	LEWIS STRENGE		BAIL TEST
358	KEN KRIDER		BAIL TEST
359	JOHNSON &		BAIL TEST
360	JOHN SPASOFF		BAIL TEST
361	ERNEST FLEMING		BAIL TEST, 1' DRAWDOWN ASSUMED, NONE LISTED ON DOE WELL LOG
362	RICHARD SMITH		BAIL TEST
363	GUY SYKES		AIR TEST, STEM AT 113'; COMPLETE DRAWDOWN ASSUMED
364	BILL TOOKER		BAIL TEST
365	DOUG		BAIL TEST

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	UTM Coordinates East	Elevation Data (ft. MSL) Elevation	Elevation Data (ft. MSL) Method
366	22N/05E-23C		GARY GABLER		0	0		5248014	565425	525	M
367	22N/05E-23C		JOHN CONRAD		0	0		5248186	565403	505	M
368	22N/05E-23C		VERNON BEHRENS		0	0		5248151	565390	515	M
369	22N/05E-23C		RON ALEXANDER		0	0		5248297	565155	499	M
370	22N/05E-23C		PASKO PROPERTIES		0	0		5248326	565192	508	M
371	22N/05E-23E		RICHARD MARSELLE		0	0		5247715	564740	361	M
372	22N/05E-23E		JIM VAN BLECK		0	0		5247890	564696	417	M
373	22N/05E-23F		ROBERT PEMBERTON		0	0		5247730	565389	518	M
374	22N/05E-23F		JOEL MILES		0	0		5247568	565129	460	M
375	22N/05E-23F		ALFRED WILCOX		0	0		5247733	565425	525	M
376	22N/05E-23G		CHARLES CRAMER		0	0		5247686	565496	525	M
377	22N/05E-23P		LEE JOHNSON		0	0		5247065	565419	470	M
378	22N/05E-23P		TOM CHARLESWORTH		0	0		5246963	565133	443	M
379	22N/05E-23P		MIKE REID		0	0		5247145	565402	480	M
380	22N/05E-23P		LAURIE SAUNDERS		0	0		5247154	565107	466	M
381	22N/05E-23P		RICH ABBOTT		0	0		5247143	565442	486	M
382	22N/05E-23P		DR. EVOY		0	0		5246913	565423	459	M
383	22N/05E-23Q		RICHARD GRADWOHL		0	0		5246990	565491	466	M
384	22N/05E-23Q		GERALD GOBEL		0	0		5246819	565653	449	M
385	22N/05E-23Q		GARY SARRETT		0	0		5246816	565508	449	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds
F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter
L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
366	22N/05E-23C	GARY GABLER		JOHNSON	174.00	174.00	1992	A	6	O	SA
367	22N/05E-23C	JOHN CONRAD		JOHNSON	152.00	152.00	1987	C	6	P	SA
368	22N/05E-23C	VERNON BEHRENS		JOHNSON	167.00	167.00	1984	A	6	O	SA
369	22N/05E-23C	RON ALEXANDER		JOHNSON	145.00	145.00	1977	A	6	O	SA
370	22N/05E-23C	PASKO		JOHNSON	140.00	140.00	1980	A	6	O	SA
371	22N/05E-23E	RICHARD		JOHNSON	45.00	45.00	1977	C	6	P	NMA
372	22N/05E-23E	JIM VAN BLECK		NORTHWEST	100.00	100.00	1979	A	6	O	NMA
373	22N/05E-23F	ROBERT		JOHNSON	154.00	154.00	1991	A	6	O	SA
374	22N/05E-23F	JOEL MILES		MUELLER	128.00	128.00	1987	C	6	S	SA
375	22N/05E-23F	ALFRED WILCOX		JOHNSON	178.00	178.00	1987	C	6	S	SA
376	22N/05E-23G	CHARLES CRAMER		JOHNSON	175.00	175.00	1978	A	6	O	SA
377	22N/05E-23P	LEE JOHNSON		JOHNSON	106.00	106.00	1992	A	6	O	SA
378	22N/05E-23P	TOM		JOHNSON	80.00	80.00	1979	A	6	O	SA
379	22N/05E-23P	MIKE REID		JOHNSON	110.00	100.00	1979	A	6	O	SA
380	22N/05E-23P	LAURIE SAUNDERS		JOHNSON	104.00	104.00	1989	A	6	O	SA
381	22N/05E-23P	RICH ABBOTT		JOHNSON	128.00	128.00	1990	A	6	O	SA
382	22N/05E-23P	DR. EVOY		JOHNSON	86.00	86.00	1990	A	6	O	SA
383	22N/05E-23Q	RICHARD		JOHNSON	114.00	114.00	1990	A	6	O	SA
384	22N/05E-23Q	GERALD GOBEL		JOHNSON	100.00	100.00	1985	A	6	O	SA
385	22N/05E-23Q	GARY SARRETT		JOHNSON	100.00	100.00	1983	A	6	O	SA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen P = Perforations O = Open bottom G = Gravel Pack

Completion Aquifer Codes: ? = Unknown PA = Perched Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer NMA = North Meridian Aquifer DA = Deep Aquifer System

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
366	22N/05E-23C	GARY GABLER		174.00	0.00	.F.	130.00	07/09/92		
367	22N/05E-23C	JOHN CONRAD		142.00	152.00	.F.	102.00	02/17/87		
368	22N/05E-23C	VERNON BEHRENS		167.00	0.00	.F.	147.00	06/28/84		
369	22N/05E-23C	RON ALEXANDER		145.00	0.00	.F.	110.00	01/17/77		
370	22N/05E-23C	PASKO		140.00	0.00	.F.	102.00	12/01/80		
371	22N/05E-23E	RICHARD		35.00	45.00	.F.	9.00	10/14/77		
372	22N/05E-23E	JIM VAN BLECK		100.00	0.00	.F.	62.00	11/08/79		
373	22N/05E-23F	ROBERT		154.00	0.00	.F.	118.00	10/23/91		
374	22N/05E-23F	JOEL MILES		123.00	128.00	.F.	88.00	11/11/87		
375	22N/05E-23F	ALFRED WILCOX		158.00	178.00	.F.	140.00	05/20/87		
376	22N/05E-23G	CHARLES CRAMER		175.00	0.00	.F.	149.00	05/09/78		
377	22N/05E-23P	LEE JOHNSON		106.00	0.00	.F.	80.00	07/13/92		
378	22N/05E-23P	TOM		80.00	0.00	.F.	60.00	08/16/79		
379	22N/05E-23P	MIKE REID		110.00	0.00	.F.	85.00	07/12/79		
380	22N/05E-23P	LAURIE SAUNDERS		104.00	0.00	.F.	90.00	09/14/89		
381	22N/05E-23P	RICH ABBOTT		128.00	0.00	.F.	95.00	11/14/90		
382	22N/05E-23P	DR. EVOY		86.00	0.00	.F.	70.00	10/05/90		
383	22N/05E-23Q	RICHARD		114.00	0.00	.F.	84.00	05/12/90		
384	22N/05E-23Q	GERALD GOBEL		100.00	0.00	.F.	67.00	01/25/85		
385	22N/05E-23Q	GARY SARRETT		100.00	0.00	.F.	75.00	10/07/83		

	Local Number	Owner	Well Name	TEST RESULTS GPM	Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
366	22N/05E-23C	GARY GABLER		20	28.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
367	22N/05E-23C	JOHN CONRAD		12	30.00	2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
368	22N/05E-23C	VERNON BEHRENS		10	6.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
369	22N/05E-23C	RON ALEXANDER		20	15.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
370	22N/05E-23C	PASKO		12	18.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
371	22N/05E-23E	RICHARD		25	15.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
372	22N/05E-23E	JIM VAN BLECK		35	12.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
373	22N/05E-23F	ROBERT		18	32.00	2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
374	22N/05E-23F	JOEL MILES		12	30.00	2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
375	22N/05E-23F	ALFRED WILCOX		5	20.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
376	22N/05E-23G	CHARLES CRAMER		10	10.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
377	22N/05E-23P	LEE JOHNSON		15	22.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
378	22N/05E-23P	TOM		15	8.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
379	22N/05E-23P	MIKE REID		12	12.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
380	22N/05E-23P	LAURIE SAUNDERS		12	9.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
381	22N/05E-23P	RICH ABBOTT		15	29.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
382	22N/05E-23P	DR. EVOY		20	12.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
383	22N/05E-23Q	RICHARD		18	25.00	2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
384	22N/05E-23Q	GERALD GOBEL		20	18.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
385	22N/05E-23Q	GARY SARRETT		30	12.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.

	Owner	Well Name	Remarks
366	GARY GABLER		AIR TEST, STEM AT 158'; COMPLETE DRAWDOWN ASSUMED
367	JOHN CONRAD		DEEPENED FROM 96'; BAIL TEST
368	VERNON BEHRENS		AIR JET TEST
369	RON ALEXANDER		BAIL TEST; LOCATION FIELD CHECKED.
370	PASKO		BAIL TEST
371	RICHARD		BAIL TEST; LOCATION FIELD CHECKED.
372	JIM VAN BLECK		BAIL TEST
373	ROBERT		AIR TEST, STEM AT 150'; COMPLETE DRAWDOWN ASSUMED; LOCATION FIELD CHECKED.
374	JOEL MILES		BAIL TEST
375	ALFRED WILCOX		PERF 158-168, SCREENED 168-178; BAIL TEST
376	CHARLES CRAMER		BAIL TEST
377	LEE JOHNSON		AIR TEST, STEM AT 102'; COMPLETE DRAWDOWN ASSUMED
378	TOM		BAIL TEST
379	MIKE REID		BAIL TEST
380	LAURIE SAUNDERS		AIR TEST, STEM AT 99'; COMPLETE DRAWDOWN ASSUMED
381	RICH ABBOTT		AIR TEST, STEM AT 124'; COMPLETE DRAWDOWN ASSUMED
382	DR. EVOY		AIR TEST, STEM AT 82'; COMPLETE DRAWDOWN ASSUMED
383	RICHARD		AIR TEST, STEM AT 109'; COMPLETE DRAWDOWN ASSUMED
384	GERALD GOBEL		AIR JET TEST
385	GARY SARRETT		

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	East	Elevation Data (ft. MSL) Elevation	Method
386	22N/05E-24B		GERALD HORNER		0	0		5248002	567383	480	M
387	22N/05E-24B		RICHARD GABRIELSON		0	0		5248148	567083	510	M
388	22N/05E-24C		TERRY FLYNN		0	0		5248043	567091	510	M
389	22N/05E-24G		RICHARD LEARN		0	0		5247886	567263	492	M
390	22N/05E-24G		ROGER PARIS		0	0		5247890	567322	492	M
391	22N/05E-24G		ALLEN PONTNAK		0	0		5247931	567033	495	M
392	22N/05E-24H		AL HILTON		0	0		5247910	567833	446	M
393	22N/05E-24J		FRED COVEY		0	0		5247537	567831	436	M
394	22N/05E-24J		CHUCK KETTLE		0	0		5247457	567826	436	M
395	22N/05E-24K		LOOS		0	0		5247229	567494	426	M
396	22N/05E-25E		GLENN BROWN		0	0		5246168	566335	443	M
397	22N/05E-25E		GARY TRESSEL		0	0		5246385	566463	459	M
398	22N/05E-25J		ROBERT STRINGER		0	0		5245807	567607	377	M
399	22N/05E-26A		JOHN DUHAMEL		0	0		5246728	565873	426	M
400	22N/05E-26E		DAN FLANERY		0	0		5246513	565042	360	M
401	22N/05E-26F		HARRY DELLICKER		0	0		5246296	565424	361	M
402	22N/05E-26F		DALE SCHNEIDER		0	0		5246345	565440	360	M
403	22N/05E-26C		STUART HALLESON		0	0		5246719	565260	415	M
404	22N/05E-26Q		UNIVERSAL LAND		0	0		5245192	565673	328	M
405	22N/05E-27N		KENNETH ROBINSON		0	0		5245364	563123	400	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
386	22N/05E-24B	GERALD HORNER		JOHNSON	120.00	120.00	1979	A	6	O	SA
387	22N/05E-24B	RICHARD		JOHNSON	114.00	114.00	1976	A	6	P	SA
388	22N/05E-24C	TERRY FLYNN		NORTHWEST	99.00	99.00	1984	A	6	O	PA
389	22N/05E-24G	RICHARD LEARN		NORTHWEST	117.00	117.00	1985	A	6	O	SA
390	22N/05E-24G	ROGER PARIS		JOHNSON	138.00	138.00	1987	A	6	O	?
391	22N/05E-24G	ALLEN PONTNAK		NORTHWEST	118.00	118.00	1984	A	6	O	SA
392	22N/05E-24H	AL HILTON		JOHNSON	76.00	76.00	1978	A	6	O	SA
393	22N/05E-24J	FRED COVEY		JOHNSON	65.00	65.00	1987	A	6	O	SA
394	22N/05E-24J	CHUCK KETTLE		NORTHWEST	71.00	71.00	1985	A	6	O	SA
395	22N/05E-24K	LOOS		JOHNSON	92.00	92.00	1978	A	6	O	SA
396	22N/05E-25E	GLENN BROWN		EVERGREEN	110.00	110.00	1973	C	6	O	SA
397	22N/05E-25E	GARY TRESSEL		JOHNSON	122.00	122.00	1987	A	8	O	SA
398	22N/05E-25J	ROBERT STRINGER		NORTHWEST	80.00	80.00	1990	A	6	O	SA
399	22N/05E-26A	JOHN DUHAMEL		JOHNSON	100.00	100.00	1987	A	6	O	SA
400	22N/05E-26E	DAN FLANERY		NORTHWEST	60.00	60.00	1978	A	6	O	SA
401	22N/05E-26F	HARRY DELLICKER		JOHNSON	40.00	40.00	1981	A	6	O	SA
402	22N/05E-26F	DALE SCHNEIDER		NORTHWEST	60.00	60.00	1992	A	6	O	SA
403	22N/05E-26C	STUART HALLESON		JOHNSON	78.00	78.00	1991	A	6	O	SA
404	22N/05E-26Q	UNIVERSAL LAND		ANDERSON	30.00	30.00	1991		18	P	?
405	22N/05E-27N	KENNETH		JOHNSON	94.00	94.00	1982	A	6	O	SA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen G = Gravel Pack P = Perforations O = Open bottom

Completion Aquifer Codes: ? = Unknown NMA = North Meridian Aquifer PA = Perched Aquifer System DA = Deep Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
386	22N/05E-24B	GERALD HORNER		120.00	0.00	.F.	69.00	05/21/79		
387	22N/05E-24B	RICHARD		104.00	114.00	.F.	100.00	06/07/76		
388	22N/05E-24C	TERRY FLYNN		99.00	0.00	.F.	68.00	04/05/84		
389	22N/05E-24G	RICHARD LEARN		117.00	0.00	.F.	74.00	08/01/85		
390	22N/05E-24G	ROGER PARIS		138.00	0.00	.F.	100.00	10/02/87		
391	22N/05E-24G	ALLEN PONTNAK		118.00	0.00	.F.	89.00	08/24/84		
392	22N/05E-24H	AL HILTON		76.00	0.00	.F.	34.00	06/27/78		
393	22N/05E-24J	FRED COVEY		65.00	0.00	.F.	35.00	01/14/87		
394	22N/05E-24J	CHUCK KETTLE		71.00	0.00	.F.	43.00	01/28/85		
395	22N/05E-24K	LOOS		92.00	0.00	.F.	61.00	05/23/78		
396	22N/05E-25E	GLENN BROWN		110.00	0.00	.F.	89.00	06/08/73		
397	22N/05E-25E	GARY TRESSEL		122.00	0.00	.F.	91.00	08/18/87		
398	22N/05E-25J	ROBERT STRINGER		80.00	0.00	.F.	13.00	01/22/90		
399	22N/05E-26A	JOHN DUHAMEL		100.00	0.00	.F.	60.00	02/27/87		
400	22N/05E-26E	DAN FLANERY		60.00	0.00	.F.	13.00	04/28/78		
401	22N/05E-26F	HARRY DELLICKER		40.00	0.00	.F.	17.00	10/17/81		
402	22N/05E-26F	DALE SCHNEIDER		60.00	0.00	.F.	12.00	05/20/92		
403	22N/05E-26C	STUART HALLESON		78.00	0.00	.F.	55.00	10/28/91		
404	22N/05E-26Q	UNIVERSAL LAND		0.00	0.00	.F.	0.00	08/08/81		
405	22N/05E-27N	KENNETH		94.00	0.00	.F.	48.00	10/12/82		

	Local Number	Owner	Well Name	TEST RESULTS GPM	Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
386	22N/05E-24B	GERALD HORNER		25	36.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
387	22N/05E-24B	RICHARD		18	4.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
388	22N/05E-24C	TERRY FLYNN		12	10.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
389	22N/05E-24G	RICHARD LEARN		30	20.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
390	22N/05E-24G	ROGER PARIS		12	15.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
391	22N/05E-24G	ALLEN PONTNAK		25	10.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
392	22N/05E-24H	AL HILTON		12	25.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
393	22N/05E-24J	FRED COVEY		8	15.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
394	22N/05E-24J	CHUCK KETTLE		40	20.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
395	22N/05E-24K	LOOS		19	14.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
396	22N/05E-25E	GLENN BROWN		8	8.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
397	22N/05E-25E	GARY TRESSEL		30	12.00	2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
398	22N/05E-25J	ROBERT STRINGER		100	67.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
399	22N/05E-26A	JOHN DUHAMEL		20	30.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
400	22N/05E-26E	DAN FLANERY		30	15.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
401	22N/05E-26F	HARRY DELLICKER		25	10.00	2.00				DOE WELL LOG	.T.	.F.	.F.	.F.
402	22N/05E-26F	DALE SCHNEIDER		30	48.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
403	22N/05E-26C	STUART HALLESON		18	19.00	2.50				DOE WELL LOG	.T.	.F.	.F.	.F.
404	22N/05E-26Q	UNIVERSAL LAND								DOE WELL LOG	.T.	.F.	.F.	.F.
405	22N/05E-27N	KENNETH		15	26.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.

	Owner	Well Name	Remarks
386	GERALD HORNER		BAIL TEST
387	RICHARD		BAIL TEST
388	TERRY FLYNN		BAIL TEST
389	RICHARD LEARN		BAIL TEST
390	ROGER PARIS		AIR JET TEST
391	ALLEN PONTNAK		BAIL TEST
392	AL HILTON		BAIL TEST
393	FRED COVEY		AIR JET TEST
394	CHUCK KETTLE		BAIL TEST
395	LOOS		BAIL TEST
396	GLENN BROWN		BAIL TEST
397	GARY TRESSEL		AIR JET TEST
398	ROBERT STRINGER		AIR TEST, STEM AT 80'; COMPLETE DRAWDOWN ASSUMED
399	JOHN DUHAMEL		AIR JET TEST
400	DAN FLANERY		BAIL TEST
401	HARRY DELLICKER		BAIL TEST
402	DALE SCHNEIDER		AIR TEST, STEM AT 60'; COMPLETE DRAWDOWN ASSUMED
403	STUART HALLESON		AIR TEST, STEM AT 74'; COMPLETE DRAWDOWN ASSUMED
404	UNIVERSAL LAND		7 DEWATERING WELLS ?, PERF ZONE NOT INDICATED.
405	KENNETH		BAIL TEST

	Local Number	Siteid Number	Owner	Well Name	Latitude	Longitude	Accuracy	UTM Coordinates North	East	Elevation Data (ft. MSL) Elevation	Method
406	22N/05E-28B		ARTHUR COOK		0	0		5246572	562303	440	M
407	22N/05E-28G		DENNIS HERSHBERGER		0	0		5246321	562319	417	M
408	22N/05E-28K		FRANK HERRIOT		0	0		5245401	561904	426	M
409	22N/05E-28M		ROBERT OLSEN		0	0		5245585	561757	426	M
410	22N/05E-28N		PHILLIP GAUTHIER		0	0		5245319	561750	459	M
411	22N/05E-28D		HILL, J.C.		0	0		5246626	561555	452	M
412	22N/05E-28C		GRACE EDWARDS		0	0		5246550	562370	440	M

Lat-Long Accuracy Code: S = Second T = 10 Seconds
F = 5 Seconds M = Minute

Method Code: M = Map A = Altimeter
L = Level, Surveyed

NOTE: Because of deletions from the original data entries, there are missing reference numbers. These missing numbers do not respresent missing records.

	Local Number	Owner	Well Name	Driller	Depth Drilled	Const. Depth	Const. Year	Const. methods	Casing size (in)	Well Completion	Completion Aquifer
406	22N/05E-28B	ARTHUR COOK		JOHNSON	201.00	201.00	1988	A	6	P	DA
407	22N/05E-28G	DENNIS		JOHNSON	74.00	74.00	1983	A	6	O	PA
408	22N/05E-28K	FRANK HERRIOT		JOHNSON	100.00	100.00	1979	A	6	O	SA
409	22N/05E-28M	ROBERT OLSEN		JOHNSON	80.00	80.00	1978	A	6	O	PA
410	22N/05E-28N	PHILLIP		NORHTWEST	171.00	171.00	1979	A	6	O	SA
411	22N/05E-28D	HILL, J.C.				132.00			6		SA
412	22N/05E-28C	GRACE EDWARDS				35.00			0		PA

Construction Method Code: C = Cable-tool D = Dug A = Air rotary H = Hydraulic (mud)

Well Completion Codes: S = Screen G = Gravel Pack P = Perforations O = Open bottom

Completion Aquifer Codes: ? = Unknown NMA = North Meridian Aquifer PA = Perched Aquifer System DA = Deep Aquifer System SA = Shallow Aquifer System, outside North Meridian Aquifer

	Local Number	Owner	Well Name	Depth (ft) to Top screen	Bottom	Multiple screens	Const. SWL	SWL Date	Measuring Point Height	Remarks
406	22N/05E-28B	ARTHUR COOK		191.00	201.00	.F.	180.00	02/18/88		
407	22N/05E-28G	DENNIS		74.00	0.00	.F.	45.00	03/14/83		
408	22N/05E-28K	FRANK HERRIOT		100.00	0.00	.F.	80.00	12/21/79		
409	22N/05E-28M	ROBERT OLSEN		80.00	0.00	.F.	50.00	09/12/78		
410	22N/05E-28N	PHILLIP		171.00	0.00	.F.	114.00	10/24/79		
411	22N/05E-28D	HILL, J.C.		132.00	0.00	.F.	106.21	07/02/62		
412	22N/05E-28C	GRACE EDWARDS		0.00	0.00	.F.	0.00	/ /	0.80	TOP OF CONCRETE RIM AROUND WELL

	Local Number	Owner	Well Name	TEST RESULTS GPM	Drawdown	Duration	Storage Coefficient	TRANSMISSIVITY Early	Late	Source of Information	AVAILABLE DATA Geologic Log	Geophy. Log	Hydrograph	Pump Test
406	22N/05E-28B	ARTHUR COOK		2	15.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
407	22N/05E-28G	DENNIS		15	12.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
408	22N/05E-28K	FRANK HERRIOT		16	10.00	3.00				DOE WELL LOG	.T.	.F.	.F.	.F.
409	22N/05E-28M	ROBERT OLSEN		15	10.00	4.00				DOE WELL LOG	.T.	.F.	.F.	.F.
410	22N/05E-28N	PHILLIP		20	30.00	1.00				DOE WELL LOG	.T.	.F.	.F.	.F.
411	22N/05E-28D	HILL, J.C.								LUZIER, 1969	.F.	.F.	.F.	.F.
412	22N/05E-28C	GRACE EDWARDS								R&N FIELD CHECK	.F.	.F.	.F.	.F.

	Owner	Well Name	Remarks	
406	ARTHUR COOK		AIR TEST, STEM SET 15' BELOW SWL(?)	DEEPENED WELL FROM 194'
407	DENNIS		BAIL TEST	
408	FRANK HERRIOT		BAIL TEST	
409	ROBERT OLSEN		BAIL TEST	
410	PHILLIP		BAIL TEST	
411	HILL, J.C.		OPENING DEPTH ASSUMED	
412	GRACE EDWARDS		LARGE DIAMETER WELL. SHE DOES NOT KNOW THE CONSTRUCTION OR ACCURATE DEPTH.	L

APPENDIX 2
NORTH MERIDIAN AQUIFER PROTECTION PLAN
PARCEL DATABASE

The following database contains a listing of parcels with identified potential contaminant sources. Potential contaminant sources are listed by their hazard code (see Table 4.2 for explanation of hazard codes).

WD111 HAZARDOUS GENERATORS

08-May-95

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
019330 0070	481	SW	3/10/95	
019330 0100	481	SW	3/10/95	
019350 0070	481	SW	3/23/95	
019350 0070	400	SW	3/23/95	
080780 0040	481	DB	3/8/95	
080780 0150	481	DB	3/8/95	
080800 0010	481	DB	3/8/95	
080800 0020	481	DB	3/8/95	
080800 0050	481	DB	3/8/95	
080800 0120	481	DB	3/8/95	
102205 9011	903	DB	4/4/95	
102205 9012	903	DB	4/4/95	
102205 9014	903	DB	4/4/95	
102205 9023	903	DB	4/4/95	
102205 9040	903	DB	4/4/95	
102205 9045	481	SW	4/5/95	
102205 9061	400	DB	4/4/95	
102205 9086	903	DB	4/4/95	
102205 9115	903	DB	4/4/95	
102205 9142	481	DB	4/4/95	
102205 9143	903	DB	4/4/95	
102205 9145	903	DB	4/4/95	
102205 9145	481	DB	4/4/95	
102205 9154	903	DB	4/4/95	
102205 9157	903	DB	4/4/95	
102205 9167	903	DB	4/4/95	
102205 9180	821	DB	4/4/95	
102205 9180	500	DB	4/4/95	
102205 9180	481	DB	4/4/95	
103000 0010	481	SW	3/8/95	
103000 0110	481	SW	3/8/95	
103000 0120	481	SW	3/8/95	
113760 0010	481	SW	3/7/95	
113760 0030	481	SW	3/7/95	
113760 0050	481	SW	3/7/95	
113760 0080	481	SW	3/7/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
113760 0100	481	SW	3/7/95	
113760 0230	500	SW	3/7/95	
140300 0010	481	SW	3/10/95	
142205 9006	481	SW	4/5/95	
142205 9006	903	SW	4/5/95	
142205 9008	903	SW	4/5/95	
142205 9020	481	SW	4/5/95	
142205 9022	903	SW	4/5/95	
142205 9024	903	SW	4/5/95	
142205 9030	903	SW	4/5/95	
142205 9030	481	SW	4/5/95	
142205 9032	481	SW	4/5/95	
142205 9035	481	SW	4/5/95	
142205 9035	100	SW	4/5/95	
142205 9036	481	SW	4/5/95	
142205 9036	903	SW	4/5/95	
142205 9038	481	SW	4/5/95	
142205 9038	903	SW	4/5/95	
142205 9039	481	SW	4/5/95	
142205 9049	903	SW	4/5/95	
142205 9052	481	SW	4/5/95	
142205 9059	481	SW	4/5/95	
142205 9072	481	SW	4/5/95	
142205 9072	903	SW	4/5/95	
142205 9080	903	SW	4/5/95	
142205 9089	481	SW	4/5/95	
142205 9097	481	SW	4/5/95	
142205 9097	903	SW	4/5/95	
142205 9099	481	SW	4/5/95	
142205 9108	481	SW	4/5/95	
142205 9112	481	SW	4/5/95	
142205 9117	481	SW	4/5/95	
142205 9126	481	SW	4/5/95	
142205 9131	481	SW	4/5/95	
142205 9132	481	SW	4/5/95	
142205 9144	481	SW	4/5/95	
142205 9145	481	SW	4/5/95	
142205 9146	481	SW	4/5/95	
142205 9148	481	SW	4/5/95	
142205 9148	903	SW	4/5/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
142205 9152	481	SW	4/5/95	
142205 9157	481	SW	4/5/95	
142205 9163	481	SW	4/5/95	
142205 9164	903	SW	4/5/95	
142205 9164	481	SW	4/5/95	
142205 9169	903	SW	4/5/95	
142205 9169	481	SW	4/5/95	
142205 9174	481	SW	4/5/95	
142205 9174	903	SW	4/5/95	
142205 9175	481	SW	4/5/95	
142205 9179	903	SW	4/5/95	
142205 9214	481	SW	4/5/95	
142205 9217	481	SW	4/5/95	
150950 0040	481	SW	3/7/95	
150950 0090	481	SW	3/7/95	
150950 0140	481	SW	3/7/95	
150950 0220	7538	SW	3/7/95	
150950 0250	481	SW	3/7/95	
150950 0290	481	SW	3/7/95	
150950 0390	481	SW	3/7/95	
150950 0460	481	SW	3/7/95	
151590 0050	481	SW	3/30/95	
151590 0100	481	SW	3/30/95	
151590 0200	481	SW	3/30/95	
151590 0280	481	SW	3/30/95	
151590 0280	500	SW	3/30/95	
151591 0090	481	SW	4/4/95	
151591 0140	481	SW	4/4/95	
151591 0170	481	SW	4/4/95	
151591 0200	481	SW	4/4/95	
151591 0260	481	SW	4/4/95	
151591 0340	481	SW	3/30/95	
151591 0440	500	SW	4/4/95	
152205 9002	950	SW	4/5/95	
152205 9003	903	SW	4/5/95	
152205 9005	903	SW	4/5/95	
152205 9008	904	DB	3/8/95	
152205 9008	100	DB	3/8/95	
152205 9012	903	SW	3/9/95	
152205 9021	481	SW	4/4/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
152205 9021	903	SW	4/4/95	
152205 9033	903	SW	3/10/95	
152205 9034	481	SW	3/10/95	
152205 9034	5941	SW	3/10/95	
152205 9034	7216	SW	3/10/95	
152205 9035	481	SW	3/10/95	
152205 9036	481	SW	3/10/95	
152205 9041	903	SW	4/5/95	
152205 9044	904	SW	3/9/95	
152205 9044	902	SW	3/9/95	
152205 9044	400	SW	3/9/95	
152205 9049	481	SW	3/9/95	
152205 9050	481	SW	3/9/95	
152205 9051	481	SW	3/9/95	
152205 9056	481	SW	4/5/95	
152205 9058	903	SW	3/9/95	
152205 9059	903	SW	3/9/95	
152205 9060	903	DB	3/8/95	
152205 9060	481	DB	3/8/95	
152205 9063	903	SW	4/5/95	
152205 9064	481	SW	3/10/95	
152205 9065	481	SW	3/10/95	
152205 9066	481	SW	3/10/95	
152205 9067	481	SW	3/10/95	
152205 9071	481	SW	3/9/95	
152205 9078	481	SW	3/9/95	
152205 9082	903	SW	4/4/95	
152205 9088	903	DB	3/8/95	
152205 9104	481	SW	4/5/95	
152205 9105	481	SW	4/4/95	
152205 9107	481	SW	3/9/95	
152205 9110	481	SW	4/4/95	
152205 9112	481	SW	4/4/95	
152205 9113	481	SW	4/4/95	
152205 9119	903	SW	4/4/95	(EXISTING HOME REMAINING
152205 9119	500	SW	4/4/95	(EXISTING HOME REMAINING
152205 9119	481	SW	4/4/95	(EXISTING HOME REMAINGIN
152205 9120	481	SW	4/4/95	
152205 9131	481	SW	4/5/95	
152205 9133	481	SW	4/4/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
152205 9140	8071	SW	3/10/95	
152205 9142	903	SW	4/5/95	
152205 9143	903	SW	4/5/95	
152205 9144	903	SW	4/5/95	
152205 9144	481	SW	4/5/95	
152205 9147	903	SW	4/5/95	
152205 9149	591	SW	3/10/95	
152205 9149	8071	SW	3/10/95	
152205 9150	500	SW	3/10/95	
152205 9156	481	SW	3/9/95	
152205 9164	481	DB	3/8/95	
152205 9166	481	DB	3/8/95	
152205 9168	904	DB	3/8/95	
152205 9170	903	SW	4/5/95	
152205 9171	903	SW	4/5/95	
152205 9172	903	SW	4/5/95	
152205 9173	481	SW	4/5/95	
179030 0400	481	DB	4/24/95	
179030 0440	400	DB	4/24/95	
179640 0030	481	SW	3/30/95	
179640 0050	481	SW	3/30/95	
179640 0070	481	SW	3/30/95	
179640 0090	481	SW	3/30/95	
179640 0170	481	SW	3/30/95	
179640 0200	481	SW	3/30/95	
179640 0220	481	SW	3/30/95	
179640 0240	481	SW	3/30/95	
212205 9001	6513	SW	3/7/95	
212205 9001	481	SW	3/7/95	
212205 9001	7399	SW	3/7/95	
212205 9003	903	SW	3/7/95	
212205 9016	400	SW	3/7/95	
212205 9016	100	SW	3/7/95	
212205 9016	481	SW	3/7/95	
212205 9016	1	SW	3/7/95	
212205 9018	821	SW	3/7/95	
212205 9018	500	SW	3/7/95	
212205 9018	481	SW	3/7/95	
212205 9020	481	SW	3/8/95	
212205 9021	481	SW	3/7/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
212205 9024	481	SW	3/7/95	
212205 9026	481	SW	3/8/95	
212205 9029	200	SW	3/7/95	
212205 9037	903	SW	3/7/95	
212205 9040	481	SW	3/8/95	
212205 9041	481	SW	3/8/95	
212205 9044	903	SW	3/7/95	
212205 9063	481	SW	3/8/95	
212205 9063	903	SW	3/8/95	
212205 9064	903	SW	3/8/95	
212205 9064	481	SW	3/8/95	
212205 9079	481	SW	3/8/95	
212205 9090	7399	SW	3/8/95	
212205 9098	903	SW	3/7/95	
212205 9102	903	SW	3/7/95	
212205 9106	503	SW	3/8/95	
212205 9117	481	SW	3/8/95	
212205 9127	481	SW	3/8/95	
212205 9132	904	SW	3/7/95	
212205 9132	400	SW	3/7/95	
212205 9132	100	SW	3/7/95	
212205 9132	481	SW	3/7/95	
212205 9140	904	SW	3/7/95	
212205 9152	7399	SW	3/7/95	
212205 9154	481	SW	3/7/95	
212205 9154	554	SW	3/7/95	
212205 9154	400	SW	3/7/95	
221500 0010	481	SW	3/10/95	
221500 0140	481	SW	3/10/95	
221500 0220	481	SW	3/10/95	
222205 9001	481	SW	3/27/95	
222205 9001	903	SW	3/27/95	
222205 9009	200	DB	3/9/95	
222205 9010	7216	DB	3/9/95	
222205 9010	591	DB	3/9/95	
222205 9010	8071	DB	3/9/95	
222205 9010	600	DB	3/9/95	
222205 9010	723	DB	3/9/95	
222205 9010	481	DB	3/9/95	
222205 9018	903	DB	3/14/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
222205 9018	503	DB	3/14/95	
222205 9020	300	DB	3/14/95	
222205 9027	481	SW	3/10/95	
222205 9036	903	DB	3/14/95	
222205 9043	481	DB	3/14/95	MADISON PLACE UNDER CON
222205 9043	500	DB	3/14/95	MADISON PLACE UNDER CON
222205 9049	481	SW	3/27/95	
222205 9049	903	SW	3/27/95	
222205 9052	903	DB	3/14/95	
222205 9052	503	DB	3/14/95	
222205 9053	503	DB	3/9/95	
222205 9054	903	SW	3/27/95	
222205 9054	481	SW	3/27/95	
222205 9058	503	DB	3/14/95	
222205 9061	503	DB	3/9/95	
222205 9063	481	SW	3/27/95	
222205 9067	481	SW	3/27/95	
222205 9071	400	DB	3/9/95	
222205 9071	503	DB	3/9/95	
222205 9073	481	DB	3/14/95	
222205 9074	500	DB	3/14/95	COUNTY CLUB VILLAGE UND
222205 9074	481	DB	3/14/95	COUNTY CLUB VILLAGE UND
222205 9078	481	SW	3/27/95	
222205 9082	481	SW	3/27/95	
222205 9088	481	DB	3/14/95	
222205 9088	500	DB	3/14/95	
222205 9091	481	SW	3/27/95	
222205 9091	950	SW	3/27/95	
222205 9099	481	DB	3/14/95	
222205 9102	903	DB	3/9/95	
222205 9102	902	DB	3/9/95	
222205 9102	901	DB	3/9/95	
222205 9102	100	DB	3/9/95	
222205 9103	903	DB	3/14/95	
222205 9103	503	DB	3/14/95	
222205 9114	481	DB	3/14/95	
222205 9116	481	SW	3/10/95	
222205 9116	503	SW	3/10/95	
222205 9118	481	DB	3/14/95	
222205 9119	481	DB	3/14/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
222205 9126	7538	DB	3/14/95	
222205 9127	503	DB	3/9/95	
222205 9136	481	SW	3/10/95	
222205 9139	481	SW	3/27/95	
232205 9008	481	SW	3/27/95	
232205 9008	903	SW	4/5/95	
232205 9010	903	SW	3/27/95	
232205 9013	481	SW	3/28/95	
232205 9013	100	SW	3/28/95	
232205 9013	503	SW	3/28/95	
232205 9013	950	SW	3/28/95	
232205 9013	354	SW	3/28/95	
232205 9013	500	SW	3/28/95	
232205 9014	481	SW	3/23/95	(FUNERAL HOME AND CEMET
232205 9014	300	SW	3/23/95	(FUNERAL HOME AND CEME
232205 9025	903	SW	3/23/95	
232205 9039	8071	SW	3/9/95	
232205 9051	903	SW	3/28/95	
232205 9052	903	SW	3/27/95	
232205 9054	481	SW	3/23/95	
232205 9055	481	SW	3/27/95	
232205 9058	481	SW	3/28/95	
232205 9059	903	SW	3/27/95	
232205 9060	903	SW	3/28/95	
232205 9060	481	SW	3/28/95	
232205 9062	903	SW	3/23/95	
232205 9062	481	SW	3/23/95	
232205 9063	903	SW	3/23/95	
232205 9068	481	SW	3/23/95	
232205 9069	481	SW	3/27/95	
232205 9071	481	SW	3/23/95	
232205 9080	903	SW	3/28/95	
232205 9081	481	SW	3/28/95	
232205 9085	903	SW	3/27/95	
232205 9088	481	SW	3/23/95	
232205 9090	481	SW	3/28/95	
232205 9100	481	SW	3/28/95	
232205 9109	903	SW	3/27/95	
232205 9115	481	SW	3/23/95	
232205 9128	903	SW	3/23/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
232205 9128	481	SW	3/23/95	
232205 9133	481	SW	3/23/95	
232205 9134	481	SW	3/23/95	
262205 9001	481	SW	4/4/95	
262205 9001	903	SW	4/4/95	
262205 9006	481	SW	3/23/95	
262205 9009	481	SW	3/23/95	
262205 9016	481	SW	3/30/95	
262205 9020	481	SW	3/23/95	CASCADE MOBILE VILLA (MO
262205 9020	500	SW	3/23/95	CASCADE MOBILE VILLA (MO
262205 9021	481	SW	3/23/95	SOOS CREEK MOBILE HOME P
262205 9021	500	SW	3/23/95	SOOS CREEK MOBILE HOME P
262205 9027	481	SW	4/4/95	
262205 9027	554	SW	4/4/95	
262205 9027	354	SW	4/4/95	
262205 9037	481	SW	3/30/95	
262205 9038	481	SW	3/30/95	
262205 9041	481	SW	3/30/95	
262205 9041	500	SW	3/30/95	
262205 9042	903	SW	3/30/95	
262205 9043	481	SW	4/4/95	
262205 9044	481	SW	3/23/95	
262205 9044	500	SW	3/23/95	
262205 9047	903	SW	3/30/95	
262205 9050	903	SW	3/30/95	
262205 9062	481	SW	3/23/95	
262205 9063	354	SW	3/23/95	
262205 9063	950	SW	3/23/95	
262205 9063	481	SW	3/23/95	
262205 9063	700	SW	3/23/95	
262205 9064	481	SW	3/23/95	152nd Retail Bldg
262205 9064	8071	SW	3/23/95	152nd Retail Bldg
262205 9064	7216	SW	3/23/95	152nd Retail Bldg
262205 9064	500	SW	3/23/95	152nd Retail Bldg
262205 9064	7538	SW	3/23/95	152nd Retail Bldg
262205 9064	5941	SW	3/23/95	152nd Retail Bldg
262205 9064	950	SW	3/23/95	152nd Retail Bldg
262205 9067	481	SW	3/23/95	
262205 9070	481	SW	3/23/95	
262205 9071	481	SW	3/23/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
262205 9072	481	SW	3/30/95	
262205 9073	700	SW	3/30/95	
262205 9074	724	SW	3/30/95	
262205 9076	481	SW	3/30/95	
262205 9078	481	SW	3/23/95	
262205 9079	481	SW	3/30/95	
262205 9091	100	SW	3/23/95	
262205 9091	950	SW	3/23/95	
262205 9091	354	SW	3/23/95	
262205 9093	481	SW	3/30/95	
262205 9095	481	SW	3/30/95	
262205 9099	950	SW	4/4/95	
262205 9100	481	SW	3/23/95	
262205 9101	481	SW	3/30/95	
262205 9102	481	SW	3/23/95	
262205 9104	481	SW	3/23/95	
262205 9104	481	SW	3/22/95	
262205 9109	481	SW	3/30/95	
262205 9110	481	SW	3/23/95	REC. VEHICLE, BOAT, TRAILO
262205 9111	481	SW	3/30/95	
262205 9114	481	SW	3/30/95	
262205 9114	950	SW	3/30/95	
262205 9120	481	SW	3/23/95	
262205 9123	481	SW	3/30/95	
262205 9124	481	SW	3/30/95	
262205 9126	100	SW	3/30/95	
262205 9126	354	SW	3/30/95	
262205 9126	950	SW	3/30/95	
262205 9131	481	SW	3/30/95	
262205 9132	481	SW	3/30/95	
262205 9144	481	SW	3/23/95	
262205 9147	481	SW	3/23/95	
262205 9147	481	SW	3/22/95	
262205 9157	481	SW	3/30/95	
262205 9165	481	SW	3/30/95	
262205 9166	481	SW	4/4/95	
262205 9170	481	SW	3/23/95	
262205 9178	481	SW	3/30/95	
272205 9001	481	SW	3/10/95	
272205 9003	500	SW	3/10/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
272205 9003	481	SW	3/10/95	
272205 9005	903	SW	3/10/95	
272205 9005	481	SW	3/10/95	
272205 9013	500	SW	3/15/95	
272205 9013	903	SW	3/15/95	
272205 9014	481	SW	3/15/95	
272205 9017	481	SW	3/17/95	APARTMENTS UNDER CONST
272205 9017	500	SW	3/17/95	APARTMENTS UNDER CONST
272205 9022	500	SW	3/23/95	
272205 9022	481	SW	3/23/95	
272205 9026	481	SW	3/17/95	
272205 9038	481	SW	3/17/95	
272205 9042	481	SW	3/17/95	
272205 9043	481	SW	3/17/95	
272205 9046	481	SW	3/15/95	
272205 9054	481	SW	3/15/95	
272205 9062	821	DB	3/14/95	
272205 9062	500	DB	3/14/95	
272205 9062	481	DB	3/14/95	
272205 9068	481	SW	3/10/95	
272205 9073	481	SW	3/17/95	
272205 9074	903	SW	3/15/95	
272205 9078	481	SW	3/15/95	
272205 9087	481	SW	3/15/95	
272205 9101	481	SW	3/15/95	
272205 9105	481	SW	3/17/95	
272205 9108	481	SW	3/17/95	
272205 9109	903	SW	3/15/95	
272205 9124	481	SW	3/17/95	
272205 9126	481	SW	3/15/95	
272205 9126	903	SW	3/15/95	
272205 9128	481	SW	3/17/95	
272205 9128	7538	SW	3/17/95	
272205 9130	950	SW	3/15/95	
272205 9131	481	SW	3/17/95	
272205 9133	481	SW	3/23/95	
272205 9133	481	SW	3/17/95	
272205 9140	903	DB	3/14/95	
272205 9141	481	SW	3/23/95	
272205 9141	481	SW	3/17/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
272205 9147	481	SW	3/17/95	
272205 9154	481	SW	3/15/95	
272205 9155	481	SW	3/15/95	
272205 9156	481	SW	3/17/95	
272205 9160	481	SW	3/15/95	
272205 9161	100	SW	3/10/95	
272205 9161	481	SW	3/10/95	
272205 9164	481	DB	3/14/95	
272205 9164	503	DB	3/14/95	
272205 9165	481	SW	3/17/95	
272205 9172	481	SW	3/17/95	
272205 9173	481	SW	3/17/95	
272205 9180	904	SW	3/15/95	
272205 9183	481	SW	3/17/95	
272205 9184	481	SW	3/17/95	
272205 9188	903	SW	3/17/95	
272205 9188	950	SW	3/17/95	
272205 9193	481	DB	3/14/95	
272205 9193	950	DB	3/14/95	
272205 9193	503	DB	3/14/95	
272205 9201	481	SW	3/23/95	
272205 9206	6513	DB	3/14/95	
272205 9206	481	DB	3/14/95	
272205 9214	481	SW	3/15/95	
272205 9215	481	SW	3/15/95	
272205 9218	481	DB	3/14/95	
272205 9218	503	DB	3/14/95	
272205 9218	7399	DB	3/14/95	
272205 9220	100	SW	3/10/95	
272205 9220	481	SW	3/10/95	
272205 9226	7399	DB	3/14/95	
272205 9230	481	SW	3/10/95	
272205 9246	481	SW	3/17/95	
272205 9251	903	SW	3/17/95	
272205 9254	481	SW	3/17/95	
272205 9256	903	SW	3/15/95	
272205 9264	903	DB	3/14/95	
272205 9277	481	SW	3/23/95	
272205 9284	481	SW	3/15/95	
272205 9286	481	SW	3/15/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
272205 9299	481	SW	3/17/95	
272205 9303	481	SW	3/10/95	
272205 9306	481	SW	3/17/95	
282205 9001	903	SW	3/8/95	
282205 9002	903	SW	3/8/95	
282205 9002	481	SW	3/8/95	
282205 9004	481	SW	3/8/95	
282205 9008	481	DB	3/8/95	
282205 9023	904	DB	3/8/95	
282205 9023	481	DB	3/8/95	
282205 9026	481	DB	3/8/95	
282205 9035	481	DB	3/8/95	
282205 9042	200	DB	3/8/95	
282205 9062	100	DB	3/8/95	
282205 9062	5941	DB	3/8/95	
282205 9062	724	DB	3/8/95	
282205 9062	500	DB	3/8/95	
282205 9062	7216	DB	3/8/95	
282205 9062	950	DB	3/8/95	
282205 9062	591	DB	3/8/95	
282205 9062	723	DB	3/8/95	
282205 9062	8071	DB	3/8/95	
282205 9062	481	DB	3/8/95	
282205 9072	41	DB	3/8/95	
282205 9072	481	DB	3/8/95	
282205 9072	500	DB	3/8/95	
282205 9099	7538	DB	3/8/95	
282205 9110	1711	DB	3/8/95	
282205 9110	100	DB	3/8/95	
282205 9110	1761	DB	3/8/95	
282205 9113	481	DB	3/8/95	
282205 9120	481	DB	3/8/95	
282205 9127	481	DB	3/8/95	
282205 9127	7538	DB	3/8/95	
282205 9128	481	DB	3/8/95	
282205 9130	481	DB	3/8/95	
282205 9135	200	DB	3/8/95	
282205 9137	481	DB	3/8/95	
282205 9141	481	DB	3/8/95	
282205 9154	481	SW	3/8/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
282205 9154	903	SW	3/8/95	
282205 9162	481	SW	3/8/95	
282205 9164	903	DB	3/8/95	
282205 9174	481	SW	3/8/95	
282205 9188	500	DB	3/8/95	
282205 9194	400	DB	3/8/95	
282205 9194	481	DB	3/8/95	
282205 9196	8071	DB	3/8/95	
282205 9197	481	DB	3/8/95	
282205 9198	481	DB	3/8/95	
282205 9199	481	DB	3/8/95	
282205 9200	100	DB	3/8/95	
282205 9203	7538	DB	3/8/95	
282205 9203	400	DB	3/8/95	
282205 9203	481	DB	3/8/95	
282205 9203	554	DB	3/8/95	
282205 9230	481	SW	3/8/95	
282205 9252	903	DB	3/8/95	
282205 9257	481	DB	3/8/95	
282205 9258	481	DB	3/8/95	
282205 9261	903	SW	3/8/95	
282205 9266	903	DB	3/8/95	
282205 9283	481	DB	3/8/95	
282205 9301	481	DB	3/8/95	
282205 9304	481	DB	3/8/95	
321158 0030	481	DB	3/14/95	
321158 0060	500	DB	3/14/95	
321158 0070	481	DB	3/14/95	
321158 0080	481	DB	3/14/95	
321158 0170	481	DB	3/14/95	
321159 0140	481	DB	3/9/95	
340030 0005	481	SW	3/23/95	
366240 0020	481	SW	3/9/95	
366240 0060	481	SW	3/9/95	
366240 0180	500	SW	3/9/95	
372880 0025	481	SW	3/22/95	
372880 0035	481	SW	3/22/95	
372880 0050	481	SW	3/22/95	
372880 0060	481	SW	3/22/95	
372880 0075	481	SW	3/22/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
372880 0090	481	SW	3/22/95	
372880 0105	481	SW	3/22/95	
372880 0110	481	SW	3/22/95	
372880 0175	481	SW	3/22/95	
372880 0200	481	SW	3/10/95	
372880 0215	481	SW	3/10/95	
372880 0230	481	SW	3/22/95	
372880 0235	481	SW	3/22/95	
372880 0235	481	SW	3/10/95	
372880 0240	481	SW	3/10/95	
372880 0245	481	SW	3/22/95	
372880 0290	481	SW	3/10/95	
372880 0295	481	SW	3/10/95	
372880 0300	481	SW	3/10/95	
372880 0305	481	SW	3/10/95	
372880 0310	481	SW	3/10/95	
372880 0315	481	SW	3/10/95	
381470 0000	481	SW	3/8/95	
381470 0040	481	SW	3/8/95	
381470 0060	481	SW	3/8/95	
381470 0140	481	SW	3/8/95	
381470 0290	481	SW	3/8/95	
381470 0390	481	SW	3/8/95	
381470 0430	481	SW	3/8/95	
381470 0510	481	SW	3/8/95	
381470 0590	481	SW	3/8/95	
381470 0620	481	SW	3/8/95	
381470 0670	481	SW	3/8/95	
381470 0700	481	SW	3/8/95	
381470 0750	481	SW	3/8/95	
381470 0990	481	SW	3/8/95	
381470 1050	481	SW	3/8/95	
381470 1120	500	SW	3/8/95	
382650 0030	481	SW	3/7/95	
382650 0070	481	SW	3/7/95	
382650 0410	481	SW	3/7/95	
382650 0520	481	SW	3/7/95	
382650 0650	481	SW	3/7/95	
382650 0730	481	SW	3/7/95	
382650 0800	481	SW	3/7/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
382650 0840	481	SW	3/7/95	
382650 0910	481	SW	3/7/95	
382650 1020	481	SW	3/7/95	
382650 1230	481	SW	3/7/95	
382650 1260	481	SW	3/7/95	
382650 1350	500	SW	3/7/95	
386500 0010	481	SW	3/15/95	
386500 0100	481	SW	3/15/95	
403050 0110	481	SW	3/15/95	
403050 0130	481	SW	3/15/95	
403050 0150	481	SW	3/15/95	
403050 0170	481	SW	3/15/95	
405080 0005	481	SW	3/23/95	
405080 0030	481	SW	3/23/95	
405080 0070	481	SW	3/23/95	
405080 0100	481	SW	3/23/95	
405110 0090	481	SW	3/10/95	
405110 0140	481	SW	3/10/95	
405110 0250	481	SW	3/10/95	
405110 0260	481	SW	3/10/95	
405110 0280	481	SW	3/10/95	
405110 0310	481	SW	3/10/95	
405110 0320	481	SW	3/10/95	
405110 0340	481	SW	3/10/95	
405110 0370	481	SW	3/10/95	
405110 0390	481	SW	3/10/95	
405110 0440	481	SW	3/10/95	
405110 0470	481	SW	3/10/95	
405110 0490	481	SW	3/10/95	
405110 0510	500	SW	3/10/95	
405120 0005	481	SW	3/23/95	LAKE MERIDIAN CONDOS
405120 0005	6513	SW	3/23/95	LAKE MERIDIAN CONDOS
405130 0010	6513	DB	3/14/95	
405130 0020	6513	DB	3/14/95	
405130 0030	6513	DB	3/14/95	
405130 0040	6513	DB	3/14/95	
405130 0050	6513	DB	3/14/95	
405130 0060	6513	DB	3/14/95	
405130 0070	6513	DB	3/14/95	
405130 0080	481	DB	3/14/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
405130 0080	6513	DB	3/14/95	
405130 0090	6513	DB	3/14/95	
405130 0100	6513	DB	3/14/95	
405130 0110	6513	DB	3/14/95	
405130 0120	6513	DB	3/14/95	
405130 0130	6513	DB	3/14/95	
405130 0140	6513	DB	3/14/95	
405130 0150	6513	DB	3/14/95	
405130 0160	6513	DB	3/14/95	
405130 0170	6513	DB	3/14/95	
405130 0180	6513	DB	3/14/95	
405130 0190	6513	DB	3/14/95	
405130 0200	6513	DB	3/14/95	
405170 0000	481	DB	3/14/95	
405170 0000	6513	DB	3/14/95	
425200 0020	481	DB	3/14/95	
425200 0040	481	DB	3/14/95	
439700 0000	500	SW	3/9/95	
439700 0140	481	SW	3/9/95	
439700 0190	481	SW	3/9/95	
439700 0230	481	SW	3/9/95	
439700 0300	481	SW	3/9/95	
439700 0350	481	SW	3/27/95	
439700 0420	481	SW	3/27/95	
439700 0450	481	SW	3/27/95	
439700 0510	481	SW	3/27/95	
439701 0220	481	SW	3/9/95	
439701 0270	481	SW	3/9/95	
439701 0300	481	SW	3/9/95	
439701 0340	481	SW	3/9/95	
439701 0410	481	SW	3/9/95	
439701 0430	481	SW	3/9/95	
439702 0020	481	SW	3/9/95	
516800 0030	481	SW	3/15/95	
546540 0000	500	SW	3/30/95	
546540 0110	481	SW	3/30/95	
546540 0140	481	SW	3/30/95	
546630 0050	481	SW	3/10/95	
546630 0120	481	SW	3/10/95	
546630 0370	481	SW	3/10/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
546630 0480	481	SW	3/10/95	
546630 0490	481	SW	3/10/95	
546630 0580	481	SW	3/10/95	
546630 0600	481	SW	3/10/95	
546630 0600	503	SW	3/10/95	
546630 0620	481	SW	3/10/95	
546630 0630	481	SW	3/10/95	
546631 0000	481	SW	3/10/95	
546631 0010	481	SW	3/10/95	
546631 0040	481	SW	3/10/95	
546631 0090	481	SW	3/10/95	
546631 0300	481	SW	3/10/95	
546631 0350	481	SW	3/10/95	
546631 0440	481	SW	3/10/95	
546631 0540	481	SW	3/10/95	
546631 0770	481	SW	3/10/95	
546631 0780	503	SW	3/10/95	
546631 0780	481	SW	3/10/95	
546675 0010	481	SW	3/23/95	
546675 0130	481	SW	3/17/95	
546675 0180	481	SW	3/17/95	
546675 0300	481	SW	3/17/95	
546720 0005	481	SW	3/23/95	
546720 0060	481	SW	3/23/95	
546720 0067	481	SW	3/23/95	
546720 0067	481	SW	3/22/95	
546720 0070	481	SW	3/23/95	
546720 0070	481	SW	3/22/95	
546720 0075	481	SW	3/23/95	
546720 0075	481	SW	3/22/95	
546790 0010	481	SW	3/10/95	
546790 0040	481	SW	3/10/95	
546790 0070	481	SW	3/10/95	
546790 0090	481	SW	3/10/95	
546790 0110	481	SW	3/10/95	
546790 0120	481	SW	3/10/95	
546790 0240	481	SW	3/10/95	
546790 0270	481	SW	3/10/95	
546790 0310	481	SW	3/10/95	
546800 0020	481	DB	3/8/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
546800 0030	481	DB	3/8/95	
546800 0040	481	DB	3/8/95	
546800 0045	481	DB	3/8/95	
546800 0055	903	DB	3/8/95	
546800 0056	481	DB	3/8/95	
546800 0125	481	DB	3/8/95	
546800 0155	481	DB	3/8/95	
546800 0175	903	DB	3/8/95	
546875 0080	481	DB	3/14/95	
546880 0030	481	SW	3/10/95	
546880 0040	481	SW	3/10/95	
546930 0400	481	SW	3/23/95	
546930 0510	481	SW	3/23/95	
546950 0010	481	DB	3/9/95	
546950 1010	7399	DB	3/9/95	
546950 2270	503	DB	3/9/95	
546950 3070	481	SW	3/10/95	
546950 3210	481	SW	3/10/95	
546950 3260	481	SW	3/10/95	
546950 3680	481	SW	3/17/95	
546950 3680	500	SW	3/10/95	
546950 3680	7997	SW	3/10/95	
546950 3682	6513	SW	3/10/95	
546950 3702	6513	SW	3/10/95	
547000 0020	481	SW	3/10/95	
547000 0030	481	SW	3/10/95	
547010 0030	481	SW	3/10/95	
547010 0070	481	SW	3/10/95	
547010 0090	481	SW	3/10/95	
547010 0150	481	SW	3/10/95	
547010 0170	481	SW	3/10/95	
547010 0210	481	SW	3/10/95	
547010 0340	481	SW	3/10/95	
547010 0360	481	SW	3/10/95	
547010 0400	481	SW	3/10/95	
547010 0420	481	SW	3/10/95	
547010 0450	481	SW	3/10/95	
547011 0040	481	SW	3/10/95	
547011 0090	481	SW	3/10/95	
547011 0130	481	SW	3/10/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
714020 0610	481	DB	3/8/95	
714020 0650	481	DB	3/8/95	
714020 0810	481	DB	3/8/95	
714020 0860	481	SW	3/8/95	
776340 0015	481	DB	3/14/95	
776340 0040	481	DB	3/14/95	
776340 0065	481	DB	3/14/95	
796900 0055	481	SW	3/9/95	
796900 0092	481	SW	3/9/95	
796900 0110	481	SW	3/9/95	
796900 0120	503	SW	3/9/95	
796910 0030	481	SW	3/9/95	
796910 0050	481	SW	3/9/95	
796910 0140	481	SW	3/9/95	
796910 0160	481	SW	3/9/95	
796910 0181	481	SW	3/9/95	
796920 0010	481	SW	3/9/95	
796920 0040	481	SW	3/9/95	
796920 0070	481	SW	3/9/95	
801620 0030	481	DB	3/8/95	
801620 0070	481	DB	3/8/95	
801620 0110	481	DB	3/8/95	
801620 0290	481	DB	3/8/95	
801620 0520	481	DB	3/8/95	
801620 0550	481	DB	3/8/95	
801620 0600	481	DB	3/8/95	
801620 0650	481	DB	3/8/95	
801620 0730	481	DB	3/8/95	
801625 0000	500	DB	3/8/95	
801625 0010	481	DB	3/8/95	
801625 0050	481	DB	3/8/95	
858100 0050	481	SW	3/8/95	
858100 0080	481	SW	3/8/95	
858100 0090	481	SW	3/8/95	
858100 0110	481	SW	3/8/95	
858100 0230	481	SW	3/8/95	
858100 0260	481	SW	3/8/95	
858100 0290	481	SW	3/8/95	
858100 0300	481	SW	3/8/95	
858100 0360	481	SW	3/8/95	

PARCEL_NO	HAZARD_CODE	OBSERVER	OBSERVATION_DATE	GENERAL_COMMENT
858640 0004	481	SW	3/28/95	
858640 0015	481	SW	3/28/95	
858640 0015	950	SW	3/28/95	
858640 0025	481	SW	3/28/95	
858640 0026	481	SW	3/28/95	
858640 0029	481	SW	3/28/95	
858640 0040	481	SW	3/28/95	
858640 0070	481	SW	3/28/95	
858640 0070	904	SW	3/28/95	
858640 0095	481	SW	3/10/95	
858640 0117	481	SW	3/10/95	
895580 0001	481	SW	3/22/95	
895580 0015	481	SW	3/22/95	
895580 0025	481	SW	3/22/95	
895580 0050	481	SW	3/22/95	
895580 0065	481	SW	3/22/95	
895580 0080	481	SW	3/23/95	
895580 0080	481	SW	3/22/95	
895580 0080	354	SW	3/22/95	
941270 0340	481	SW	3/9/95	
941271 0010	481	SW	3/9/95	
941271 0060	481	SW	3/9/95	
941271 0090	481	SW	3/9/95	
941271 0130	481	SW	3/9/95	
941271 0190	481	SW	3/9/95	
941271 0430	481	SW	3/9/95	
941271 0460	481	SW	3/9/95	
941271 0510	500	SW	3/9/95	
945420 0008	481	SW	3/17/95	
945420 0014	481	SW	3/17/95	
945420 0018	481	SW	3/17/95	
945420 0030	481	SW	3/17/95	