Appendix A – Material Safety Data Sheets (MSDS)

- **Natural Gas**
- **Natural Gas Odorizer (RP Captan)**

Natural Gas

MATERIAL SAFETY DATA SHEET
Natural Gas

Northern Natural Gas Company
1111 S. 103rd St.
Omaha, NE 68124-1000

24 Hr. Company Contact: . . . . Operations Communication Center - (888) 367-6671

SECTION #1 - IDENTIFICATION

Product:	Natural Gas
CAS Number:	74-82-8
Chemical Family:	Aliphatic Hydrocarbon, Alkane Series
Synonyms:	Methane, Fuel Gas, Marsh Gas

SECTION #2 - HAZARDOUS CHEMICAL COMPONENTS

%	Material	CAS#	Exposure Limit
> 90	Methane	74-82-8	Simple asphyxiant (ACGIH)
< 5	Ethane	74-84-0	Simple asphyxiant (ACGIH)
< 1	Propane	74-98-6	1000 ppm PEL (OSHA) Simple asphyxiant (ACGIH)

This product is hazardous according to OSHA, 29 CFR 1910.1200. This product normally contains no hazardous components, other than ethane, as defined in OSHA 29 CFR §1910.1200 (i.e., greater than 1%). This product may contain small amounts of heavier hydrocarbons. This product and/or components present at concentrations greater than 0.1% are not carcinogenic according to OSHA, IARC, or NTP. Components of this product are normally within the ranges listed above, however, depending on the geographical source, gas composition may vary.

SECTION #3 - PHYSICAL DATA

Boiling Point:	-259 F, 162 C
Vapor Pressure:	N/A – Gas
Gas Density (Air = 1)	0.6
Specific Gravity:	N/A – Gas
Solubility (H_2O):	Very slightly soluble
Evaporation Rate:	Gas at normal ambient conditions
Appearance:	Colorless gas at normal temperature
Odor:	Natural gas is odorless. Various Northern Natural Gas branch lines are odorized. Odorized gas has a rotten egg or garlic type odor.

SECTION #4 - FIRE FIGHTING & EXPLOSION DATA

Flash Point:	306 F, 187.8 C
Autoignition:	1004 F, 540 C
Flammable Limits in Air:	5% (lower) 15% (upper)
Unusual Fire and Explosion Hazards:	This gas is extremely flammable and forms flammable mixtures with air. It will burn in the open or be explosive in confined spaces. Its vapors are lighter than air and will disperse. A hazard of re-ignition or explosion exists if flame is extinguished without stopping the gas flow.
Extinguishing Media:	Stop the flow of gas. Dry chemical, CO_2, or halon. Water can be used to cool the fire but may not extinguish the fire.
Special Fire Fighting Instructions:	Evacuate area upwind of source. Stop gas flow and extinguish fire. If gas source cannot be shut off immediately, equipment and surfaces exposed to the fire should be cooled with water to prevent overheating and explosions. Control fire until gas supply can be shut off.

SECTION #5 - HEALTH HAZARD DATA

Exposure Limits:	See Section # 2.
Effects of Single Overexposure:	
Swallowing:	This product is a gas at normal temperature/pressure. No potential for ingestion expected. Solid and liquefied forms of this material and pressurized gas can cause freeze burns.
Skin Absorption:	This material is not expected to be absorbed through the skin. Solid and liquefied forms of this material and pressurized gas can cause freeze burns.
Inhalation:	Exposure may produce rapid breathing, headache, dizziness, visual disturbances, muscular weakness, tremors, narcosis, unconsciousness, and death, depending on the concentration and duration of exposure.
Skin Contact:	Non-irritating, but solid and liquid forms of this material and pressurized gas can cause frostbite, blisters and redness.
Eye Contact:	This gas is non-irritating; but direct contact with liquefied/pressurized gas or frost particles may produce severe and possible permanent eye damage from freeze burns.
Effects of Repeated Overexposure:	
Medical Conditions Aggravated by Overexposure:	Personnel with pre-existing chronic respiratory diseases should avoid exposure to this material.
Emergency and First Aid Procedures:	
Swallowing:	This product is a gas at normal temperature/pressure and not expected to present a swallowing hazard.
Skin:	Frozen tissues should be flooded or soaked with warm water. DO NOT USE HOT WATER. Cryogenic burns that result in blistering or deeper tissue freezing should be promptly seen by a doctor.
Inhalation:	Immediately move personnel to area of fresh air. For respiratory distress, give air, oxygen, or administer CPR (Cardiopulmonary Resuscitation) if necessary. Obtain medical attention if breathing difficulties continue.
Eyes:	Methane gas is not expected to present an eye irritation hazard. If contacted by liquid/solid, immediately flush the eye(s) gently with warm water for at least 15 minutes. Seek medical attention if pain or redness persists.

SECTION #6 - REACTIVITY & POLYMERIZATION

Stability:	Stable
Conditions to Avoid:	High heat, open flames and other sources of ignition. Explosive reactions can occur between natural as and oxidizing agents. Spontaneous ignition with chlorine dioxide.
Incompatibility (materials to avoid):	Barium peroxide, chlorine dioxide and strong oxidizing agents.
Hazardous Combustion or Decomposition Products:	Combustion may produce carbon monoxide, carbon dioxide and other harmful substances.
Hazardous Polymerization:	None

SECTION #7 - SPILL, LEAK, & DISPOSAL PROCEDURES

Steps to be Taken in the Event of Spills, Leaks, or Release:	Eliminate all potential sources of ignition. Handling equipment and tools must be grounded to prevent sparking. Evacuate all non-essential personnel to an area upwind. Equip responders with proper protection equipment (as specified in Section # 8) and advise of hazards. Stop sources of release with non-sparking tools before attempting to put out any fire. Ventilate enclosed areas to prevent formation of flammable or oxygen-deficient atmospheres. Water spray may be used to cool equipment or reduce gas accumulation.
Waste Disposal Procedures:	Waste Natural gas in compressed gas cylinders must be disposed of as a hazardous waste.

SECTION # 8 - SPECIAL PROTECTION MEASURES

Ventilation:	Local exhaust and general room ventilation may both be essential in work areas to prevent accumulation of explosive mixtures. If mechanical ventilation is used, electrical equipment must meet National Electric Code requirements.
Eye Protection:	Use chemical-type goggles and face shields when handling liquefied gases. Safety glasses and/or face shields are recommended when handling high-pressure cylinders and piping systems or whenever gases are discharged.
Skin Protection:	If there is a potential for contact with high concentrations of compressed gas, use insulated, impervious plastic or neoprene-coated canvas gloves and protective gear (apron, face shield, etc.) to protect hands and other skin areas.
Respiratory Protection:	For excessive gas concentrations, use only NIOSH/MSHA approved, self-contained breathing apparatus.
Work/Hygiene Practices:	Emergency eye wash fountains and safety showers for first aid treatment of potential freeze burns should be available in the vicinity of any significant exposure from compressed gas release. Personnel should not enter areas where the atmosphere is below 19.5 vol. % oxygen without special procedures/equipment. Respirator use should comply with OSHA 29 CFR 1910.134 or equivalent.

SECTION #9 - SPECIAL PRECAUTIONS - STORAGE & HANDLING

Storage and Handling Conditions:	Store and use cylinders and tanks in well-ventilated areas, away from heat and sources of ignition. No smoking near storage or use. Follow standard procedures for handling cylinders, tanks, and loading/unloading. See NFPA #58 and API 2510. Fixed storage containers must be grounded and bonded during transfer of product.
Naturally Occurring Radioactive Material (NORM):	This product may contain Naturally Occurring Radioactive Material (NORM) and customers should be aware of the potential for NORM within their processing system. The actual concentration of NORM in the product is dependent on the geographical source of the natural gas and storage time prior to its delivery. Process equipment (e.g., lines, filters, pumps and reaction units) may accumulate radioactive daughters and emit gamma radiation during operation. Equipment emitting gamma radiation may be presumed to be internally contaminated with alpha-emitting decay products that may be a hazard if inhaled or ingested. Consult applicable NORM regulations for worker protection guidelines and handling requirements before initiating maintenance operations that require opening contaminated equipment.

SECTION #10 - SHIPPING INFORMATION

Proper Shipping Name:	Methane, Compressed
Hazard Class:	2.1
DOT Identification Number:	UN1971
DOT Shipping Label:	Flammable Gas (red)

SECTION #11 - REGULATORY INFORMATION

Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to state and federal reporting requirements. Consult those regulations applicable to your facility or operation.

Federal Clean Water Act:

Any spill or release of liquid oils associated with this product into "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802). Also contact appropriate state and local regulatory agencies as required.

CERCLA Section 103:

The Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA) requires notification to the National Response Center of a release of quantities of Hazardous Substances equal to or greater than the reportable quantities in 40 CFR §302.4. The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts natural gas, natural gas liquids and any indigenous components of such (e.g., benzene) from the CERCLA Section 103 reporting requirements.

EPCRA Section 304:

The Emergency Planning and Community Right-to-Know Act (EPCRA) requires emergency planning based on Threshold Planning Quantities and release reporting based on reportable quantities in 40 CFR §355. There are no known components present in this product that would require reporting under this statute.

EPCRA Sections 311/312:

The Emergency Planning and Community Right-to-Know Act (EPCRA) requires notification and annual reporting of materials for which maintenance of an MSDS is required. This product is classified under the following hazard categories: Immediate (acute) Health Hazard and Fire Hazard.

EPCRA Section 313:

The Emergency Planning and Community Right-to-Know Act (EPCRA) requires submission of annual reports of the release of toxic chemicals that appear in 40 CFR §372. This product contains no chemicals subject to reporting requirements under this statute.

Toxic Substances Control (TSCA) Status:

The ingredients of this product are on the TSCA inventory.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

This information relates only to the material designed and may not be valid for such material used in combination with other materials or in any process. Such information is to the best of this Company's knowledge believed accurate and reliable as of the date indicated. However, no representation, warranty or guarantee is made as to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitableness and completeness of such information for his own particular use.

Natural Gas Odorizer (RP Captan)

Natural Gas Odorizing

Responsible Care® Good Chemistry at Work

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Natural Gas Odorizing
3601 Decker Drive
P.O. Box 1429
Baytown, Texas 77522-1429

24 HOUR EMERGENCY TELEPHONE: 1-800-733-3665 or 1-972-404-3228 (U.S.); 32.3.575.55.55 (Europe); 1800-033-111 (Australia)

TO REQUEST AN MSDS: 1-866-295-5278 or 1-615-399-5148

CUSTOMER SERVICE: 1-281-424-5568

MSDS NUMBER: M36034

SUBSTANCE: RP CAPTAN (V)

SYNONYMS:
Mercaptan and alkyl sulfide

PRODUCT USE: gas odorant

REVISION DATE: May 13 2004

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: TERT-BUTYL MERCAPTAN
CAS NUMBER: 75-66-1
PERCENTAGE: 75-81

COMPONENT: ETHYL METHYL SULFIDE
CAS NUMBER: 624-89-5
PERCENTAGE: 18-25

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=3 REACTIVITY=0

HMIS RATINGS (SCALE 0-4): HEALTH=2 FLAMMABILITY=3 REACTIVITY=0

EMERGENCY OVERVIEW:
COLOR: colorless
PHYSICAL FORM: liquid
ODOR: gassy odor
MAJOR HEALTH HAZARDS: MAY BE IRRITATING TO RESPIRATORY TRACT, SKIN AND EYES. MAY CAUSE CENTRAL NERVOUS SYSTEM EFFECTS.
PHYSICAL HAZARDS: Extremely flammable liquid and vapor.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: irritation, central nervous system effects
LONG TERM EXPOSURE: irritation
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: dermatitis
EYE CONTACT:
SHORT TERM EXPOSURE: irritation, tearing
LONG TERM EXPOSURE: irritation
INGESTION:
SHORT TERM EXPOSURE: nausea, vomiting, central nervous system effects
LONG TERM EXPOSURE: to our knowledge, no effects are known

CARCINOGEN STATUS:
OSHA: No
NTP: No
IARC: No

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. If respiration or pulse has stopped, have a trained person administer Basic Life Support (Cardio-Pulmonary Resuscitation/Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY.

SKIN CONTACT: Wash contaminated areas with soap and water. Thoroughly clean and dry contaminated clothing and shoes before reuse. IF IRRITATION OCCURS, GET MEDICAL ATTENTION.

EYE CONTACT: Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION: Never give anything by mouth to an unconscious or convulsive person. If swallowed, do not induce vomiting. If vomiting occurs spontaneously, keep airway clear. Give water when vomiting stops. GET MEDICAL ATTENTION.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Severe fire hazard. Vapor/air mixtures are explosive. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back.

EXTINGUISHING MEDIA: Use carbon dioxide, regular dry chemical, foam or water.

FIRE FIGHTING: Water may be ineffective as an extinguishing media. Wear NIOSH approved positive-pressure self-contained breathing apparatus. Eliminate all sources of ignition. Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Flood with fine water spray. Do not scatter spilled material with high-pressure water streams. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

SENSITIVITY TO MECHANICAL IMPACT: Not sensitive

SENSITIVITY TO STATIC DISCHARGE: Electrostatic charges may build up during handling. Grounding of equipment is recommended.

FLASH POINT: -9.9 F (-23.3 C) (OC)
LOWER FLAMMABLE LIMIT: 1.7% estimated
UPPER FLAMMABLE LIMIT: 10% estimated

HAZARDOUS COMBUSTION PRODUCTS:
Thermal decomposition products or combustion: oxides of sulfur (combustion product), hydrogen sulfide (decomposition product)

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Remove sources of ignition. Ventilate closed spaces before entering. Stop leak if possible without personal risk. Collect with absorbent into suitable container. Keep container tightly closed. Liquid material may be removed with a vacuum truck. Keep out of water supplies and sewers. Releases should be reported, if required, to appropriate agencies.

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Store in a cool, dry place. Store in a well-ventilated area. Avoid heat, flames, sparks and other sources of ignition. Subject to storage and handling regulations: U.S. OSHA 29 CFR 1910.106. Keep separated from incompatible substances.

HANDLING: Avoid breathing vapor or mist. Avoid contact with eyes, skin and clothing. Keep away from heat, sparks and flame. Keep container tightly closed. Use only with adequate ventilation. Do not reuse containers.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
RP CAPTAN (V):
TERT-BUTYL MERCAPTAN:
75 ppm recommended TWA 8 hour(s) (internal Occupational Exposure Limit based on acute toxicity data)

ETHYL METHYL SULFIDE:
50 ppm recommended TWA 8 hour(s) (internal Occupational Exposure Limit based on data from analogous chemicals)

VENTILATION: Use explosion-proof equipment. Use engineering controls if feasible. Provide local exhaust ventilation where vapor may be generated. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear chemical resistant safety goggles if eye contact is likely. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear protective clothing to minimize skin contact.

GLOVES: Wear appropriate chemical resistant gloves. May be based on plant experience, not ASTM permeation testing.

PROTECTIVE MATERIAL TYPES: 4H(R), nitrile, Silver Shield(R)

RESPIRATOR: A NIOSH approved respirator with organic vapor cartridges may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits, or when symptoms have been observed that are indicative of overexposure.
SHORT ORGANIC VAPOR SERVICE LIFE.
A full facepiece air-purifying respirator may be used in concentrations up to 50X the acceptable exposure level. Supplied air should be used when the level is expected to be above 50X the acceptable level, or when there is a potential for uncontrolled release.
A respiratory protection program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant use of a respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid
APPEARANCE: clear
COLOR: colorless
ODOR: gassy odor
BOILING POINT: 145-151 F (62.8-66.1 C)
FREEZING POINT: <-60.0 F (<-51.1 C)
VAPOR PRESSURE: 5.6 psia @ 38 C
VAPOR DENSITY (air=1): 3.0
SPECIFIC GRAVITY (water=1): 0.811
DENSITY: 6.76 lbs/gal @ 15.6 C
WATER SOLUBILITY: negligible
PH: Not available
VOLATILITY: 100%
ODOR THRESHOLD: 0.008 ppb (TERT-BUTYL MERCAPTAN)
EVAPORATION RATE: Not available
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat. Keep out of water supplies and sewers.

INCOMPATIBILITIES: oxidizing materials

HAZARDOUS DECOMPOSITION:
Thermal decomposition products or combustion: oxides of sulfur (combustion product), hydrogen sulfide (decomposition product)

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

RP CAPTAN (V):
TOXICITY DATA: This material is considered to be a moderate to strong irritant to the respiratory tract, skin and eyes (with burning sensation). High exposure levels may lead to central nervous system effects, including CNS depression, headache, nausea, weak pain, a sense of coldness in the extremities, unconsciousness and death. Overexposure may cause pulmonary edema. Repeated contact with this material to the skin may result in dermatitis. Inhalation may cause loss of smell. Ingestion of this material may cause nausea, vomiting, irritation to mouth, esphogus and stomach, potential CNS depression and unconsciousness.

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:
FISH TOXICITY: No data available. However, if released in water, it rapidly dissipates through evaporation.

FATE AND TRANSPORT:
BIODEGRADATION: This material may biodegrade in soil and water.

PERSISTENCE: Based on volatilization and degradation rates, this material is believed not to persist in the environment.

BIOCONCENTRATION: This material is believed not to bioaccumulate.

OTHER ECOLOGICAL INFORMATION: This material is expected to rapidly oxidize in the atmosphere.

13. DISPOSAL CONSIDERATIONS

Reuse or reprocess if possible. Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Flammable liquids, n.o.s. (TERT-BUTYL MERCAPTAN, ETHYL METHYL SULFIDE)
ID NUMBER: UN1993
HAZARD CLASS OR DIVISION: 3
PACKING GROUP: II
LABELING REQUIREMENTS: 3
ADDITIONAL SHIPPING DESCRIPTION: Transport by vessel domestic requires flashpoint on shipping papers.

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Flammable liquid, n.o.s. (TERT-BUTYL MERCAPTAN, ETHYL METHYL SULFIDE)
UN NUMBER: UN1993
CLASS: 3
PACKING GROUP/RISK GROUP: II

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: Yes
CHRONIC: No
FIRE: Yes
REACTIVE: No
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65): Not regulated.

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65: Not regulated.

NEW JERSEY WORKER AND COMMUNITY RIGHT TO KNOW:
REPORTING REQUIREMENT:
TERT-BUTYL MERCAPTAN 75-66-1 75-81%
ETHYL METHYL SULFIDE 624-89-5 18-25%

RIGHT TO KNOW HAZARDOUS SUBSTANCE LIST:
Not regulated.

SPECIAL HEALTH HAZARD SUBSTANCE LIST:
Not regulated.

PENNSYLVANIA RIGHT TO KNOW:
REPORTING REQUIREMENT:
TERT-BUTYL MERCAPTAN 75-66-1 75-81%
ETHYL METHYL SULFIDE 624-89-5 18-25%

HAZARDOUS SUBSTANCE LIST:
TERT-BUTYL MERCAPTAN 75-66-1 75-81%

ENVIRONMENTAL HAZARDOUS SUBSTANCE LIST:
Not regulated.

SPECIAL HAZARDOUS SUBSTANCE LIST:
Not regulated.

CANADIAN REGULATIONS:
CONTROLLED PRODUCTS REGULATIONS (CPR): This product has been classified in accordance with the criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

WHMIS CLASSIFICATION: B2, D2B.

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): All the components of this substance are listed on or are exempt from the inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDSL): All components of this product are listed on the DSL.

16. OTHER INFORMATION

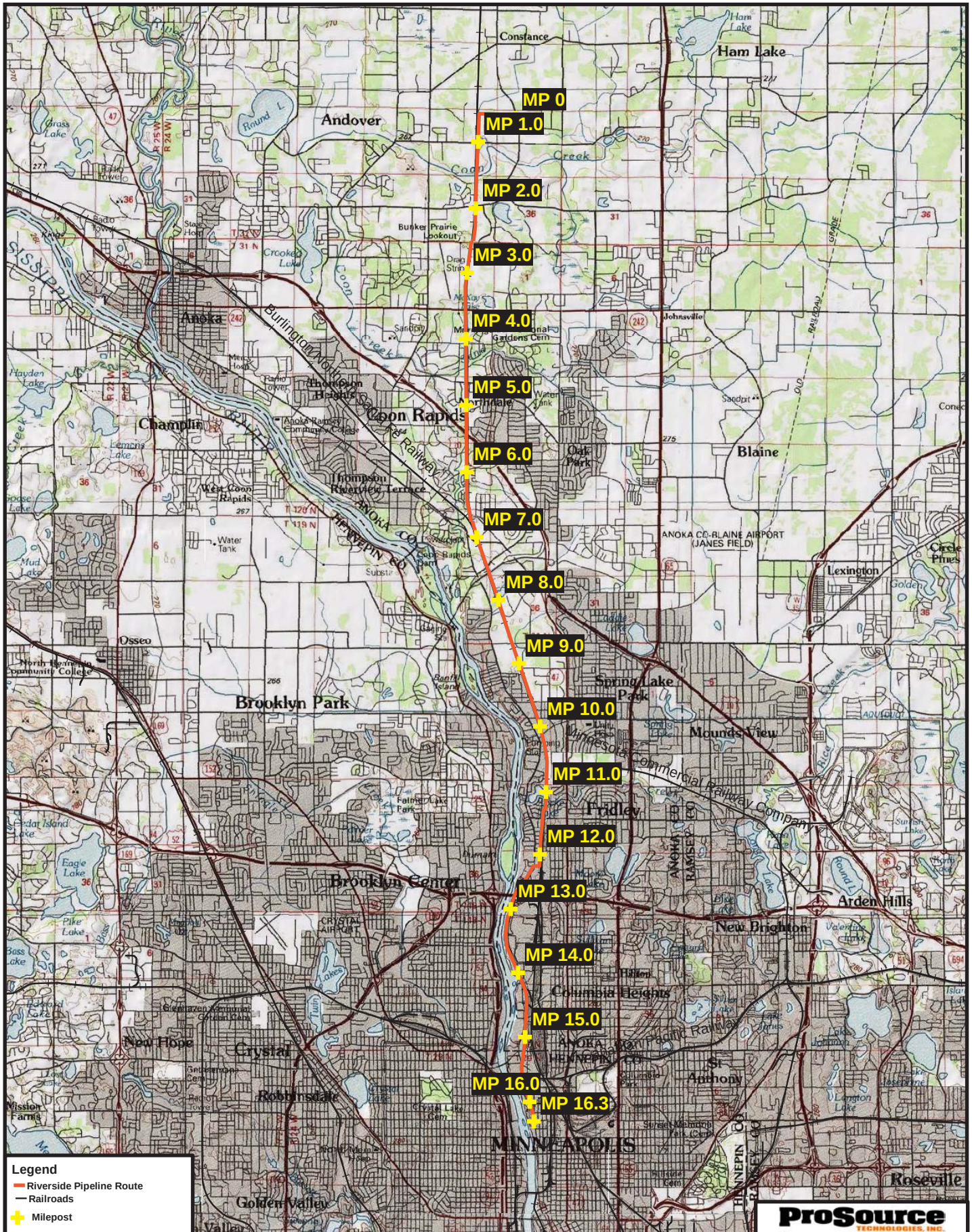
MSDS SUMMARY OF CHANGES
8. EXPOSURE CONTROLS, PERSONAL PROTECTION

IMPORTANT: The information presented herein, while not guaranteed, was prepared by competent technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTY OR GUARANTY OF ANY OTHER KIND, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, SUITABILITY, STABILITY OR OTHERWISE. The information included herein is not intended to be all-inclusive as to the appropriate manner and/or conditions of use, handling and/or storage. Factors pertaining to certain conditions of storage, handling, or use of this product may involve other or additional safety or performance considerations. While our technical personnel will be happy to respond to questions regarding safe handling and use procedures, safe handling and use remains the responsibility of the customer. No suggestions for use are intended to, and nothing herein shall be construed as a recommendation to, infringe any existing patents or violate any laws, rules, regulations or ordinances of any governmental entity.

Appendix B - Route Maps

- **Topographic Maps**
- **Aerial Photo Maps**
- **Road Maps**
- **NWI - Wetland Maps**
- **Soil Coverage Maps**
- **Route Alternatives Map**

Topographic Route Maps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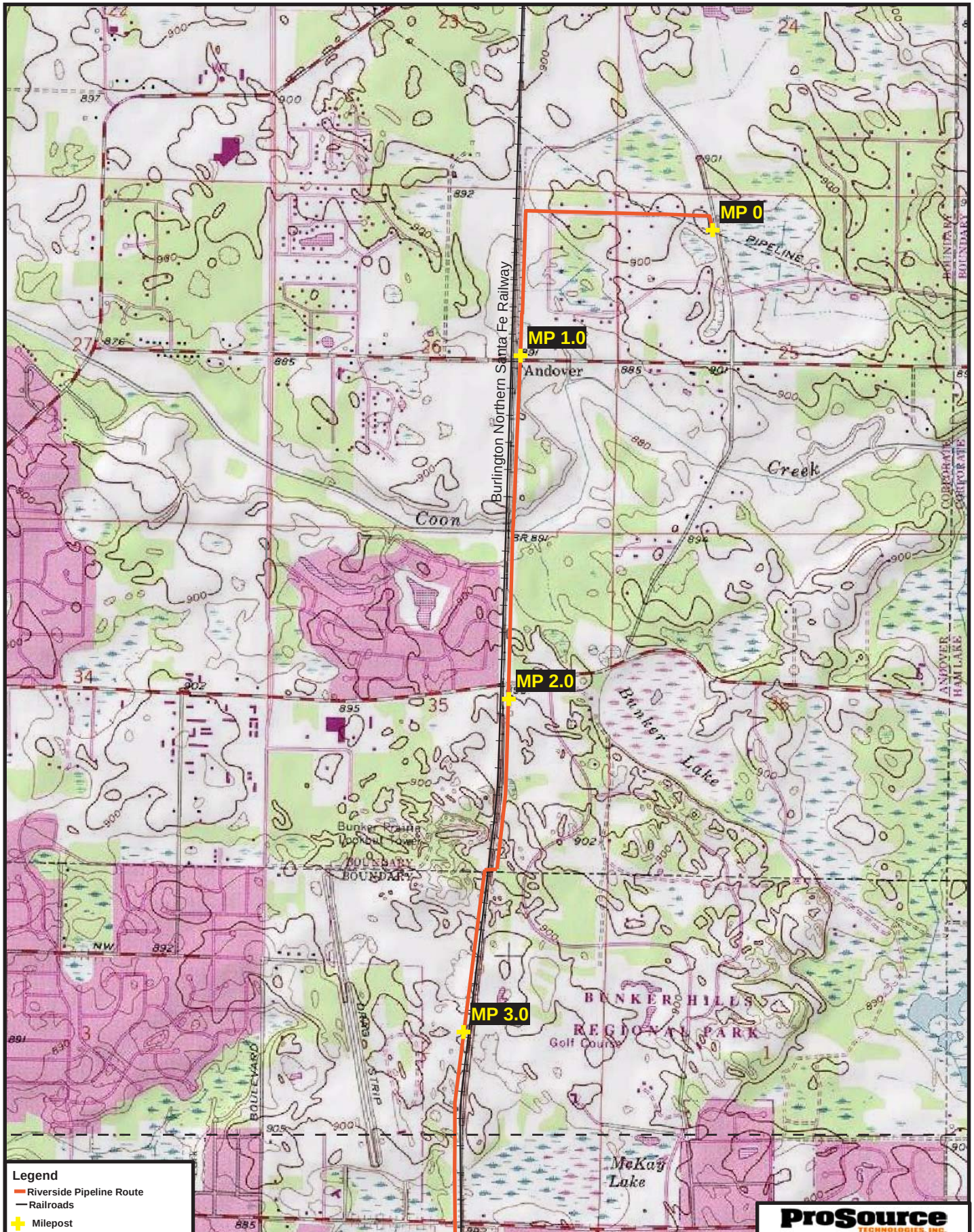
Andover
Anoka
Champlin
Coon Rapids
Blaine
Lexington
Osseo
Brooklyn Park
Spring Lake Park
Mounds View
Fridley
Brooklyn Center
Arden Hills
New Brighton
Columbia Heights
New Hope
Crystal
Robbinsdale
St. Anthony
MINNEAPOLIS
Roseville
Golden Valley
Legend
Riverside Pipeline Route
Railroads
Milepost
ProSource TECHNOLOGIES, INC.
CenterPoint Energy
ProSource Project No. 1001-00
CenterPoint Energy - Riverside Pipeline Project
Project Overview Map
0
10,000
20,000
30,000
Feet
DATE ISSUED: 04/04/06
DATE REVISED:
SCALE: 1:124,000
DRAWN BY: Sheri Roadfeldt, EIT
SERIES: Map 1 of 1



CenterPoint Energy

ProSource Project No. 1001-00

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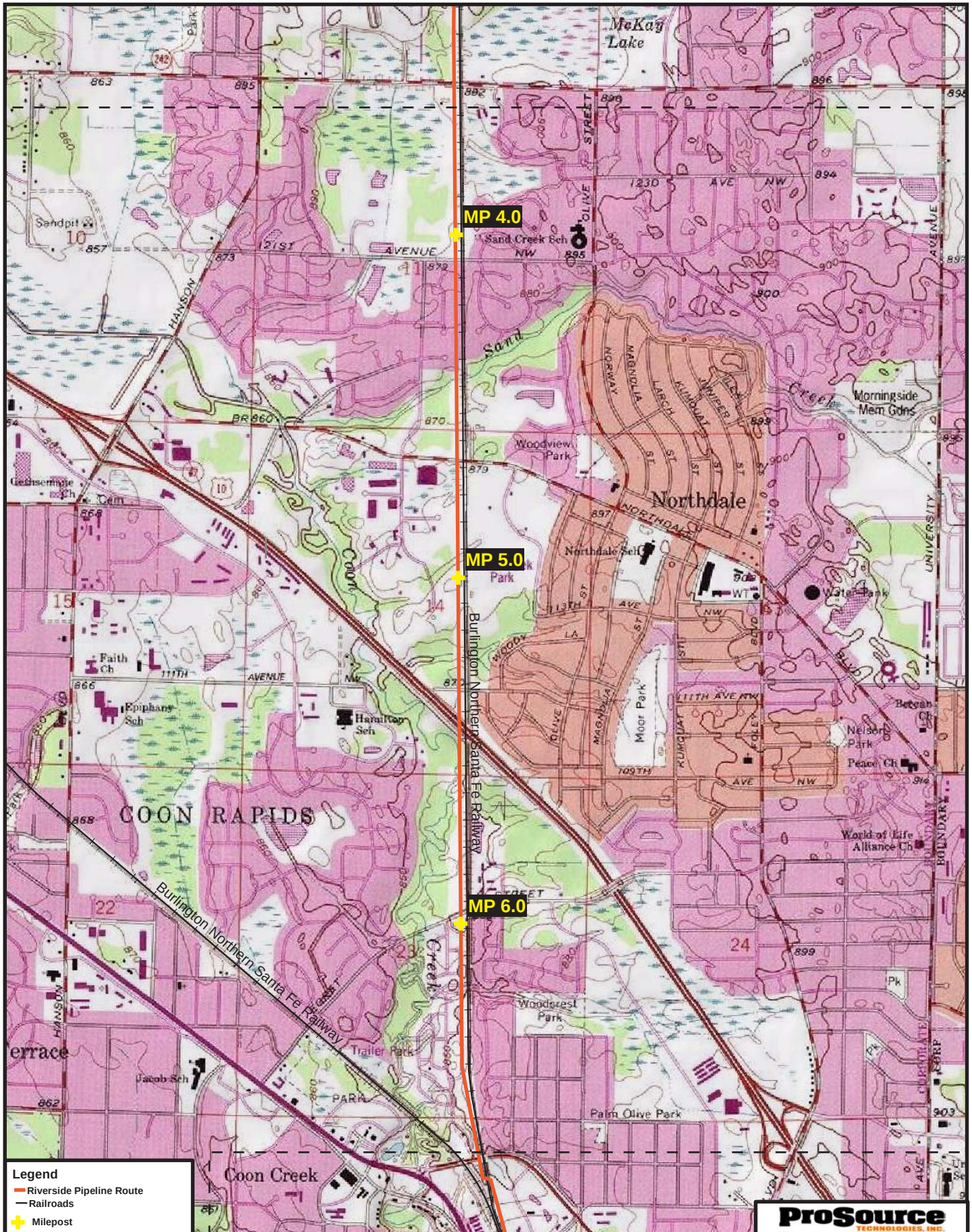
CenterPoint Energy - Riverside Pipeline Project
Project Location Map

0 1,000 2,000 3,000 Feet

ProSource TECHNOLOGIES, INC.

DATE ISSUED:	04/04/06
DATE REVISED:	
SCALE:	1:24,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 1 of 5



CenterPoint Energy

ProSource Project No. 1001-00

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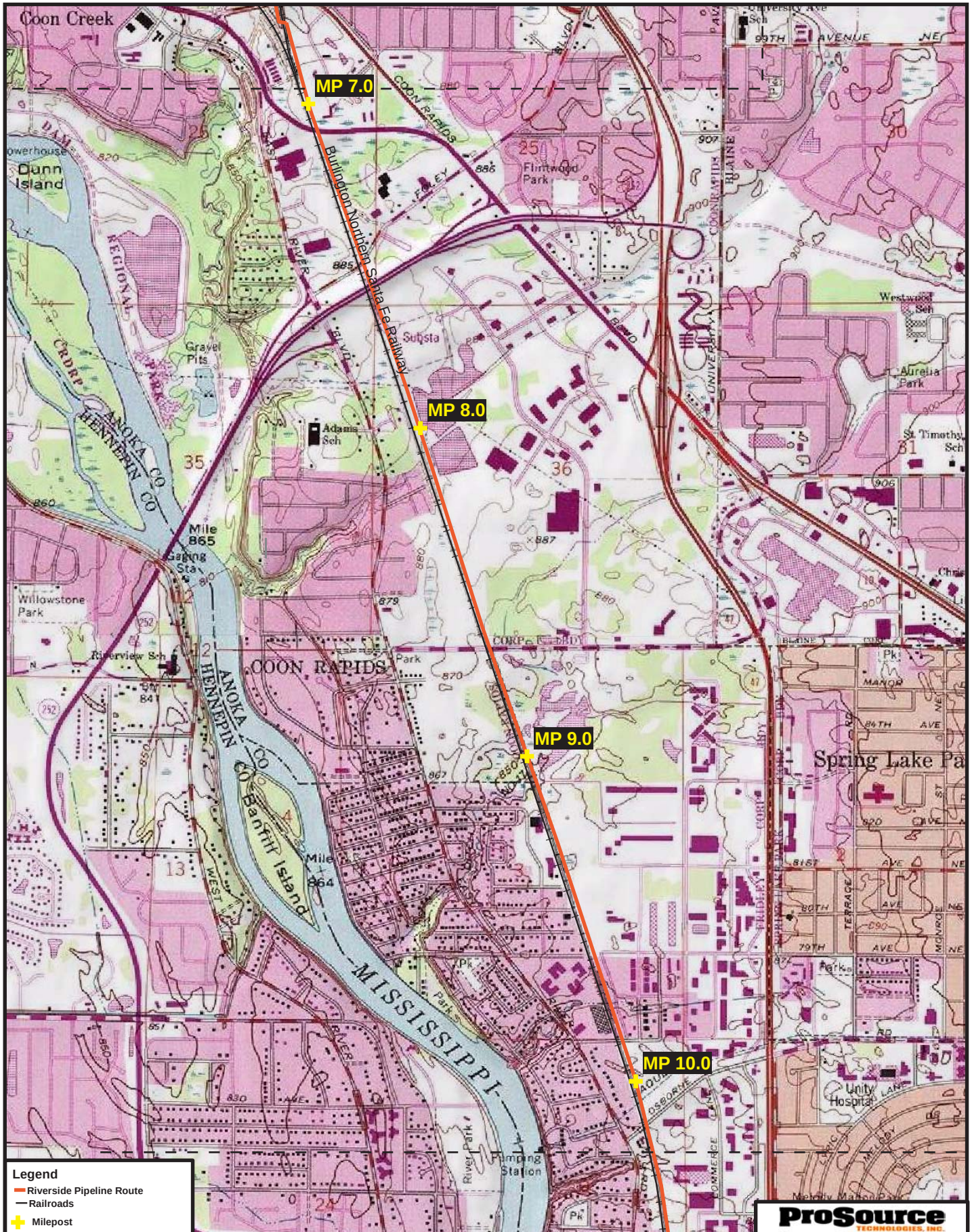
CenterPoint Energy - Riverside Pipeline Project
Project Location Map

0 1,000 2,000 3,000 Feet

ProSource TECHNOLOGIES, INC.

DATE ISSUED:	04/04/06
DATE REVISED:	
SCALE:	1:24,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 2 of 5



CenterPoint Energy

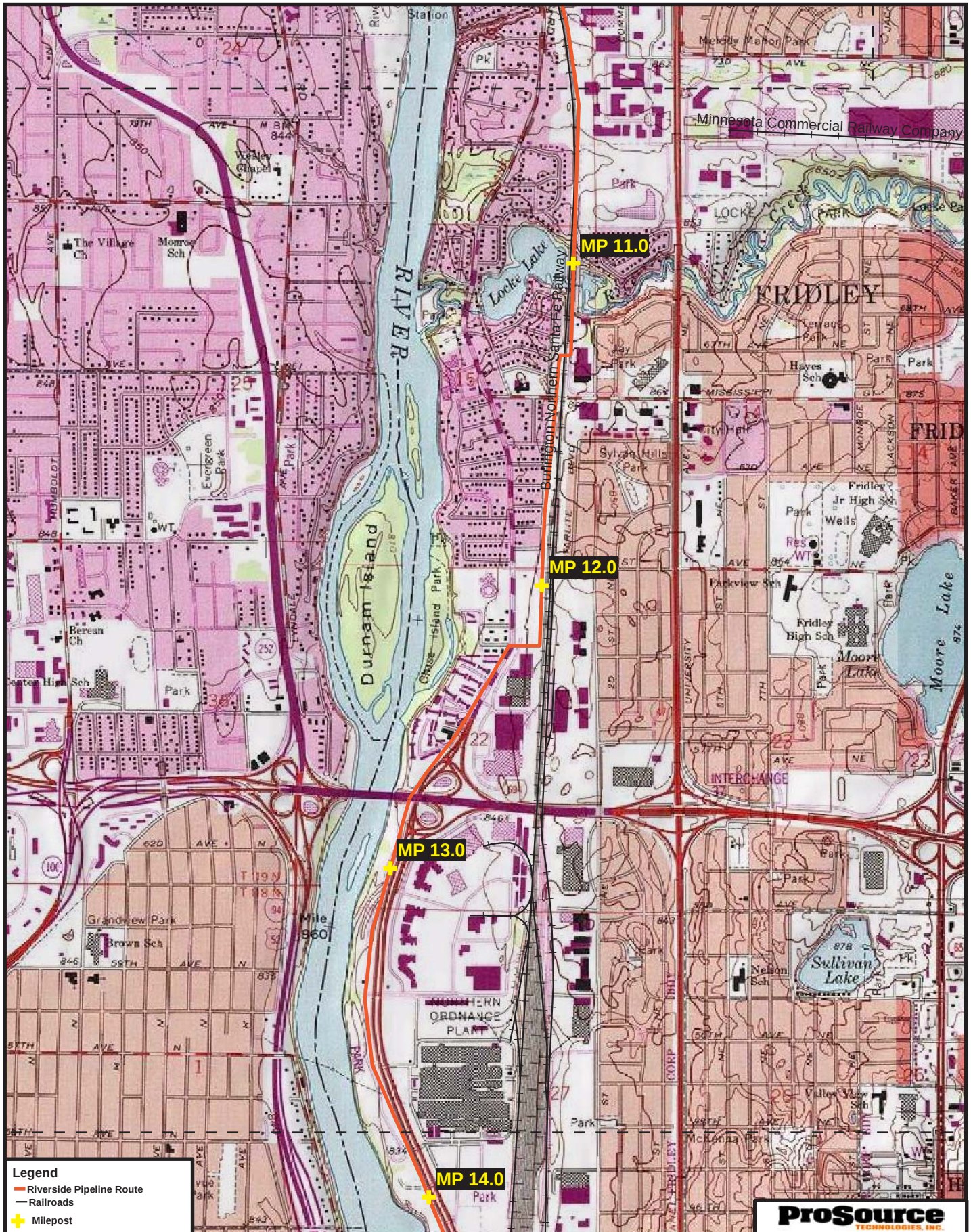
ProSource Project No. 1001-00

CenterPoint Energy - Riverside Pipeline Project
Project Location Map

0 1,000 2,000 3,000 Feet

ProSource TECHNOLOGIES, INC.

DATE ISSUED:	04/04/06
DATE REVISED:	
SCALE:	1:24,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 3 of 5



ProSource TECHNOLOGIES, INC.

CenterPoint Energy

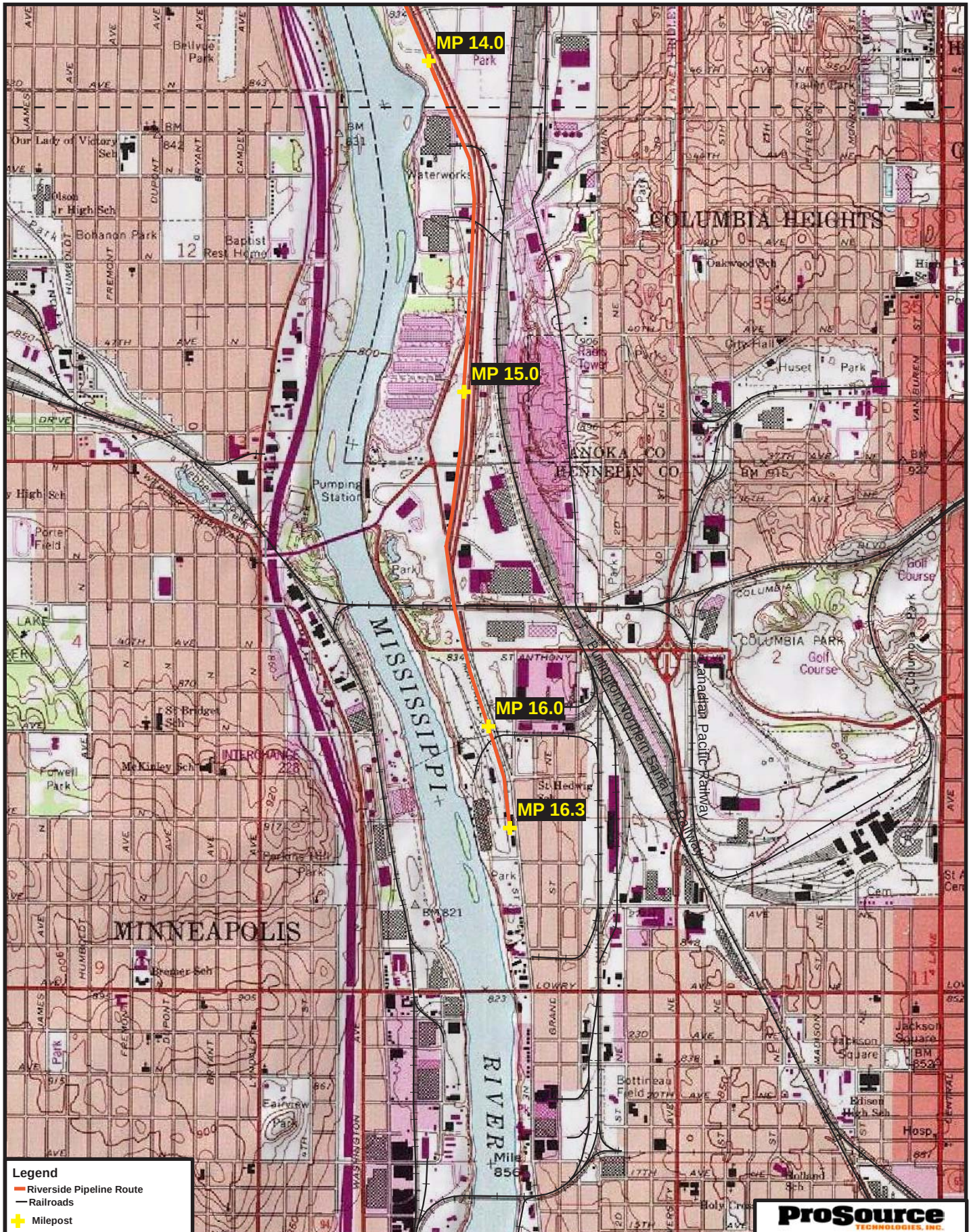
ProSource Project No. 1001-00

N

CenterPoint Energy - Riverside Pipeline Project
Project Location Map

0 1,000 2,000 3,000 Feet

DATE ISSUED:	04/04/06
DATE REVISED:	
SCALE:	1:24,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 4 of 5



CenterPoint Energy

ProSource Project No. 1001-00

N

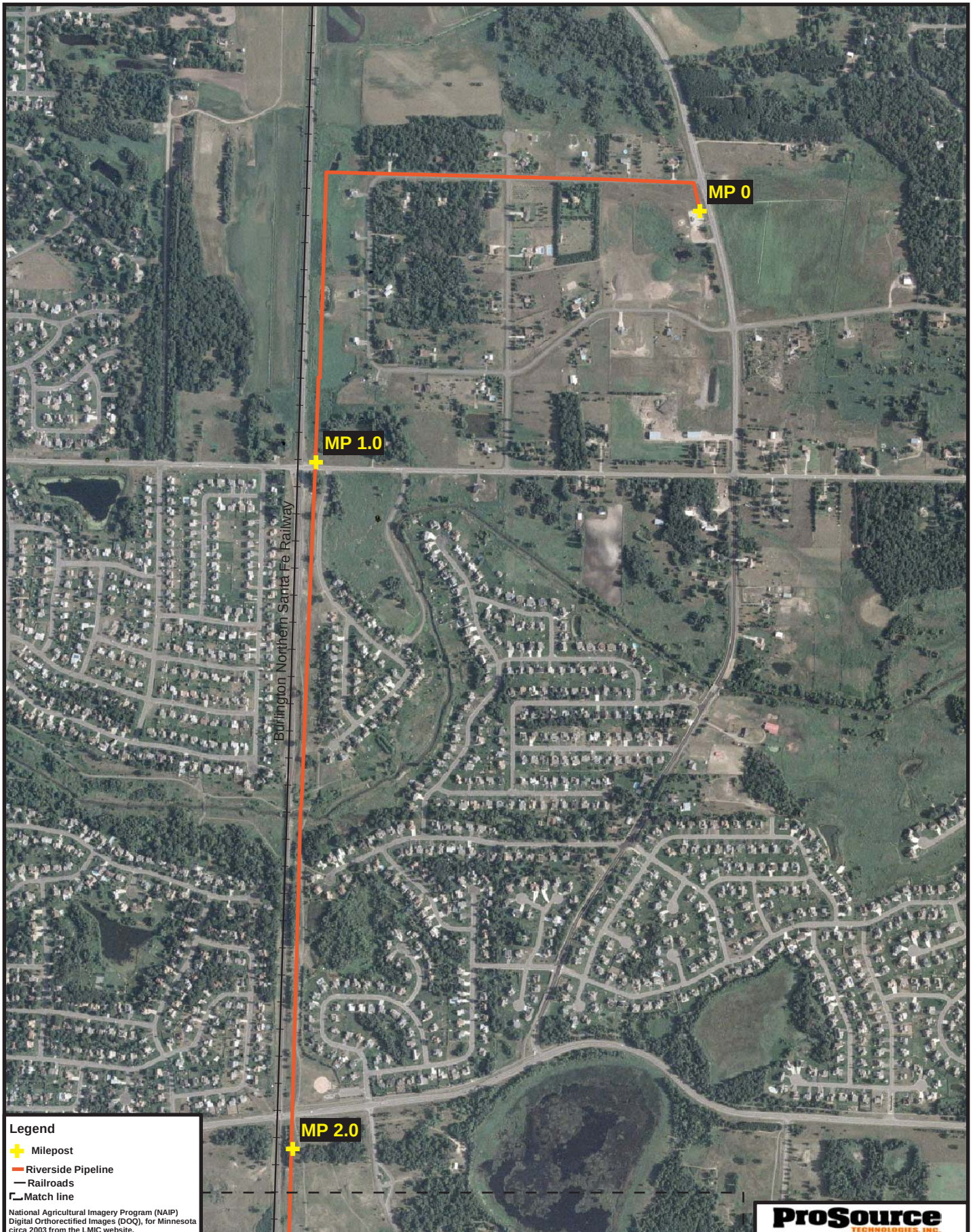
CenterPoint Energy - Riverside Pipeline Project
Project Location Map

0 1,000 2,000 3,000 Feet

ProSource TECHNOLOGIES, INC.

DATE ISSUED:	04/04/06
DATE REVISED:	
SCALE:	1:24,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 5 of 5

Aerial Photo Route Maps



Legend

- Milepost
- Riverside Pipeline
- Railroads
- Match line

National Agricultural Imagery Program (NAIP) Digital Orthorectified Images (DOQ), for Minnesota circa 2003 from the LMIC website.

CenterPoint Energy

ProSource Project No. 1001-00

N

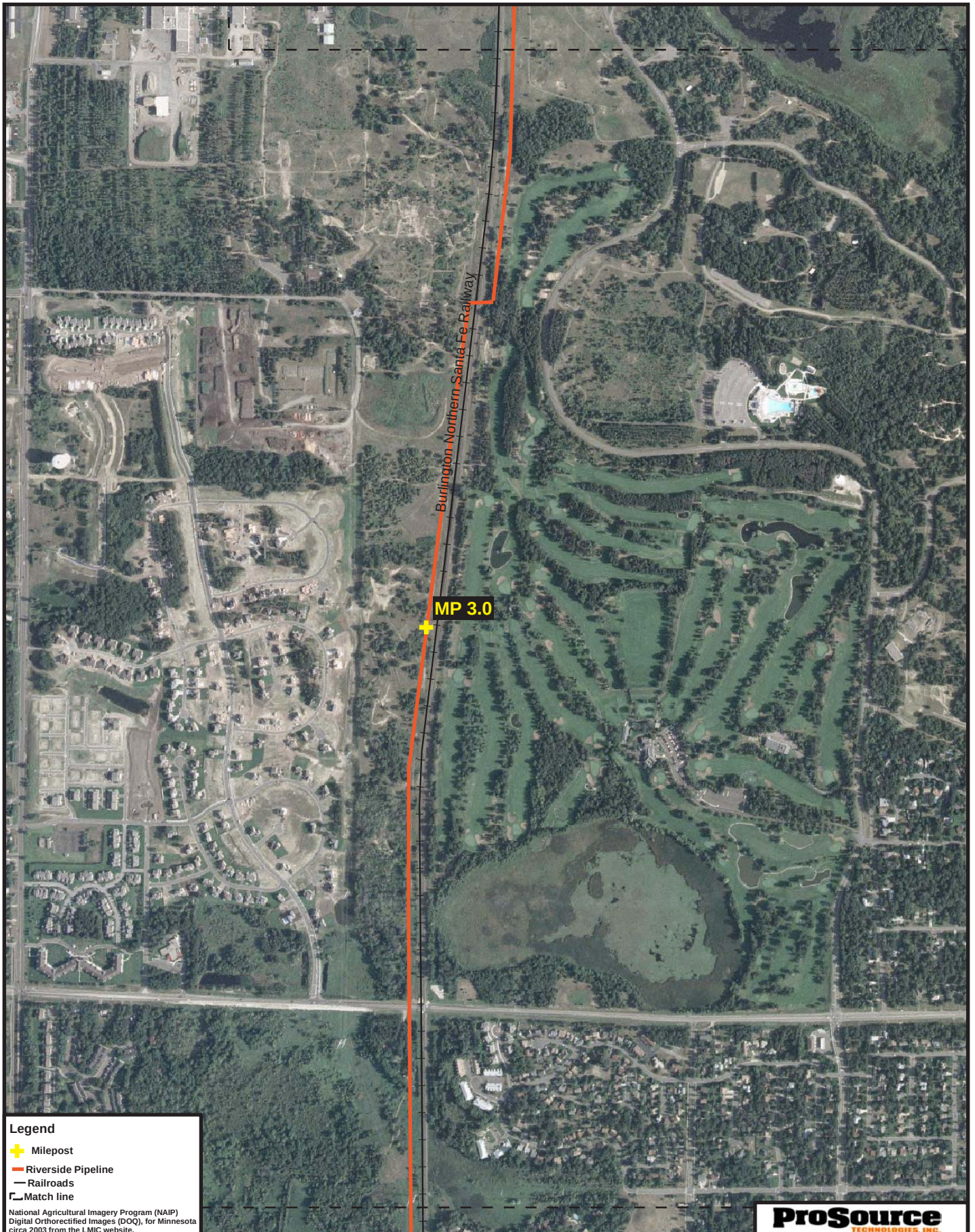
CenterPoint Energy - Riverside Pipeline Project

Project Location Map - Aerial Photos

0 1,000 2,000 3,000 Feet

ProSource TECHNOLOGIES, INC.

DATE ISSUED:	04/04/06
DATE REVISED:	
SCALE:	1:12,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 1 of 9



Legend

- Milepost
- Riverside Pipeline
- Railroads
- Match line

National Agricultural Imagery Program (NAIP) Digital Orthorectified Images (DOQ), for Minnesota circa 2003 from the LMIC website.

CenterPoint Energy

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ProSource Project No. 1001-00

CenterPoint Energy - Riverside Pipeline Project

Project Location Map - Aerial Photos

0 1,000 2,000 3,000 Feet

ProSource TECHNOLOGIES, INC.

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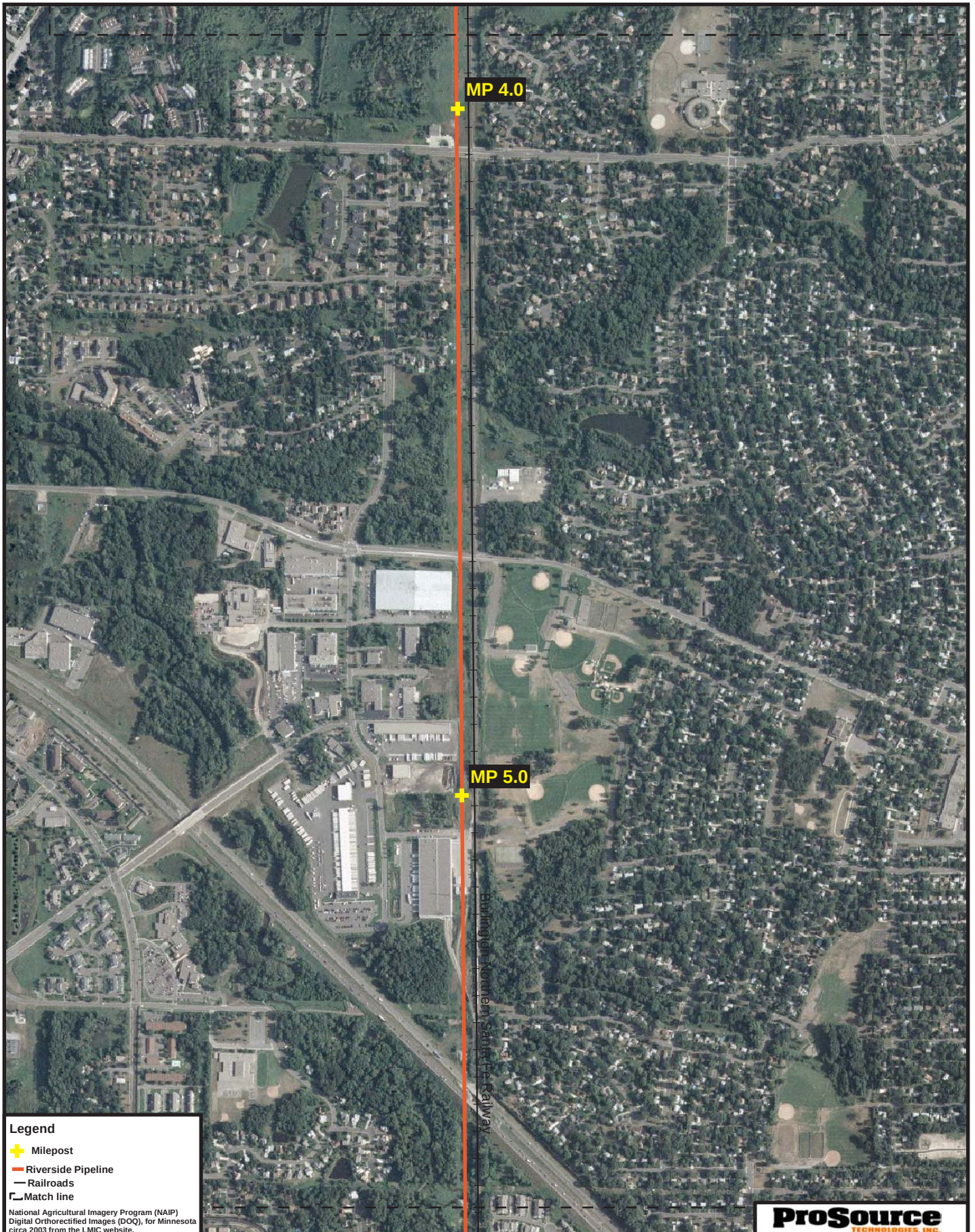
SERIES:	Map 2 of 9



Legend

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- Railroads
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0 1,000 2,000 3,000 Feet

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Legend

- Milepost
- Riverside Pipeline
- Railroads
- Match line

National Agricultural Imagery Program (NAIP) Digital Orthorectified Images (DOQ), for Minnesota circa 2003 from the LMIC website.

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Legend

- Milepost
- Riverside Pipeline
- Railroads
- Match line

National Agricultural Imagery Program (NAIP) Digital Orthorectified Images (DOQ), for Minnesota circa 2003 from the LMIC website.

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Project Location Map - Aerial Photos

0 1,000 2,000 3,000 Feet

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Legend

- Milepost
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DRAWN BY:	Sheri Roadfeldt, EIT
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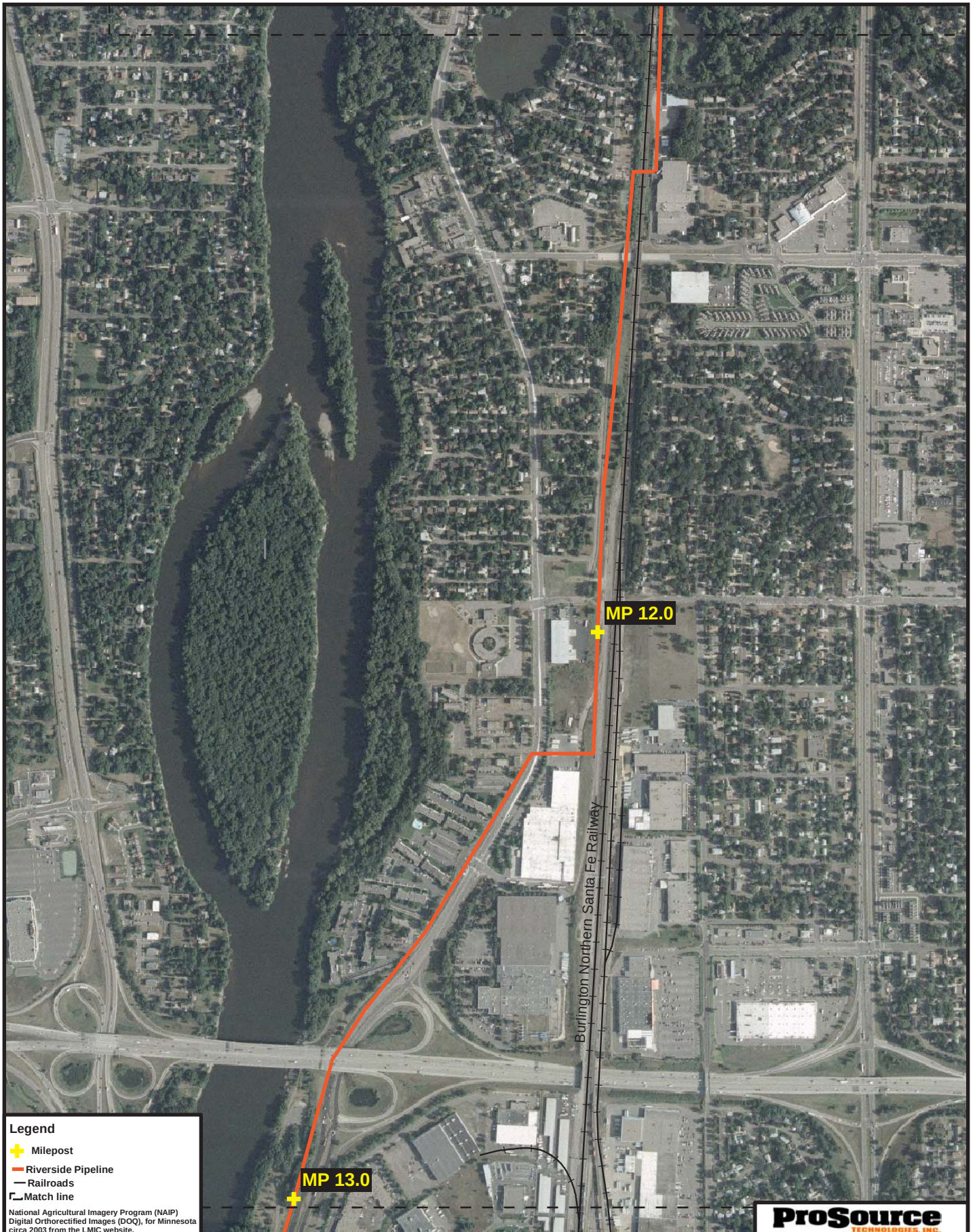

Legend

- Milepost
- Riverside Pipeline
- Railroads
- Match line

National Agricultural Imagery Program (NAIP) Digital Orthorectified Images (DOQ), for Minnesota circa 2003 from the LMIC website.

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Project Location Map - Aerial Photos

0 1,000 2,000 3,000 Feet

ProSource TECHNOLOGIES, INC.

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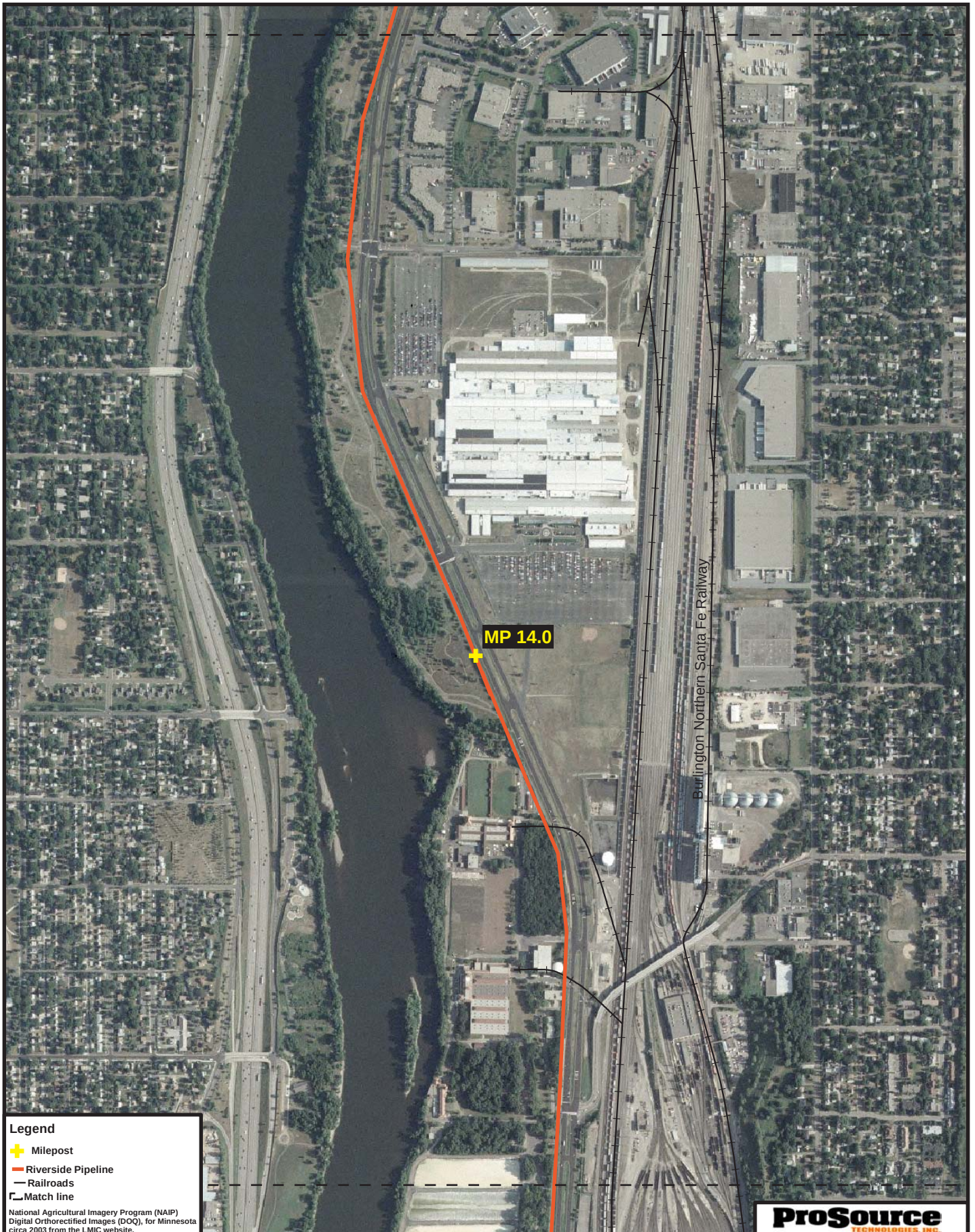
SCALE:	1:12,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 7 of 9



Legend

- Milepost
- Riverside Pipeline
- Railroads
- Match line

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Project Location Map - Aerial Photos

0 1,000 2,000 3,000 Feet

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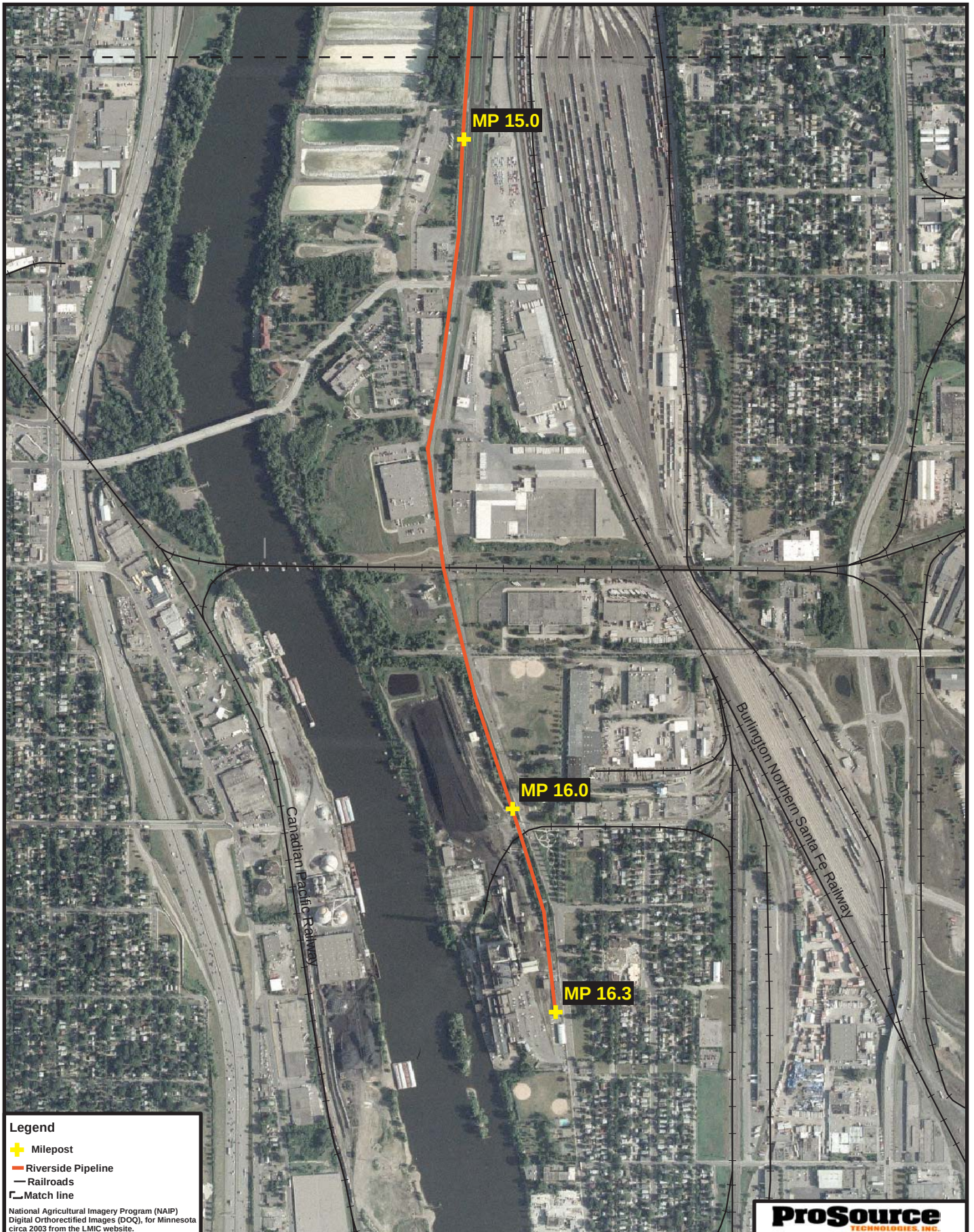
SCALE:	1:12,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 8 of 9



Legend

- Milepost
- Riverside Pipeline
- Railroads
- Match line

National Agricultural Imagery Program (NAIP) Digital Orthorectified Images (DOQ), for Minnesota circa 2003 from the LMIC website.

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CenterPoint Energy - Riverside Pipeline Project

Project Location Map - Aerial Photos

0 1,000 2,000 3,000 Feet

ProSource TECHNOLOGIES, INC.

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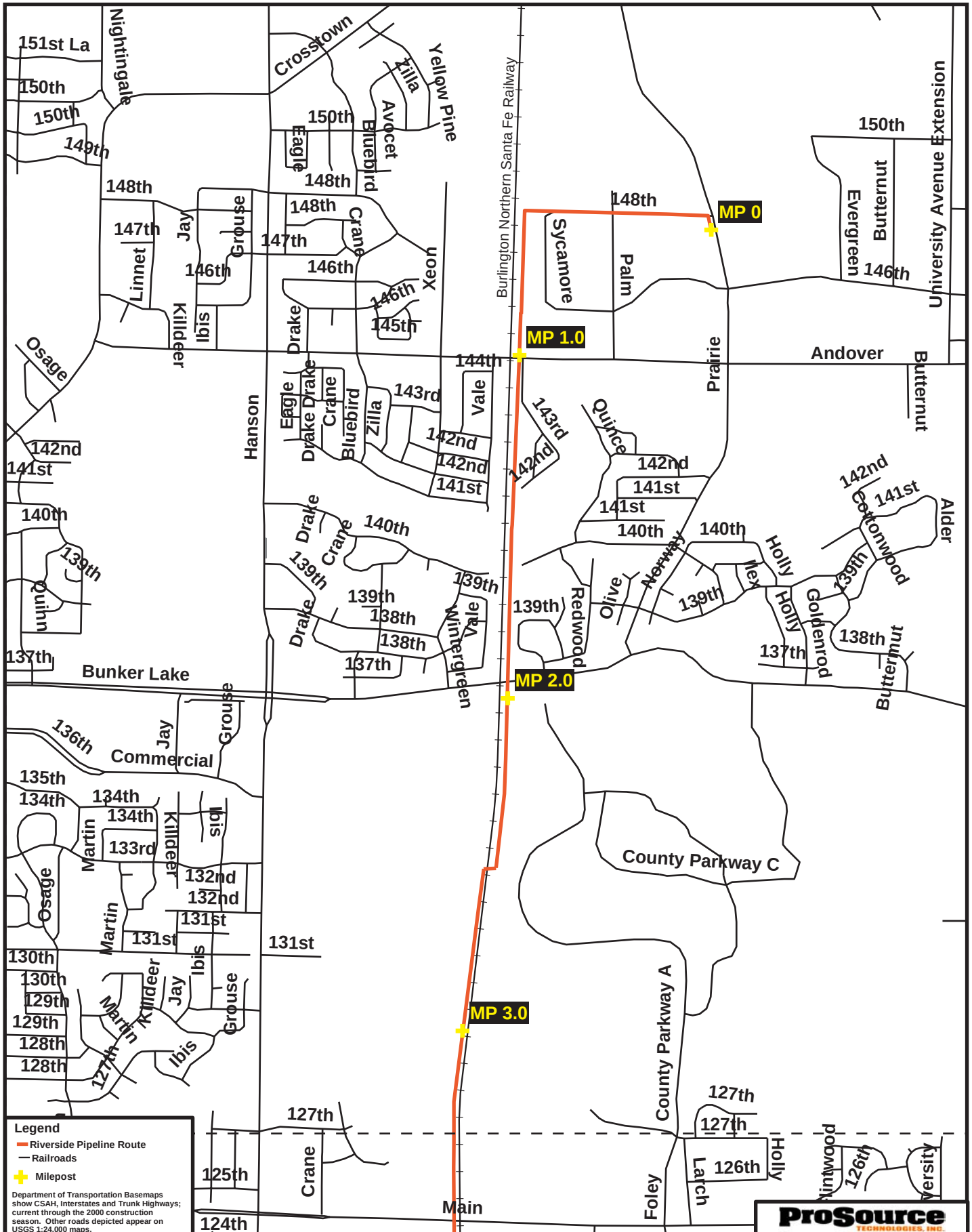
SCALE:	1:12,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 9 of 9

Road Maps



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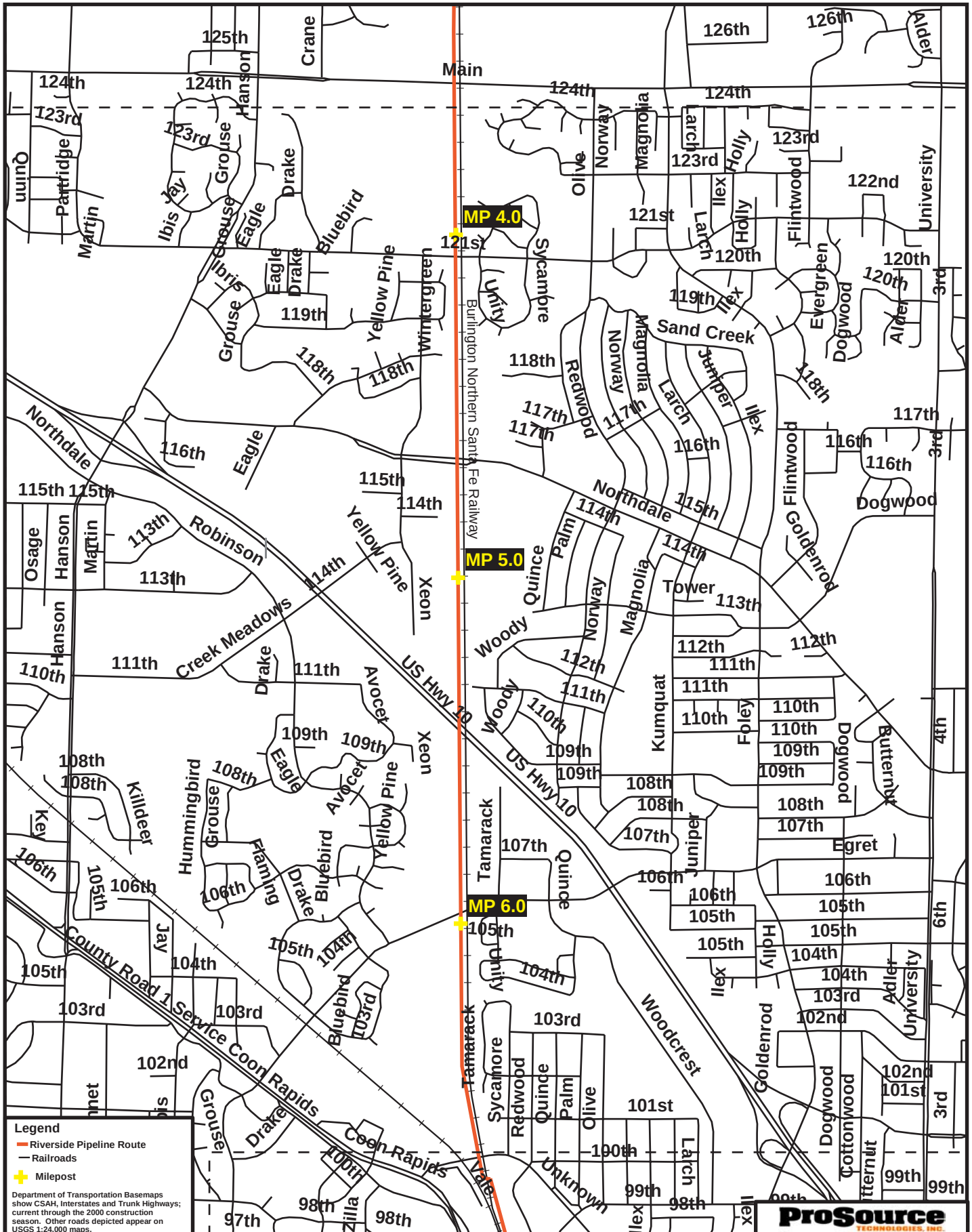
Department of Transportation Road Map

ProSource TECHNOLOGIES, INC.

DATE ISSUED:	04/04/06
DATE REVISED:	
SCALE:	1:24,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 1 of 5



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ProSource Project No. 1001-00

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CenterPoint Energy - Riverside Pipeline Project

Department of Transportation Road Map

0 1,000 2,000 3,000 Feet

ProSource TECHNOLOGIES, INC.

DATE ISSUED:	04/04/06
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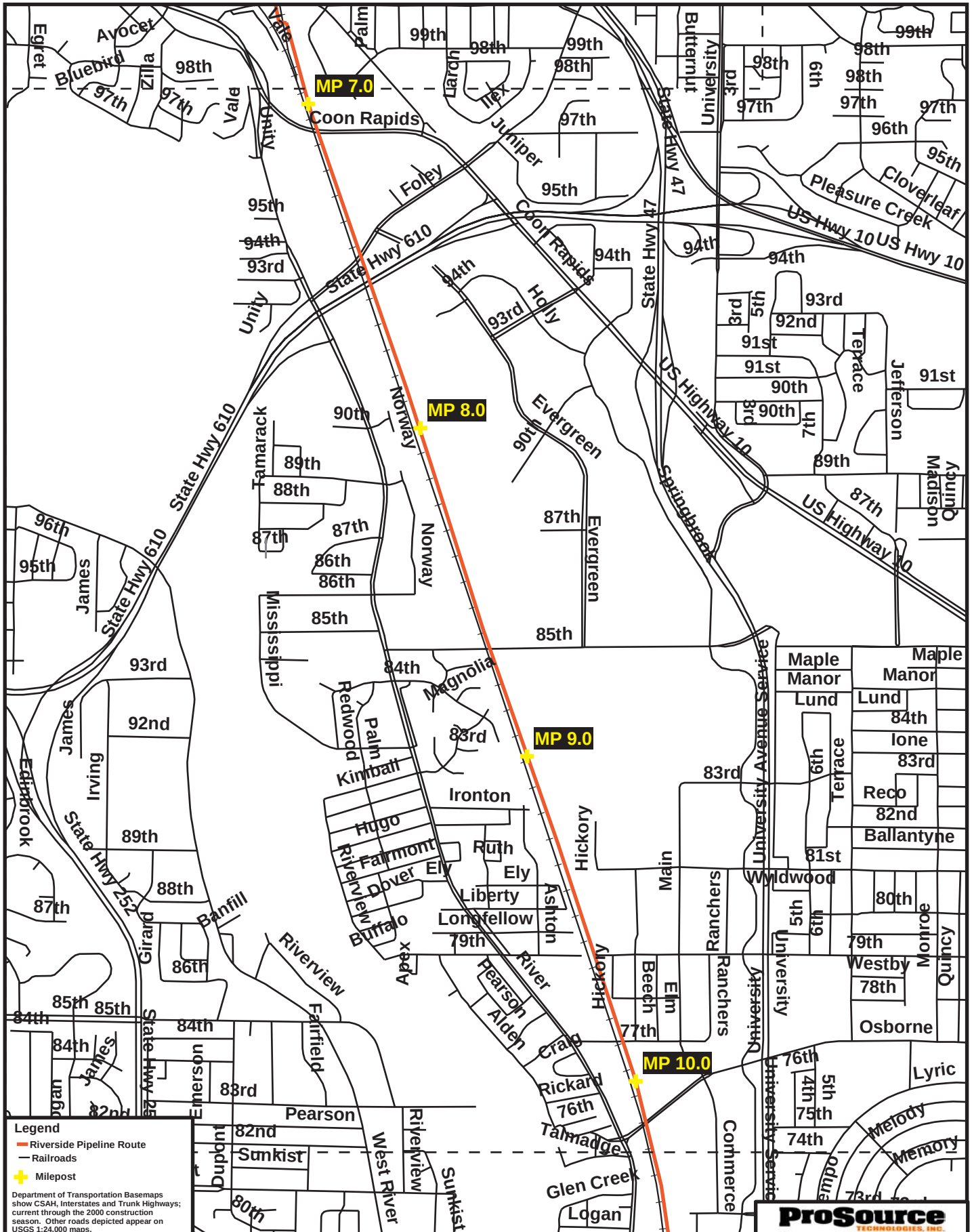
SERIES:	Map 2 of 5



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CenterPoint Energy - Riverside Pipeline Project

Department of Transportation Road Map

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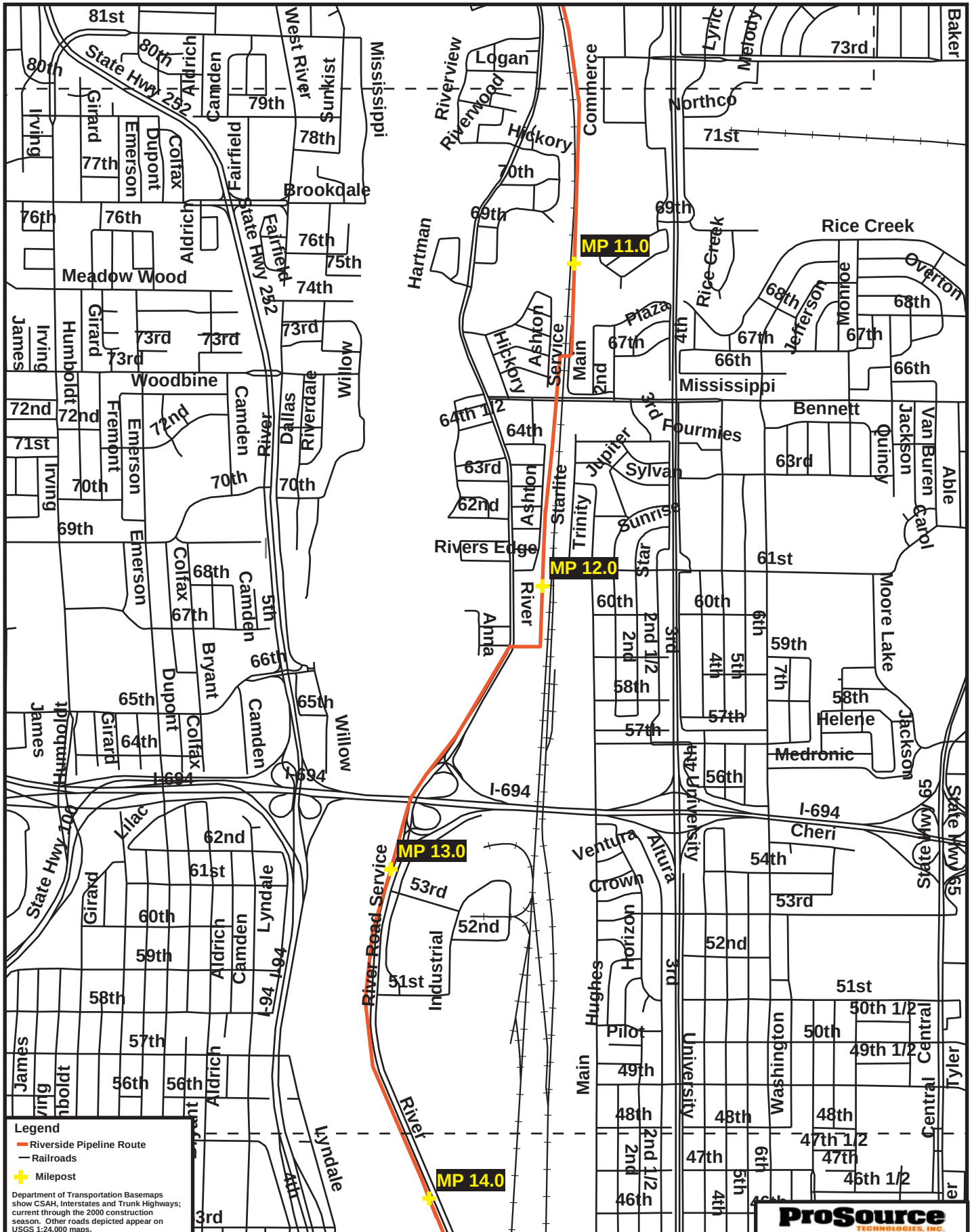
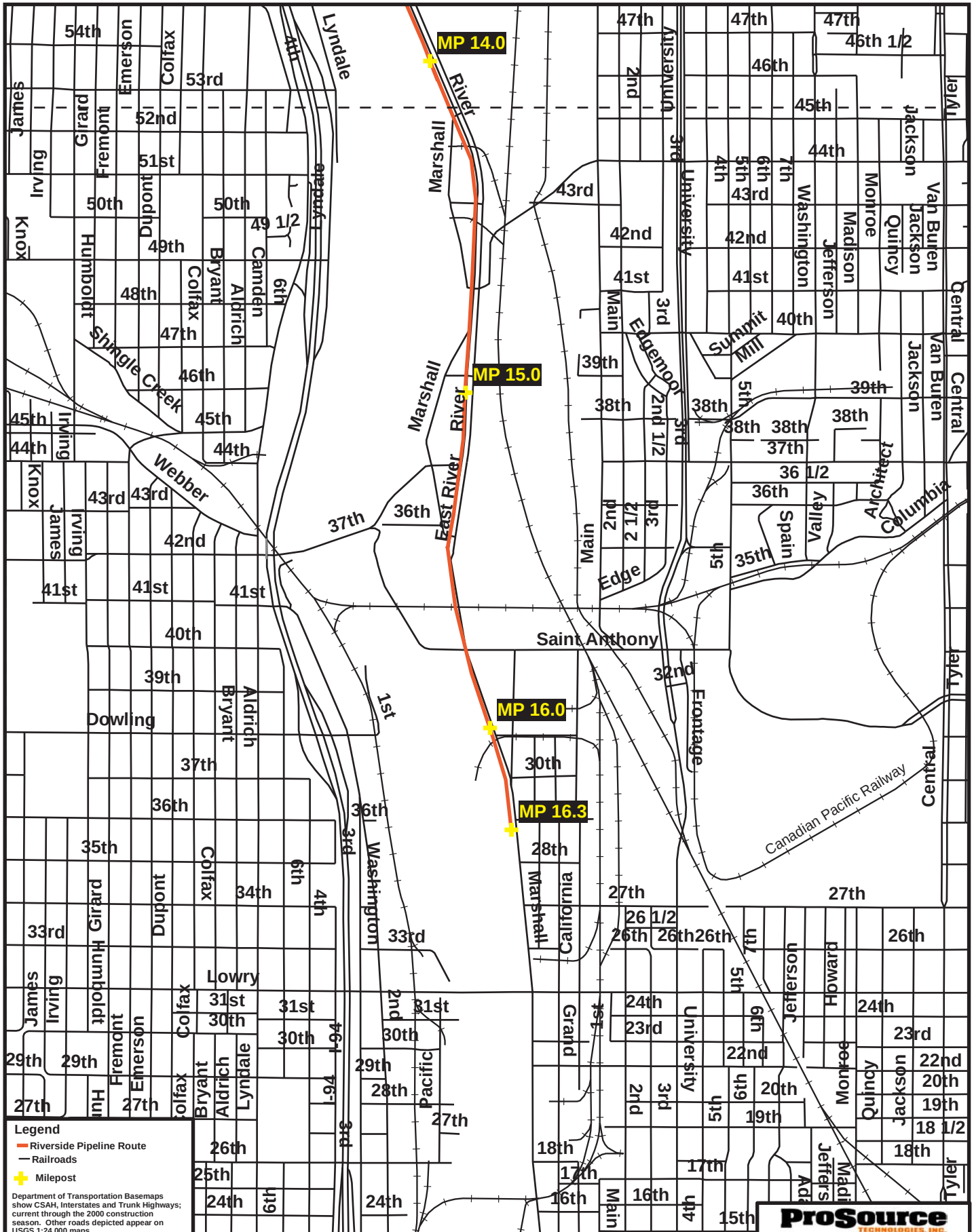
SCALE:	1:24,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 3 of 5


MP 11.0
MP 12.0
MP 13.0
MP 14.0
Legend
Riverside Pipeline Route
Railroads
Milepost
Department of Transportation Basemaps show CSAH, Interstates and Trunk Highways; current through the 2000 construction season. Other roads depicted appear on USGS 1:24,000 maps.
CenterPoint Energy
ProSource Project No. 1001-00
CenterPoint Energy - Riverside Pipeline Project
Department of Transportation Road Map
0 1,000 2,000 3,000 Feet
ProSource TECHNOLOGIES, INC.
DATE ISSUED: 04/04/06
DATE REVISED:
SCALE: 1:24,000
DRAWN BY: Sheri Roadfeldt, EIT
SERIES: Map 4 of 5



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CenterPoint Energy - Riverside Pipeline Project
Department of Transportation Road Map

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SCALE:	1:24,000
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SERIES:	Map 5 of 5

National Wetland Inventory Maps

CenterPoint Energy - Riverside Pipeline Project

National Wetland Inventory Map

DATE ISSUED:	03/31/06
DATE REVISED:	
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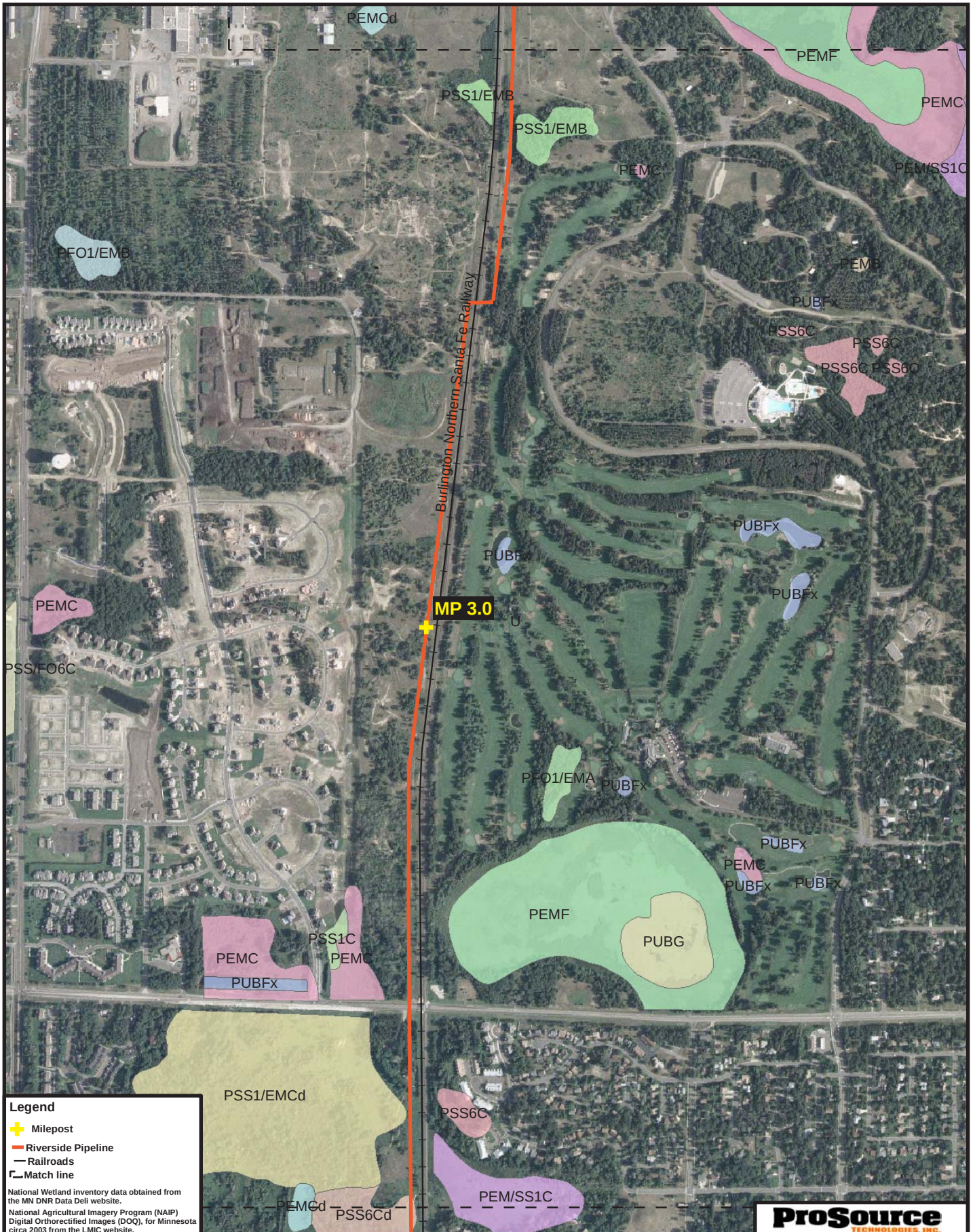
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 1 of 9



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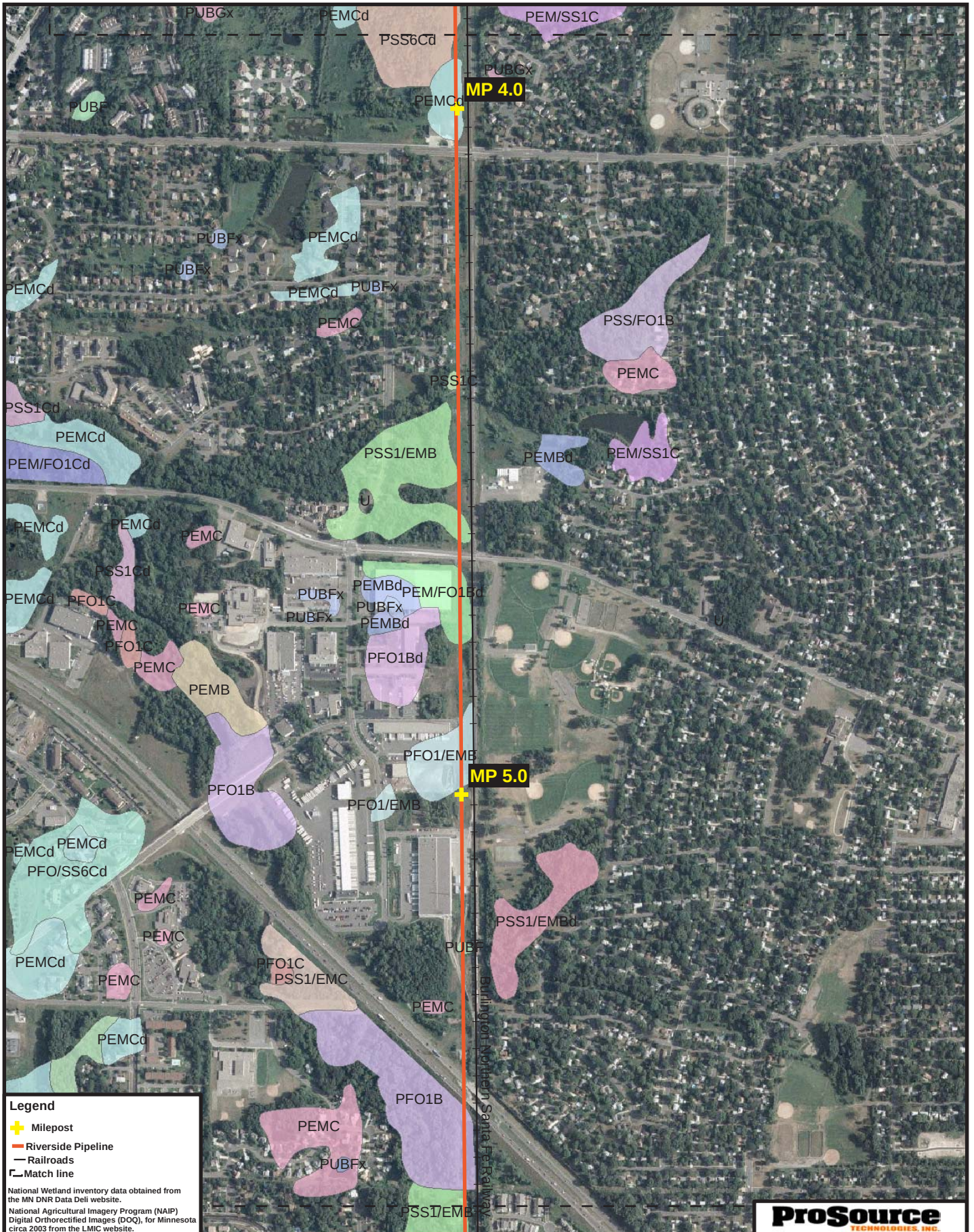
CenterPoint Energy - Riverside Pipeline Project

National Wetland Inventory Map

0 1,000 2,000 3,000 Feet

DATE ISSUED:	03/31/06
DATE REVISED:	
SCALE:	1:12,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 2 of 9


PUBGx
PEMCd
PEM/SS1C
PSS6Cd
PUBGx
MP 4.0
PEMCd
PUBF
PUBFx
PEMCd
PUBFx
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PEMCd
PUBFx
PEMC
PSS/FO1B
PEMC
PSS1C
PSS1Cd
PEMCd
PEM/FO1Cd
PSS1/EMB
PEMBd
PEM/SS1C
U
PEMCd
PEMCd
PEMC
PSS1Cd
PEMCd
PFO1C
PEMC
PUBFx
PEMBd
PEM/FO1Bd
PUBFx
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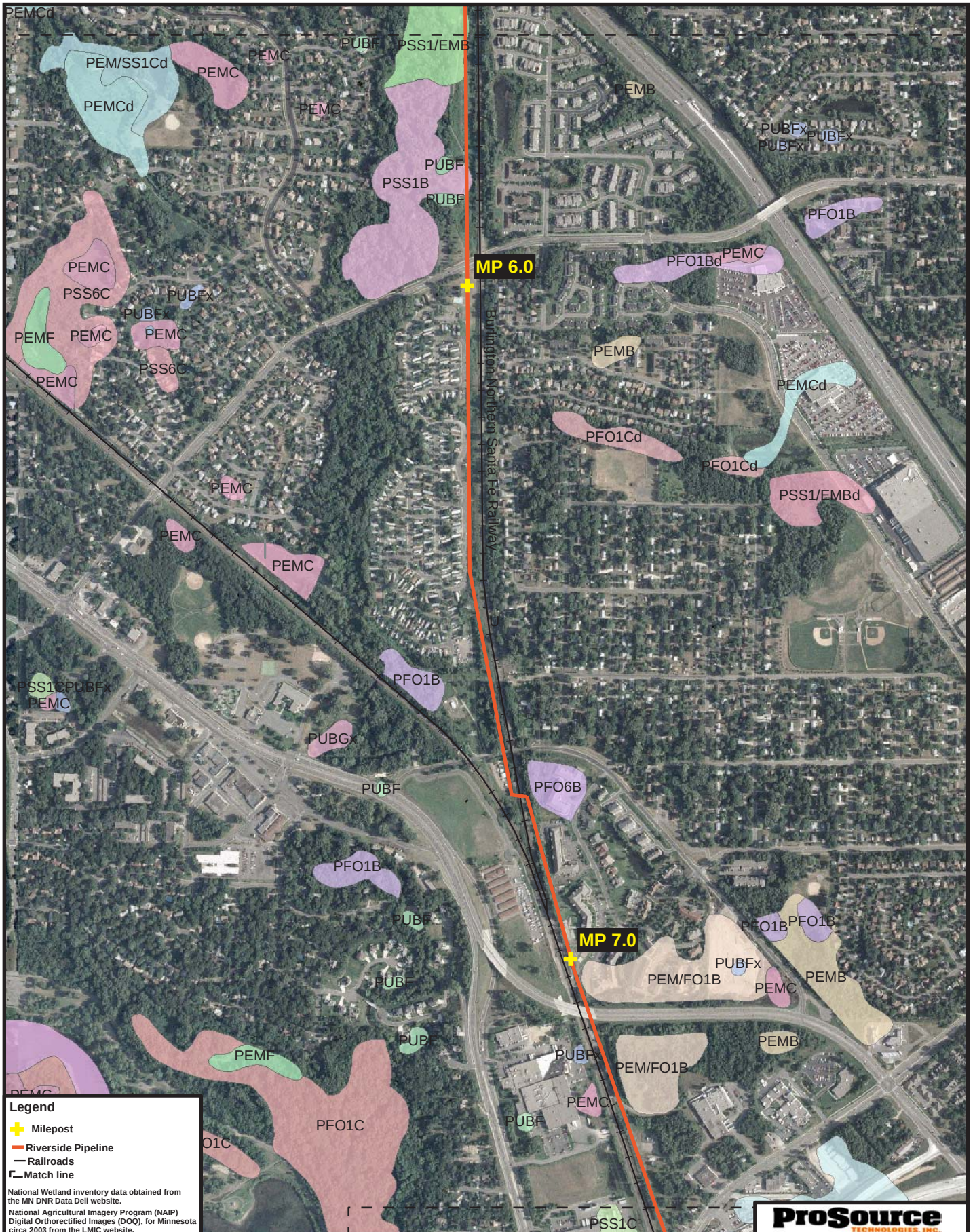
PEMC
PFO1C
PEMC
PFO1Bd
PEMB
PFO1/EMB
MP 5.0
PFO1B
PFO1/EMB
PEMCd
PEMCd
PFO/SS6Cd
PEMC
PEMC
PSS1/EMBd
PUBF
PEMCd
PFO1C
PEMC
PSS1/EMC
PEMC
PEMCd
Burlington Northern Santa Fe Railway
PFO1B
PEMC
PUBFx
PSS1/EMB
Legend
Milepost
Riverside Pipeline
Railroads
Match line
National Wetland inventory data obtained from the MN DNR Data Deli website.
National Agricultural Imagery Program (NAIP) Digital Orthorectified Images (DOQ), for Minnesota circa 2003 from the LMIC website.
ProSource TECHNOLOGIES, INC.
CenterPoint Energy
ProSource Project No. 1001-00
N
CenterPoint Energy - Riverside Pipeline Project
National Wetland Inventory Map
0
1,000
2,000
3,000
Feet
DATE ISSUED: 03/31/06
DATE REVISED:
SCALE: 1:12,000
DRAWN BY: Sheri Roadfeldt, EIT
SERIES: Map 3 of 9



CenterPoint Energy - Riverside Pipeline Project

National Wetland Inventory Map

DATE ISSUED:	03/31/06
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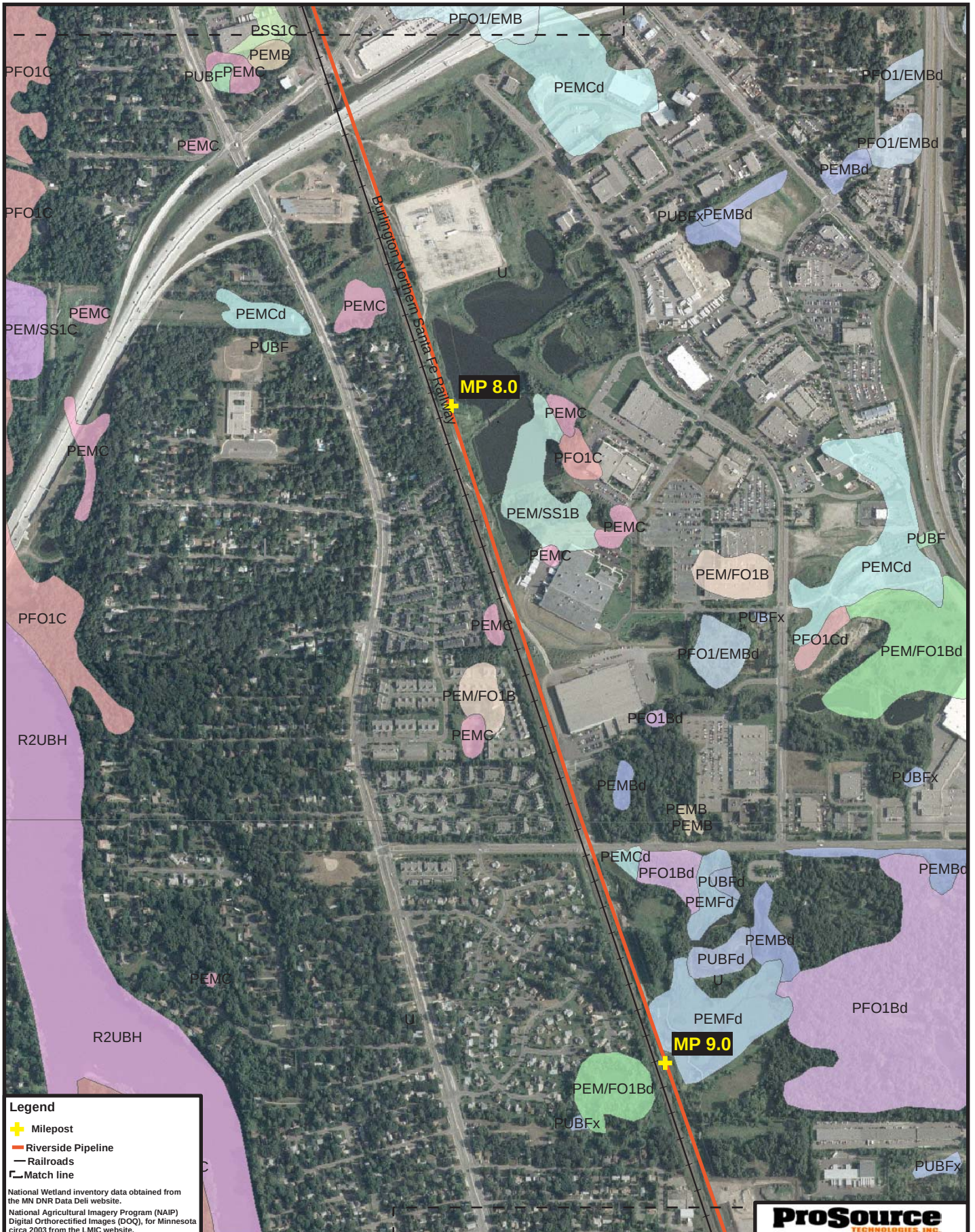
SCALE:	1:12,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 4 of 9


PFO1/EMB
PSS1C
PEMB
PUBF
PEMC
PFO1C
PEMCd
PFO1/EMBd
PEMC
PFO1/EMBd
PEMBd
PFO1C
PUBFx
PEMBd
Burlington Northern Santa Fe Railway
U
PEMC
PEMCd
PEMC
PEM/SS1C
PUBF
MP 8.0
PEMC
PEMC
PFO1C
PEM/SS1B
PEMC
PUBF
PEMC
PEM/FO1B
PEMCd
PFO1C
PUBFx
PEMC
PFO1Cd
PFO1/EMBd
PEM/FO1Bd
PEM/FO1B
PFO1Bd
R2UBH
PEMC
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PUBFd
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PUBFd
U
PEMC
PFO1Bd
U
PEMFd
R2UBH
MP 9.0
PEM/FO1Bd
PUBFx
PUBFx
Legend
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Match line
National Wetland inventory data obtained from the MN DNR Data Deli website.
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ProSource TECHNOLOGIES, INC.
CenterPoint Energy
ProSource Project No. 1001-00
N
CenterPoint Energy - Riverside Pipeline Project
National Wetland Inventory Map
0
1,000
2,000
3,000
Feet
DATE ISSUED: 03/31/06
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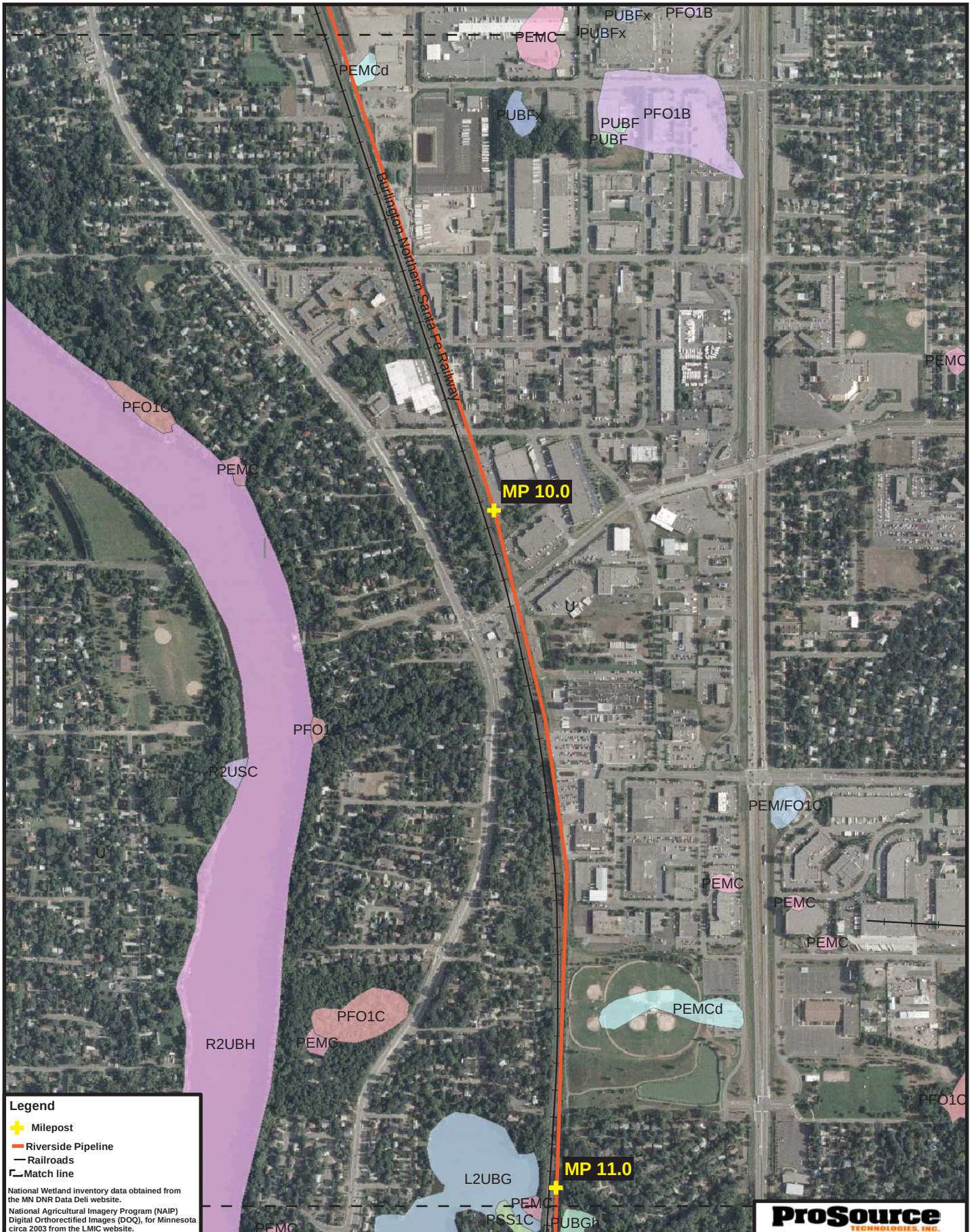
SCALE: 1:12,000
DRAWN BY: Sheri Roadfeldt, EIT
SERIES: Map 5 of 9



CenterPoint Energy - Riverside Pipeline Project

National Wetland Inventory Map

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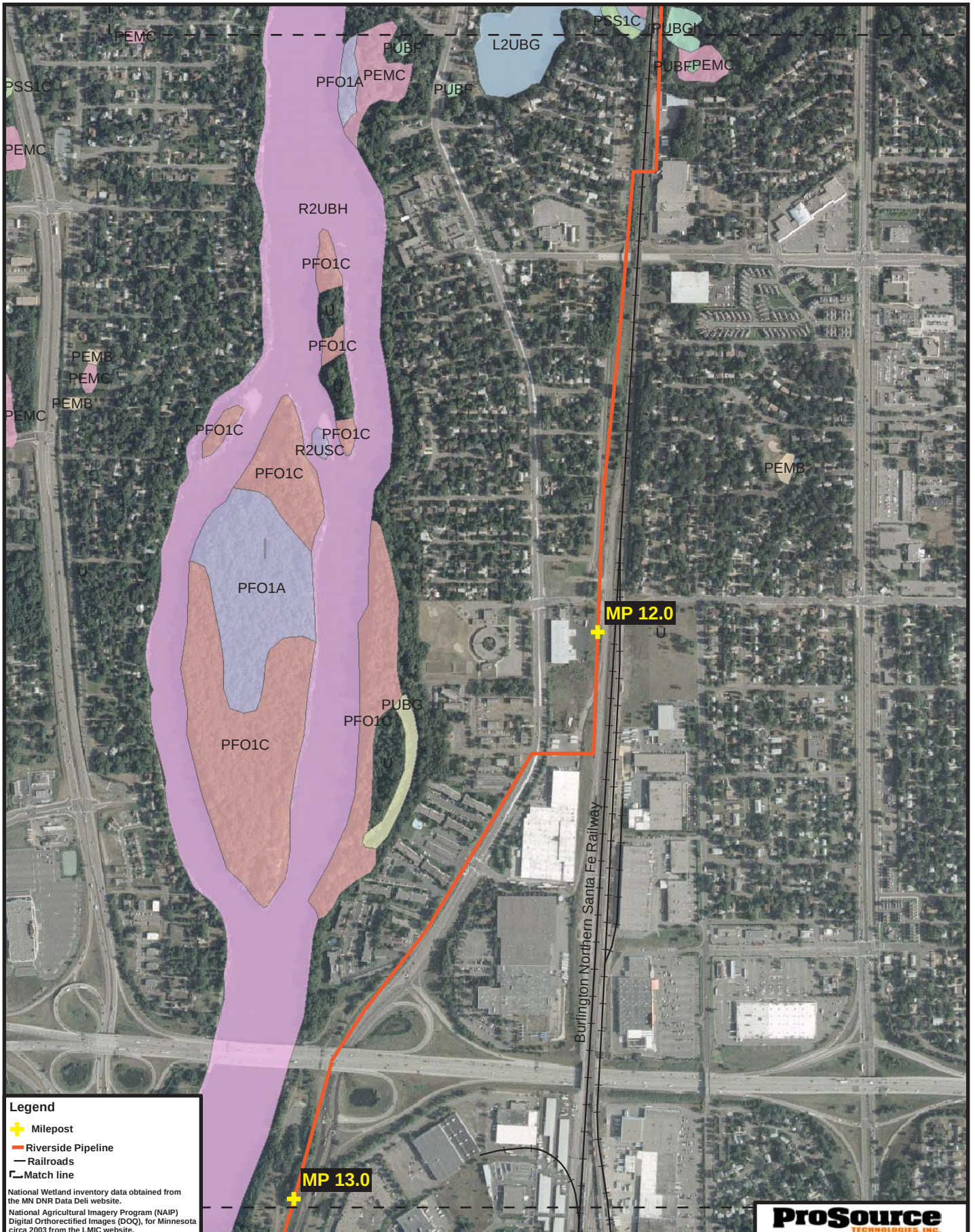
SERIES:	Map 6 of 9



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National Wetland Inventory Map

0 1,000 2,000 3,000 Feet

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SCALE:	1:12,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 7 of 9

Legend

- Milepost
- Riverside Pipeline
- Railroads
- Match line

National Wetland inventory data obtained from the MN DNR Data Deli website.

National Agricultural Imagery Program (NAIP) Digital Orthorectified Images (DOQ), for Minnesota circa 2003 from the LMIC website.

CenterPoint Energy

ProSource Project No. 1001-00

CenterPoint Energy - Riverside Pipeline Project

National Wetland Inventory Map

0 1,000 2,000 3,000 Feet

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SERIES:	Map 8 of 9

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National Wetland Inventory Map

0 1,000 2,000 3,000 Feet

DATE ISSUED:	03/31/06
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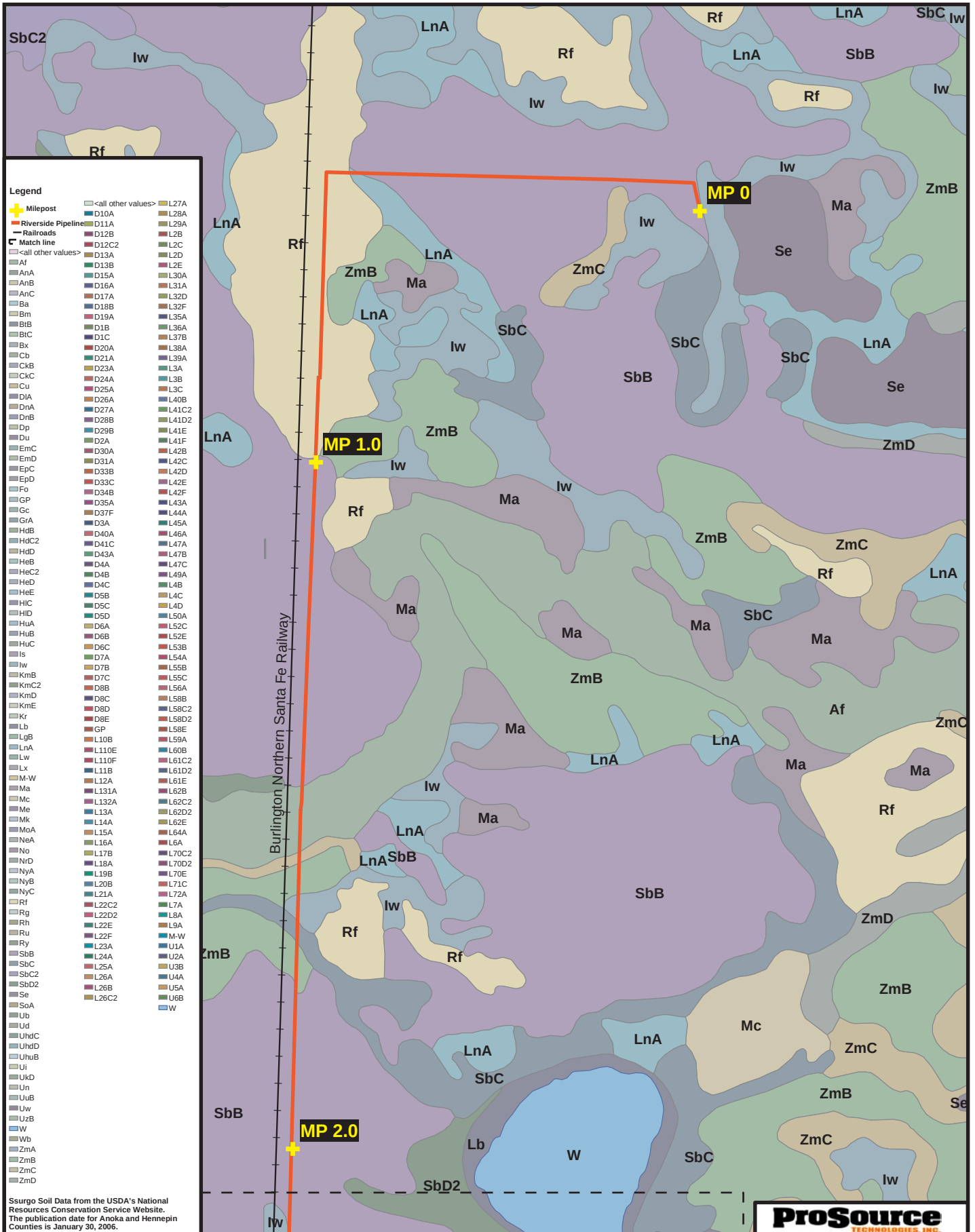
SERIES:	Map 9 of 9

National Wetland Inventory Maps – Key

Cowardin Classification System:

PEM – Palustrine Emergent PUB – Palustrine Unconsolidated Bottom PFO – Palustrine Forested PSS – Palustrine Scrub-shrub Subclass – Emergent 1. Persistent 2. Non-Persistent Subclass – Forested 1. Broad-leaved Deciduous 2. Needle-leaved Deciduous 3. Broad-leaved Evergreen 4. Needle-leaved Evergreen 5. Dead Subclass – Scrub-Shrub 1. Broad-leaved Deciduous 2. Needle-leaved Deciduous 3. Broad-leaved Evergreen 4. Needle-leaved Evergreen 5. Dead	Modifiers: A = Temporarily Flooded B = Saturated C = Seasonally Flooded F = Semipermanently Flooded G = Intermittently Exposed H = Permanently Flooded J = Intermittently Flooded K = Artificially Flooded U = Unknown Z = Intermittently Exposed/Permanent	Special Modifiers: b = Beaver d = Partially drained/ditched f = Farmed h = Diked/impounded r = Artificial substrate s = Spoil x = Excavated

Soil Cover Maps



Ssurgo Soil Data from the USDA's National Resources Conservation Service Website. The publication date for Anoka and Hennepin Counties is January 30, 2006.

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CenterPoint Energy - Riverside Pipeline Project

Ssurgo Soils Map

0 1,000 2,000 3,000 Feet

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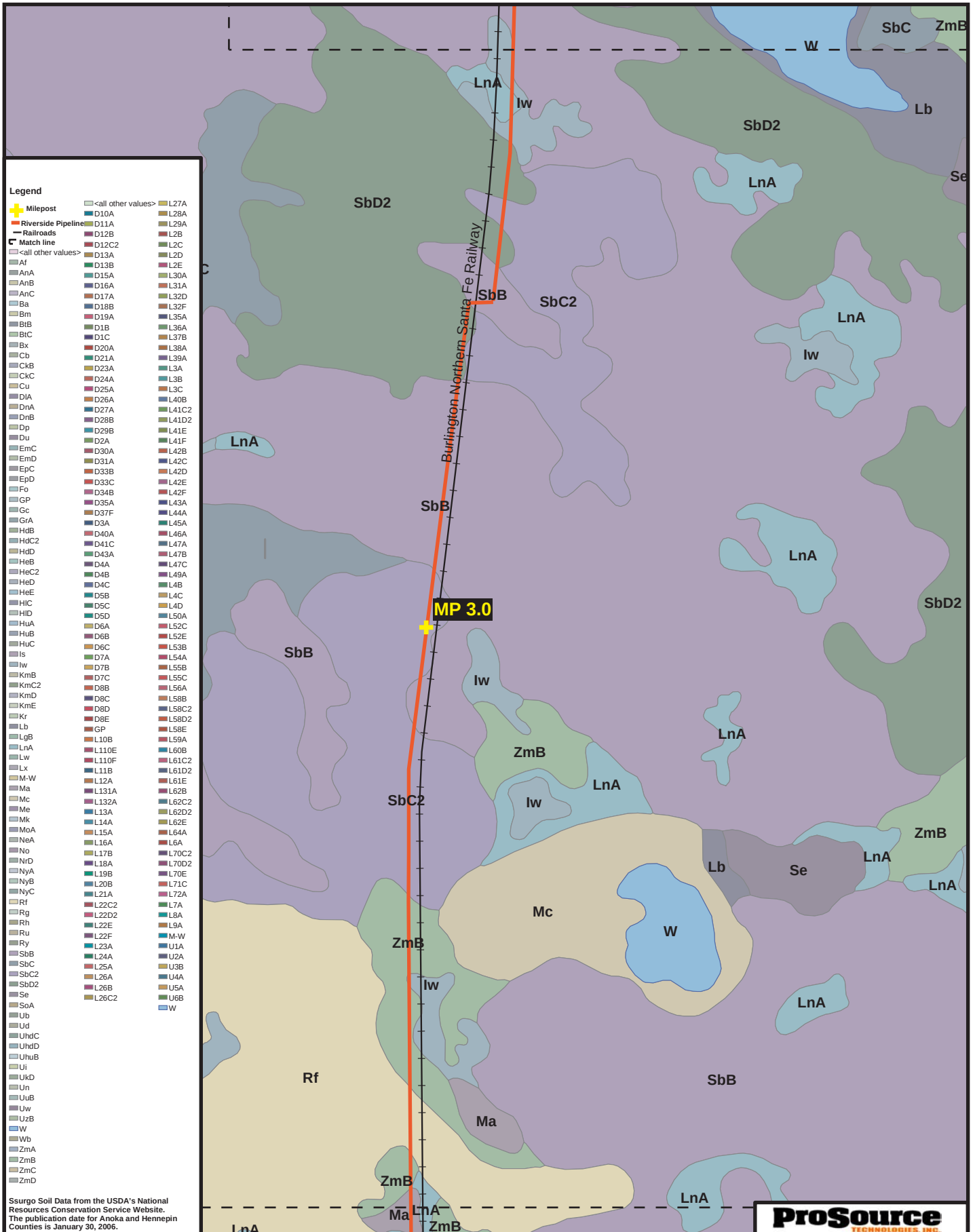
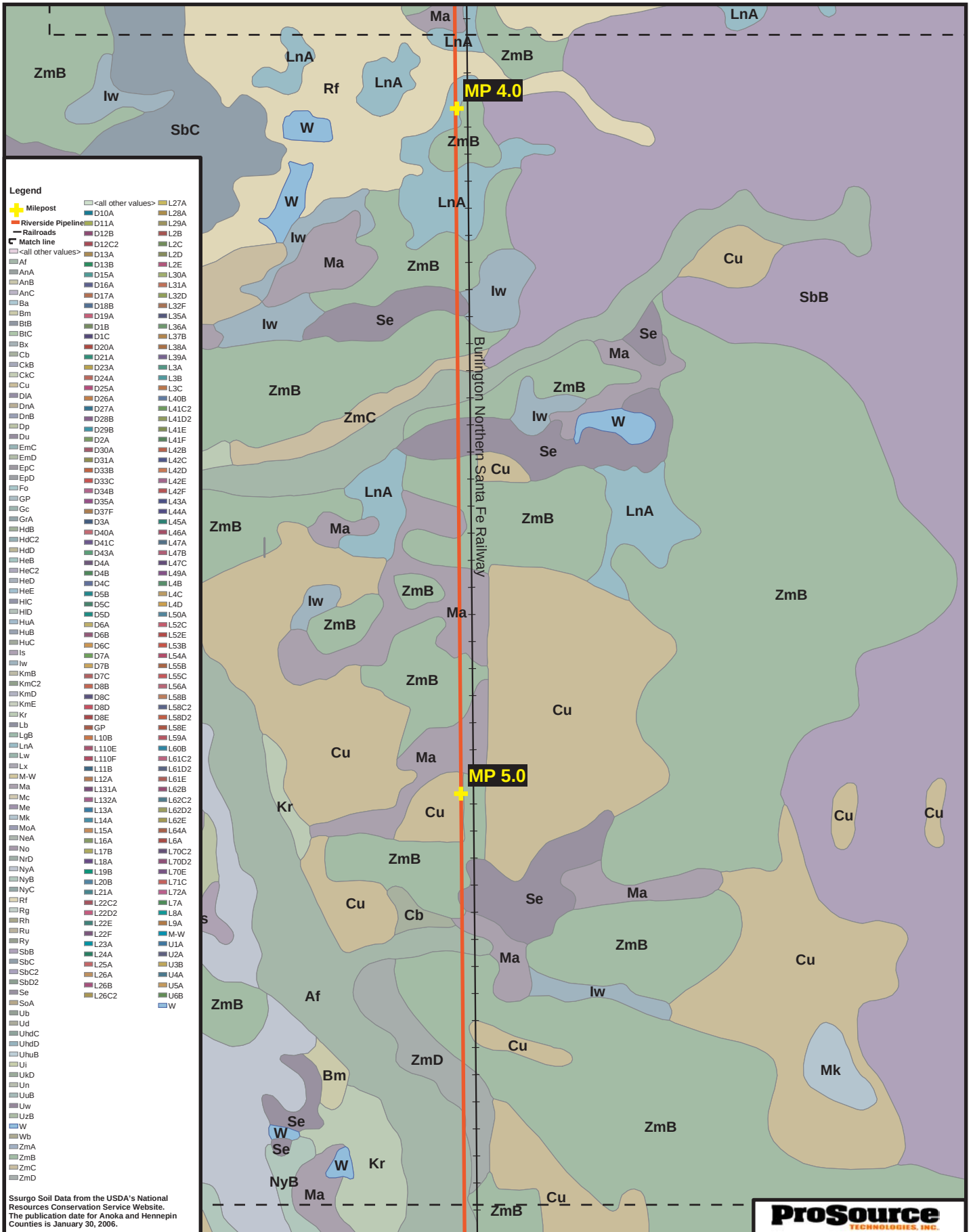
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 1 of 9



CenterPoint Energy - Riverside Pipeline Project
Ssurgo Soils Map

DATE ISSUED:	04/04/06
DATE REVISED:	
SCALE:	1:12,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 2 of 9



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CenterPoint Energy

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CenterPoint Energy - Riverside Pipeline Project

Ssurgo Soils Map

0 1,000 2,000 3,000 Feet

ProSource TECHNOLOGIES, INC.

DATE ISSUED:	04/04/06
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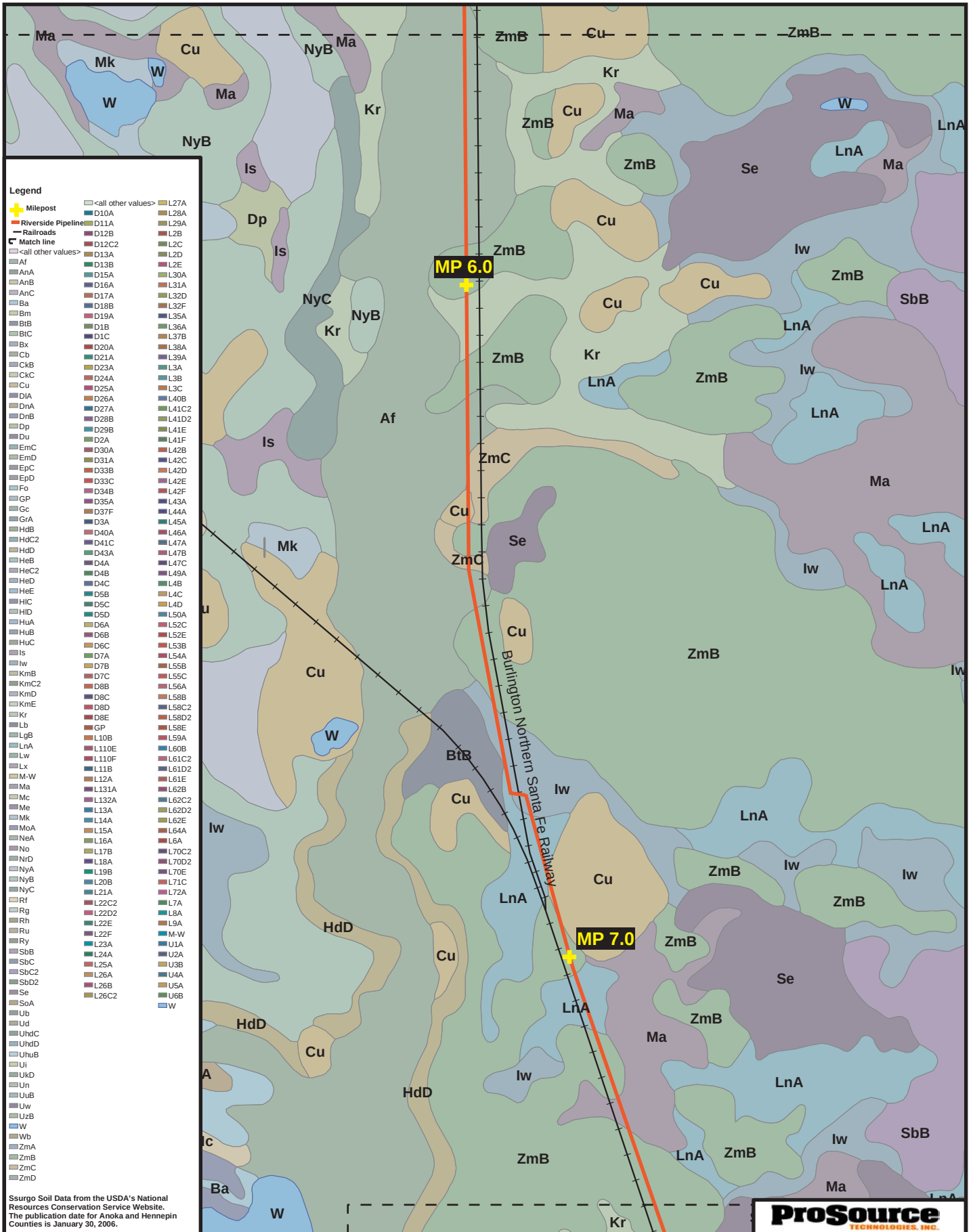
SCALE:	1:12,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 3 of 9



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CenterPoint Energy - Riverside Pipeline Project

Ssurgo Soils Map

0 1,000 2,000 3,000 Feet

ProSource TECHNOLOGIES, INC.

DATE ISSUED:	04/04/06
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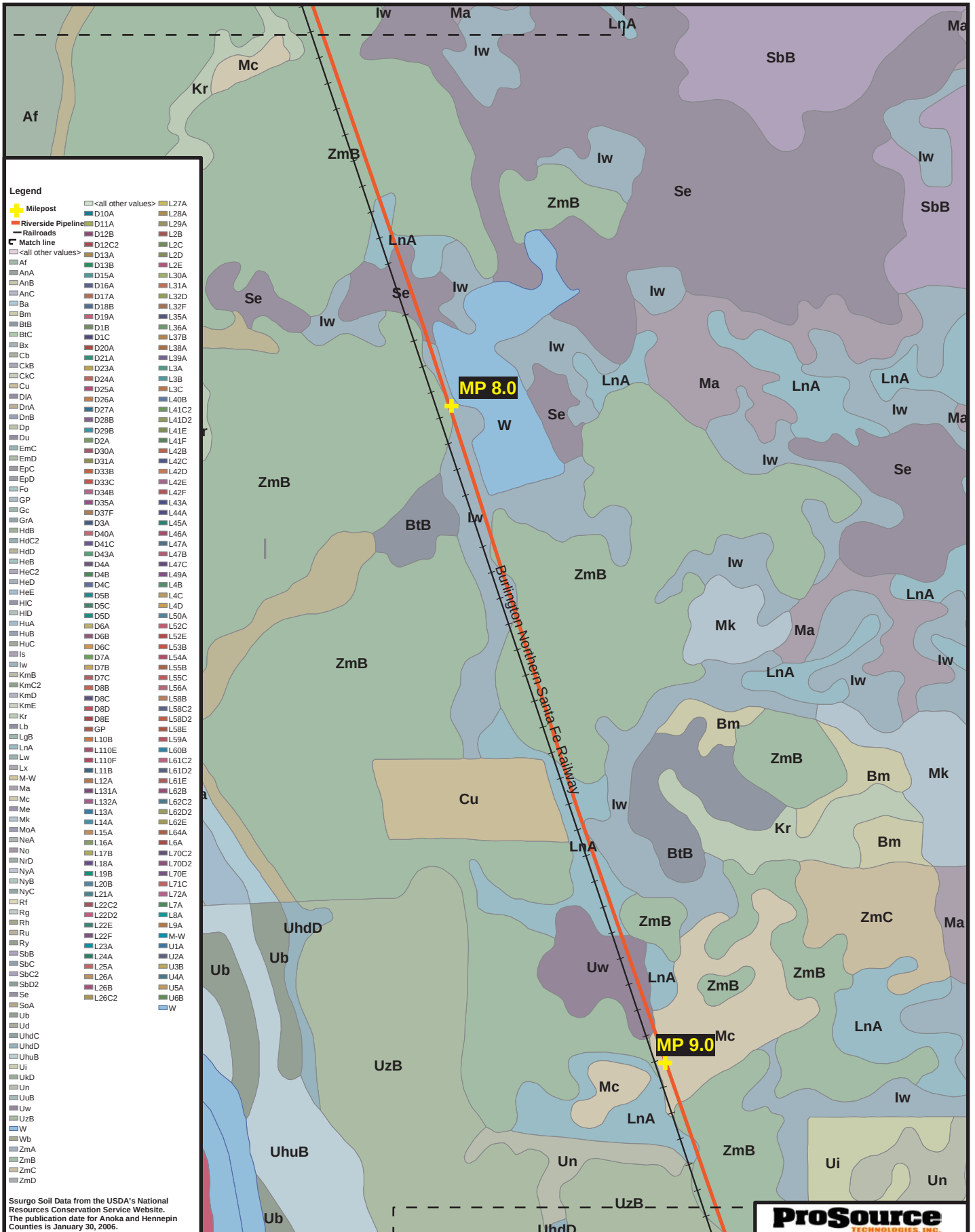
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 4 of 9


Legend
Milepost
Riverside Pipeline
Railroads
Match line
<all other values>
Af
AnA
AnB
AnC
Ba
Bm
BtB
BtC
Bx
Cb
CkB
CkC
Cu
DlA
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DnB
Dp
Du
EmC
EmD
EpC
EpD
Fo
GP
Gc
GrA
HdB
HdC2
HdD
HeB
HeC2
HeD
HeE
HlC
HlD
HuA
HuB
HuC
Is
Iw
KmB
KmC2
KmD
KmE
Kr
Lb
LgB
LnA
Lw
Lx
M-W
Ma
Mc
Me
Mk
MoA
NeA
No
NrD
NyA
NyB
NyC
Rf
Rg
Rh
Ru
Ry
SbB
SbC
SbC2
SbD2
Se
SoA
Ub
Ud
UhdC
UhdD
UhuB
Ui
UkD
Un
UuB
Uw
UzB
W
Wb
ZmA
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D11A
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L58B
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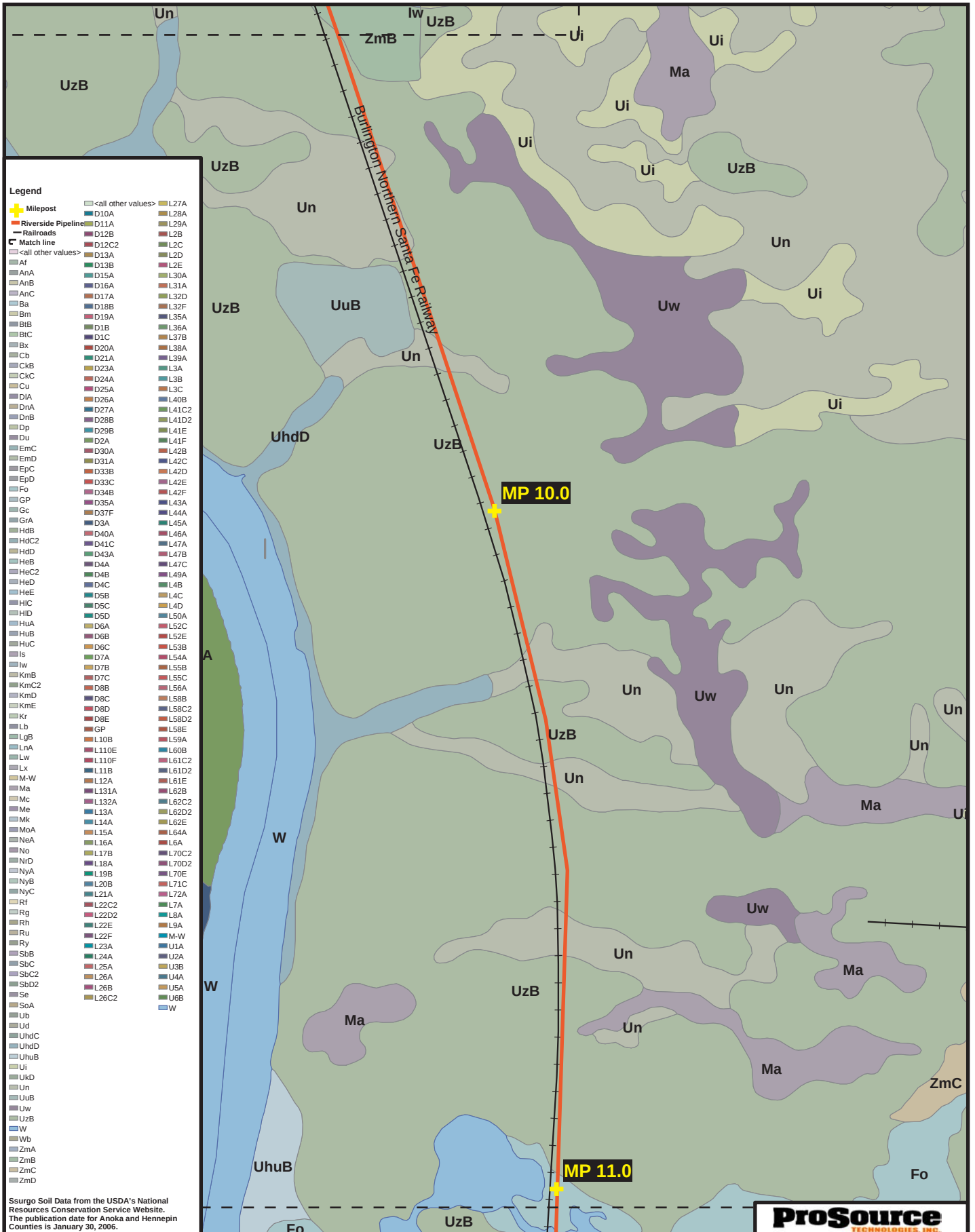
L58D2
L58E
L59A
L60B
L61C2
L61D2
L61E
L62B
L62C2
L62D2
L62E
L64A
L6A
L70C2
L70D2
L70E
L71C
L72A
L7A
L8A
L9A
M-W
U1A
U2A
U3B
U4A
U5A
U6B
W
Ssurgo Soil Data from the USDA's National Resources Conservation Service Website.
The publication date for Anoka and Hennepin Counties is January 30, 2006.
MP 8.0
MP 9.0
Burlington Northern Santa Fe Railway
CenterPoint Energy
ProSource Project No. 1001-00
N
CenterPoint Energy - Riverside Pipeline Project
Ssurgo Soils Map
0
1,000
2,000
3,000
Feet
ProSource TECHNOLOGIES, INC.
DATE ISSUED: 04/04/06
DATE REVISED:
SCALE: 1:12,000
DRAWN BY: Sheri Roadfeldt, EIT
SERIES: Map 5 of 9



Ssurgo Soil Data from the USDA's National Resources Conservation Service Website. The publication date for Anoka and Hennepin Counties is January 30, 2006.

ProSource TECHNOLOGIES, INC.

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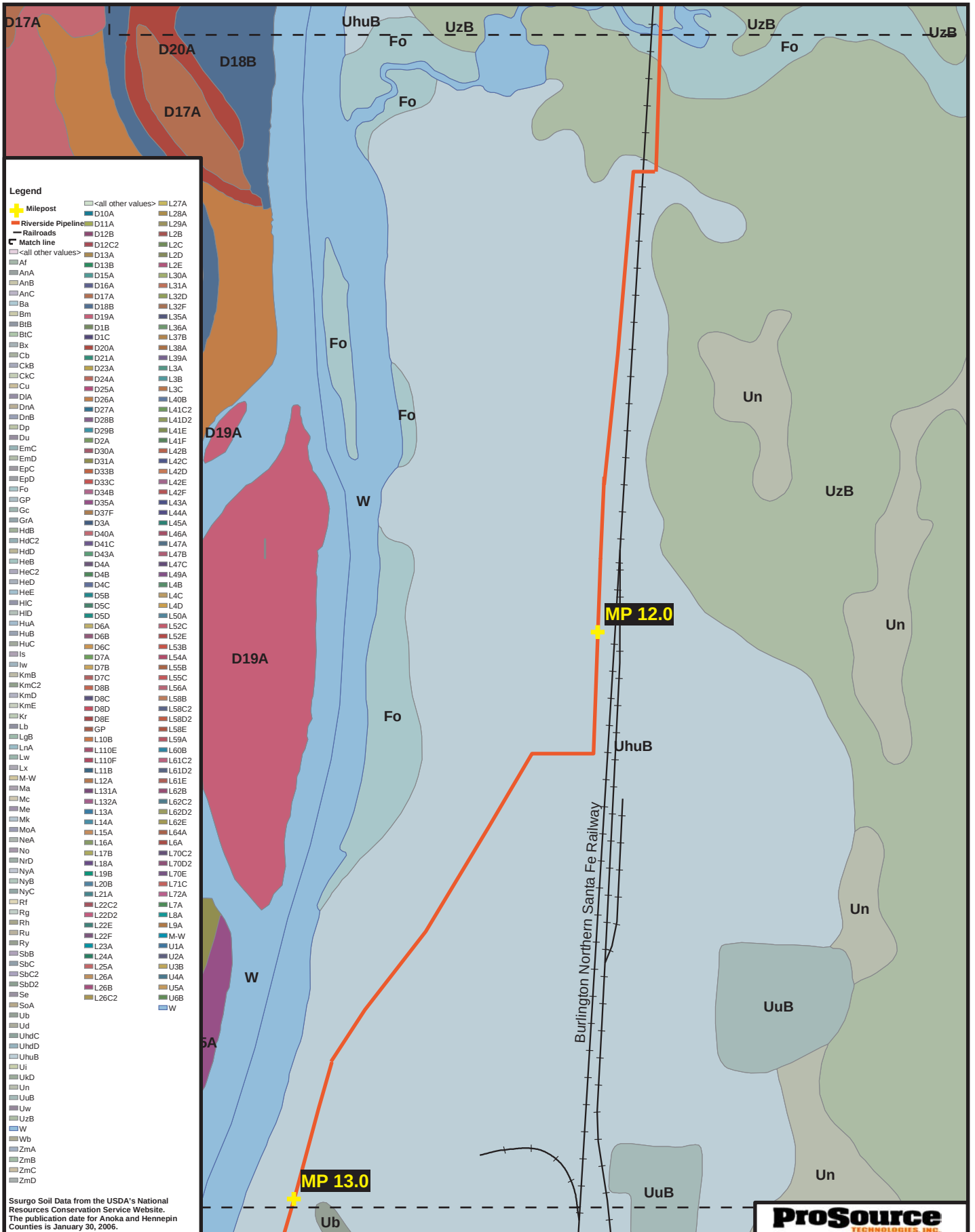
ProSource Project No. 1001-00

CenterPoint Energy - Riverside Pipeline Project

Ssurgo Soils Map

0 1,000 2,000 3,000 Feet

DATE ISSUED:	04/04/06
DATE REVISED:	
SCALE:	1:12,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 6 of 9



CenterPoint Energy

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ProSource Project No. 1001-00

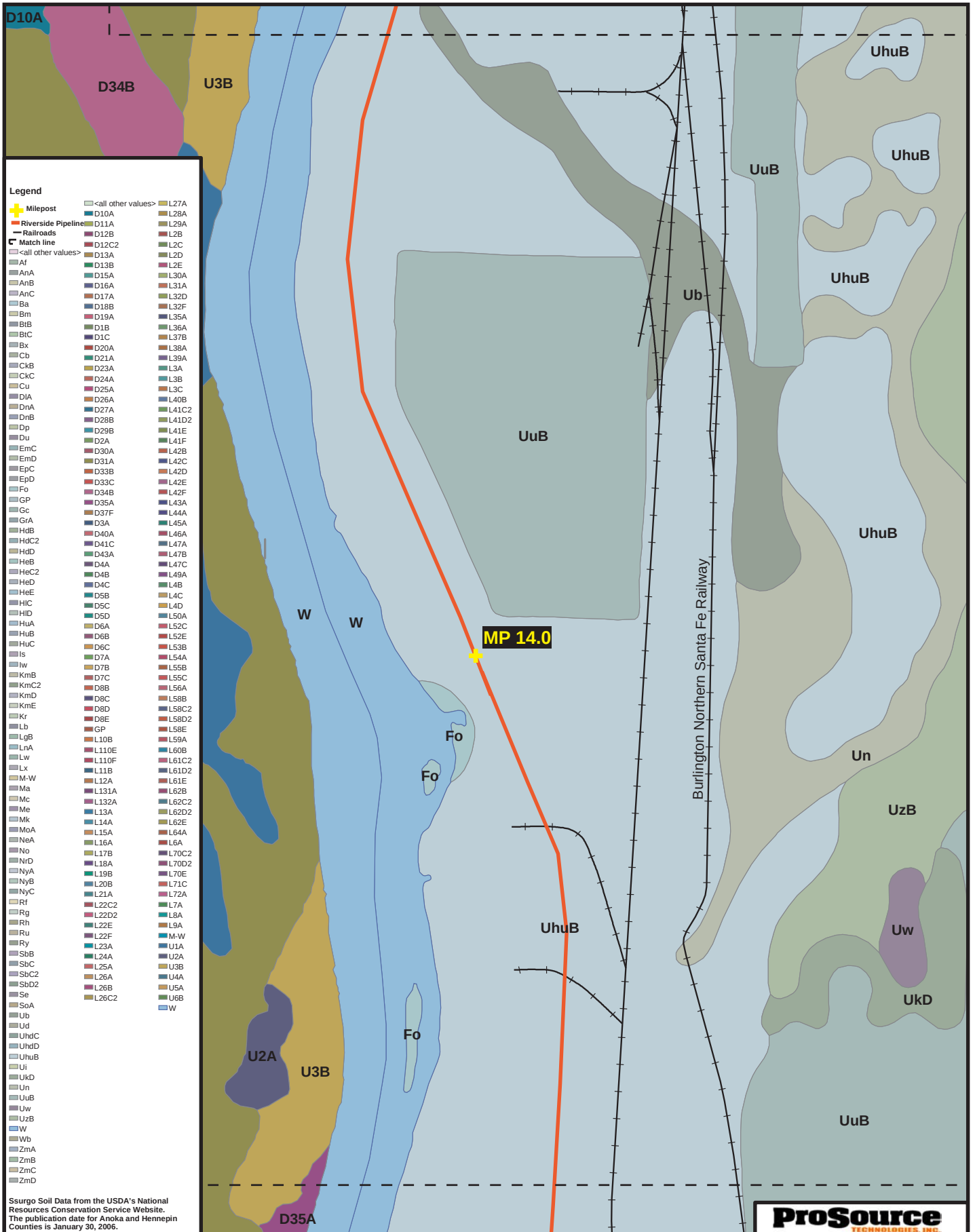
CenterPoint Energy - Riverside Pipeline Project

Ssurgo Soils Map

0 1,000 2,000 3,000 Feet

ProSource TECHNOLOGIES, INC.

DATE ISSUED:	04/04/06
DATE REVISED:	
SCALE:	1:12,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 7 of 9



Ssurgo Soil Data from the USDA's National Resources Conservation Service Website. The publication date for Anoka and Hennepin Counties is January 30, 2006.

CenterPoint Energy

N

ProSource Project No. 1001-00

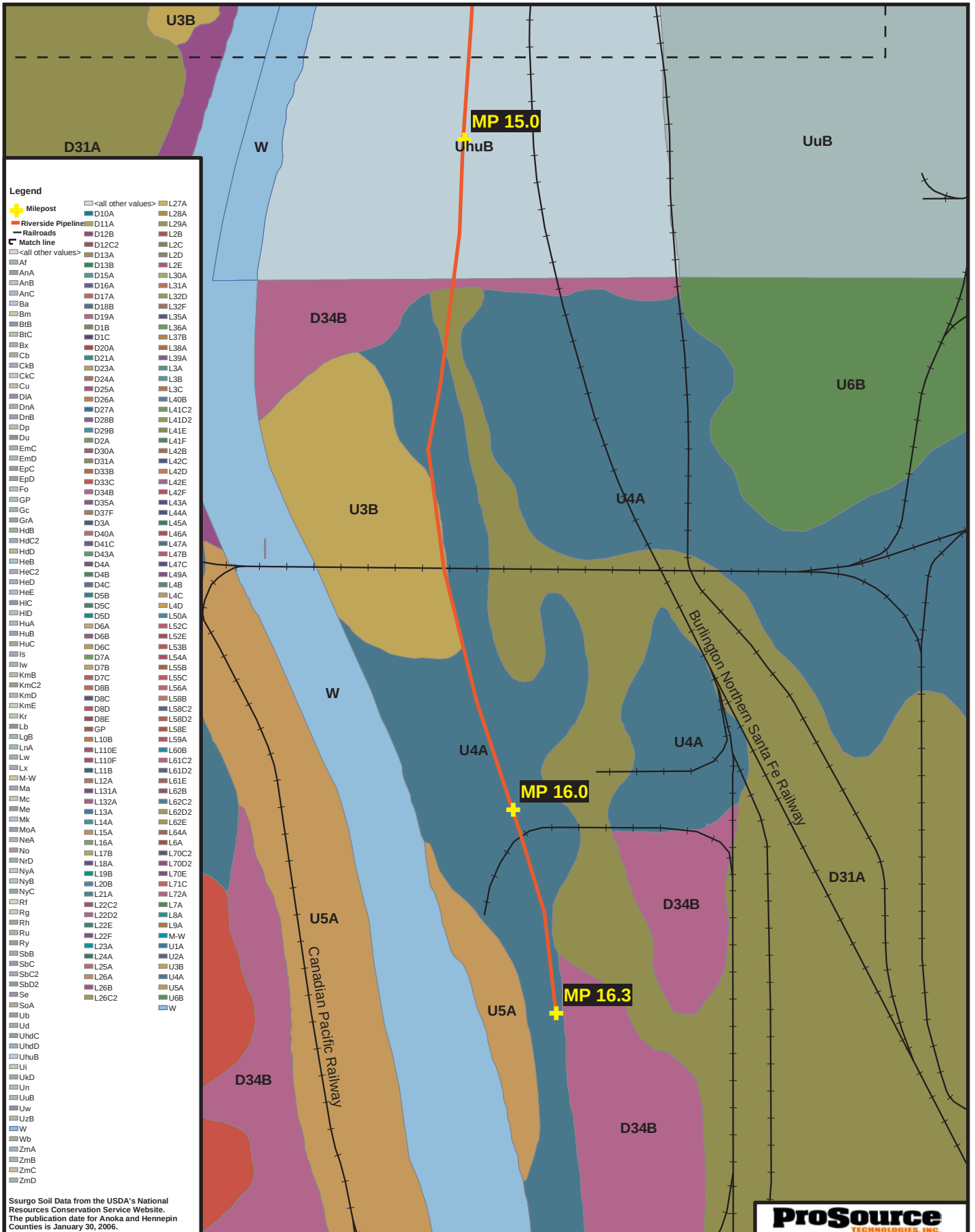
CenterPoint Energy - Riverside Pipeline Project

Ssurgo Soils Map

0 1,000 2,000 3,000 Feet

ProSource TECHNOLOGIES, INC.

DATE ISSUED:	04/04/06
DATE REVISED:	
SCALE:	1:12,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 8 of 9



Ssurgo Soil Data from the USDA's National Resources Conservation Service Website. The publication date for Anoka and Hennepin Counties is January 30, 2006.

CenterPoint Energy

N

ProSource Project No. 1001-00

CenterPoint Energy - Riverside Pipeline Project

Ssurgo Soils Map

0 1,000 2,000 3,000 Feet

ProSource TECHNOLOGIES, INC.

DATE ISSUED:	04/04/06
DATE REVISED:	
SCALE:	1:12,000
DRAWN BY:	Sheri Roadfeldt, EIT
SERIES:	Map 9 of 9

Soils Map – Key

Sb – Sartell fine sand

LnA – Lino loamy fine sand

Rf – Rifle mucky peat

Af – Alluvial land, mixed, frequently flooded

Zm – Zimmerman fine sand

Iw – Isanti fine sandy loam

Ma – Markey muck

Se – Seelyeville muck

Cu – Cut and fill land

Kr – Kratka loamy fine sand

Uw – Urban land-Udorthent, wet substratum complex

Mc – Marsh

Un – Urban land – Lino complex

UzB – Urban land-Zimmerman complex

Fo – Fordum-Winterfield complex

W- Water

UhuB – Urban land-Hubbard complex

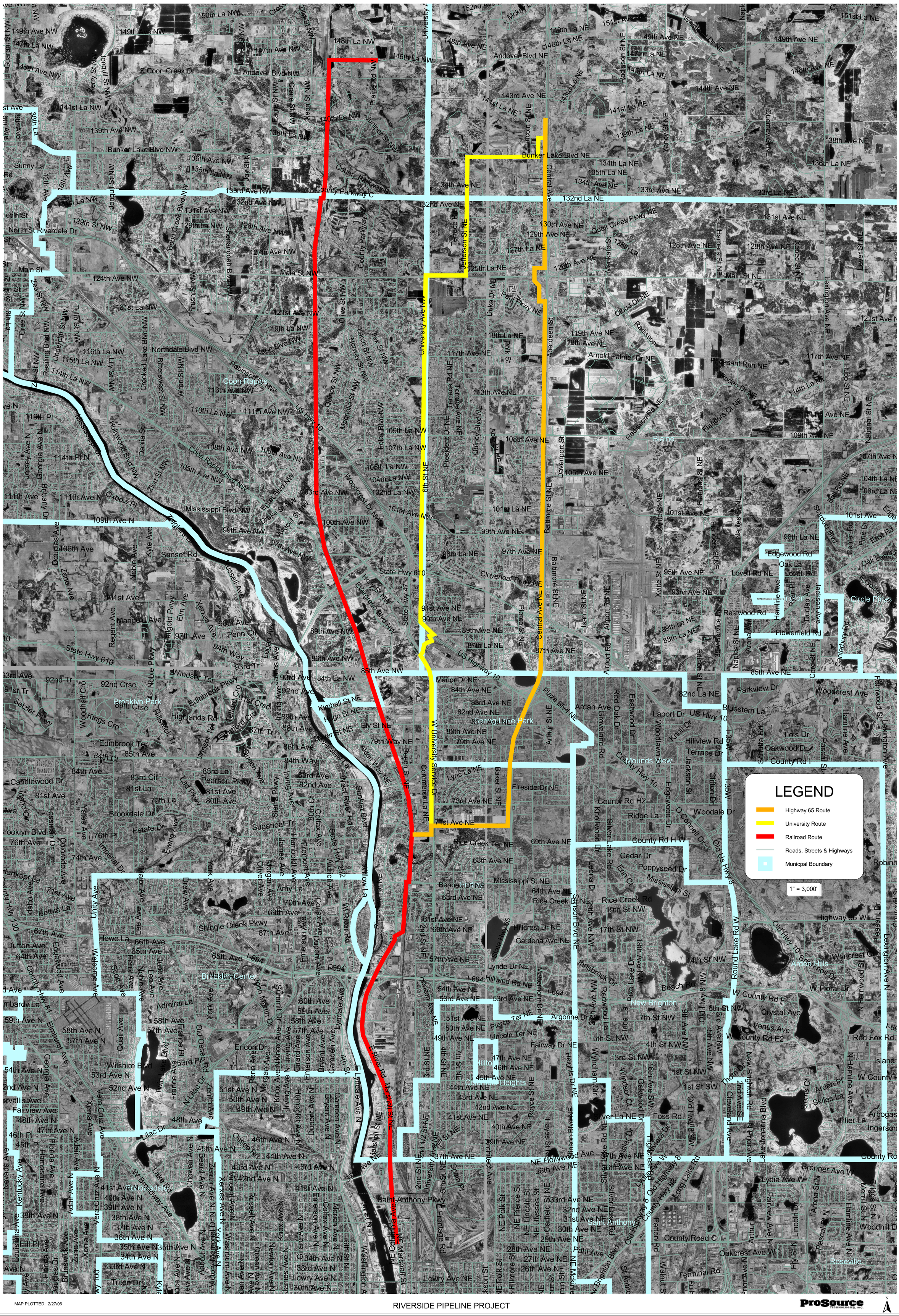
D34B – Urban land – Hubbard complex

D31A – Urban land – Duelm complex

U3B – Udorthents (cut and fill land), 0 – 6 percent slopes

U4A – Urban land-Udipsamments (cut and fill land) complex, 0-2 percent slopes

Route Alternatives Map



MAP PLOTTED: 2/27/06

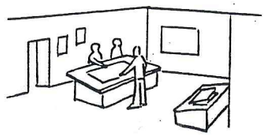
RIVERSIDE PIPELINE PROJECT

ProSource TECHNOLOGIES, INC.

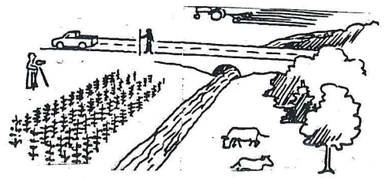
Appendix C – Typical Drawings

- **Typical Stages of Construction**
- **Cross-Section Typical Drawings**
- **Erosion Control Typical Drawings**

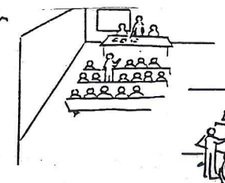
Typical Stages of Construction



CENTERPOINT ENERGY AND PROSOURCE TECHNOLOGIES, INC. PLAN THE PROJECT.



THE RIGHT-OF-WAY IS SURVEYED AND LANDOWNERS ARE CONTACTED.



PROSOURCE PERFORMS ENVIRONMENTAL REVIEW OF LAYOUT AND CHARACTERISTICS OF LAND ALONG RIGHT-OF-WAY.

PROSOURCE CONTACTS REGULATORY AGENCIES IN PREPARATION FOR REVIEW AND PUBLIC MEETINGS.

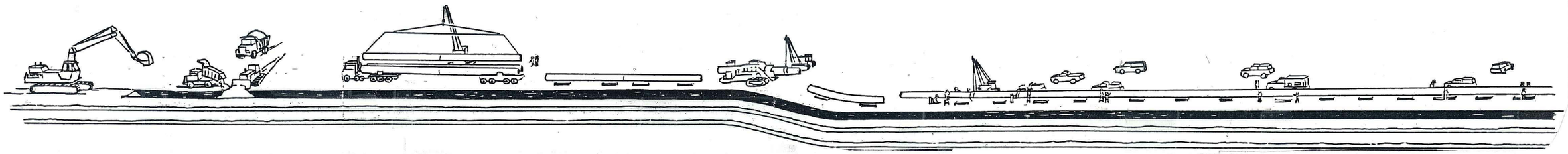
ENGINEERS DESIGN THE PIPELINE WITH ENVIRONMENTAL PROTECTION SAFEGUARDS.

PROSOURCE RIGHT-OF-WAY AGENTS CONTACT LANDOWNERS. ARRANGEMENTS ARE MADE FOR SITE-SPECIFIC NEEDS.

CONSTRUCTION BEGINS WITH CLEARING AND GRADING. SPECIALIZED AND LOCAL CONSTRUCTION WORKERS ARE HIRED.

TOPSOIL IS SEPERATED AS NECESSARY AND EROSION CONTROL MEASURES ARE PUT IN PLACE. ENVIRONMENTAL AND SAFETY INSPECTIONS BEGIN.

SPECIAL CROSSING PROCEDURES USED TO SAFEGUARD THE ENVIRONMENT.



CONSTRUCTION CREWS PREPARE THE DITCH FOR THE PIPE.

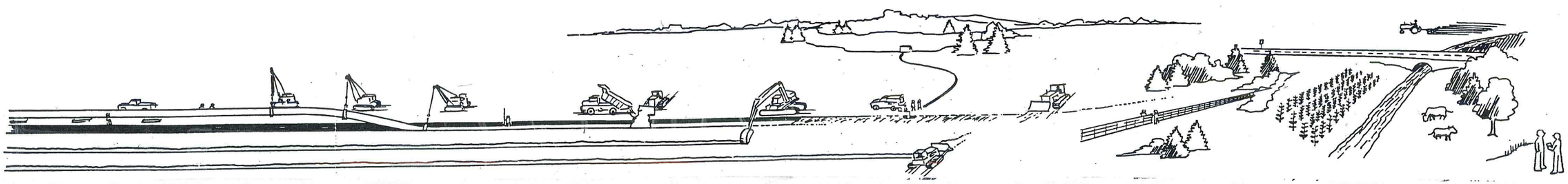
CREWS LAY OUT PIPE SECTIONS.

PIPE IS BENT TO FIT THE TERRAIN OR MEET SPECIAL NEEDS.

WELDERS JOIN THE PIPES TOGETHER.

SAFETY AND PIPELINE INTEGRITY PROCEDURES INCLUDE X-RAY INSPECTION AND WELD CERTIFICATION.

PIPELINE JOINTS ARE COATED AND INSPECTED.



WORKERS LOWER PIPE INTO SPECIALLY PREPARED DITCH.

THE DITCH IS BACKFILLED AND TOPSOIL REPLACED.

THE FINAL PHASE OF CONSTRUCTION INCLUDES TESTING OF THE PIPELINE, PIPELINE INSPECTION AND START-UP.

LAND IS RESEEDED, CONTOURED AND RESTORED WITH LANDOWNERS APPROVAL.

PROSOURCE CONTACTS LANDOWNERS TO DISCUSS ANY CONCERNS.

CenterPoint Energy

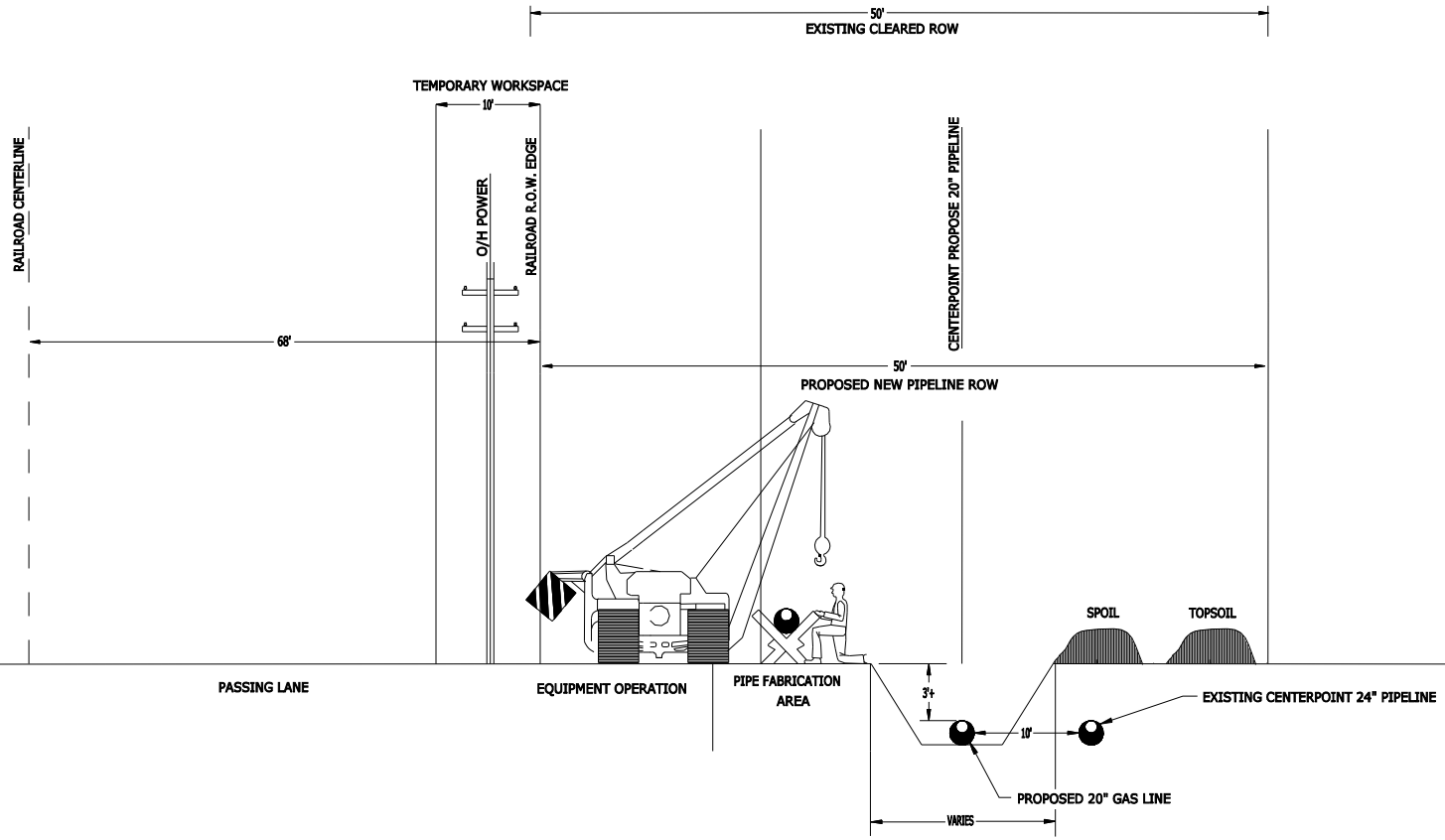
TYPICAL STAGES OF PIPELINE CONSTRUCTION

ProSource TECHNOLOGIES, INC.

CENTERPOINT ENERGY
Riverside Pipeline Project
ProSource Project No.: 1001-00

Cross-Section Typical Drawings

PRELIMINARY CONSTRUCTION DRAWING
ADJACENT TO RAILROAD



CONSTRUCTION CROSS SECTION

CenterPoint Energy

NOTE: THIS IS NOT A SCALE DRAWING.

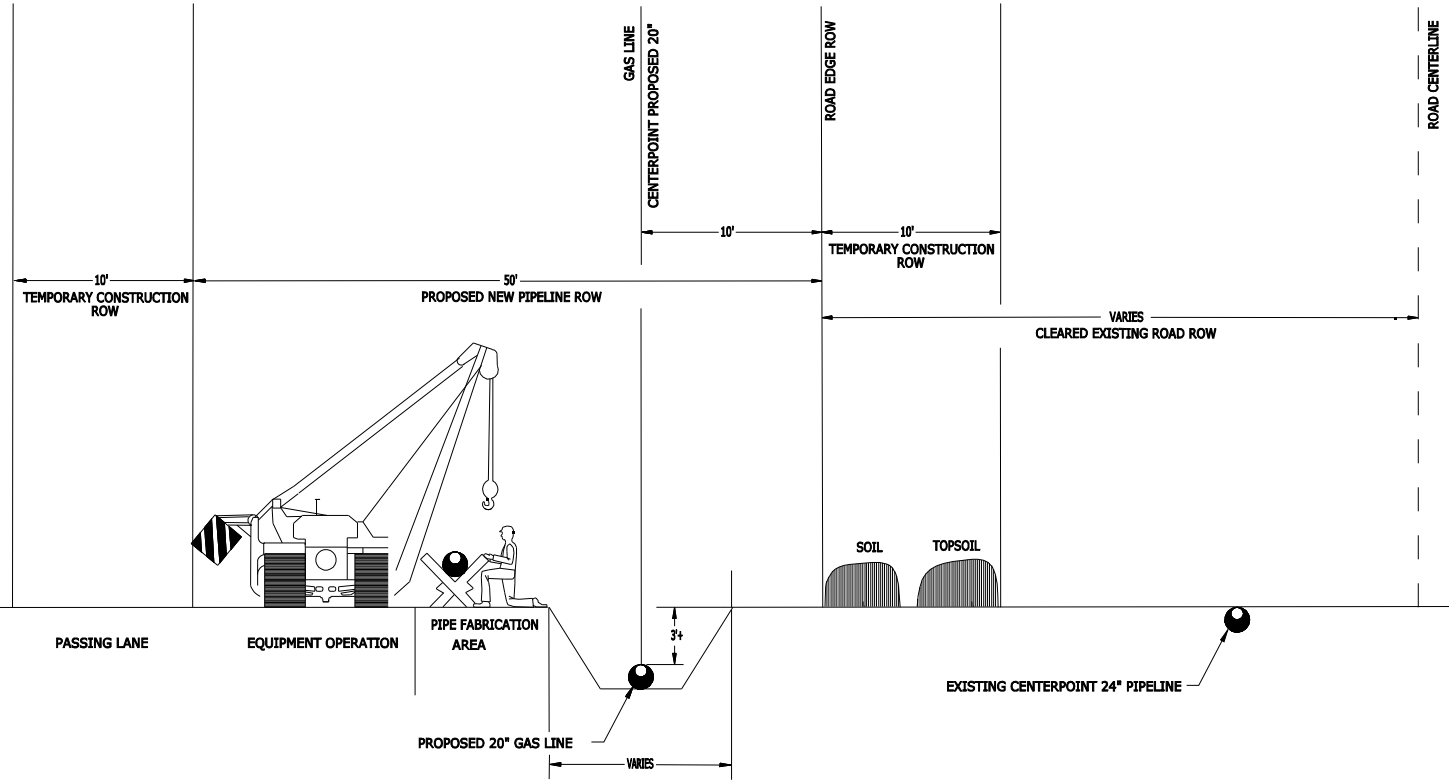
DATE: 3/3/06

CENTERPOINT ENERGY
Riverside Pipeline Project
ProSource Project No.: 1001-00

TYPICAL RIGHT-OF-WAY
CROSS SECTION
ADJACENT TO RAILROAD

ProSource TECHNOLOGIES, INC.

PRELIMINARY CONSTRUCTION DRAWING
ADJACENT TO ROAD



CONSTRUCTION CROSS SECTION

CenterPoint Energy

NOTE: THIS IS NOT A SCALE DRAWING.

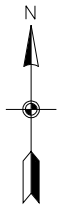
DATE: 3/3/06

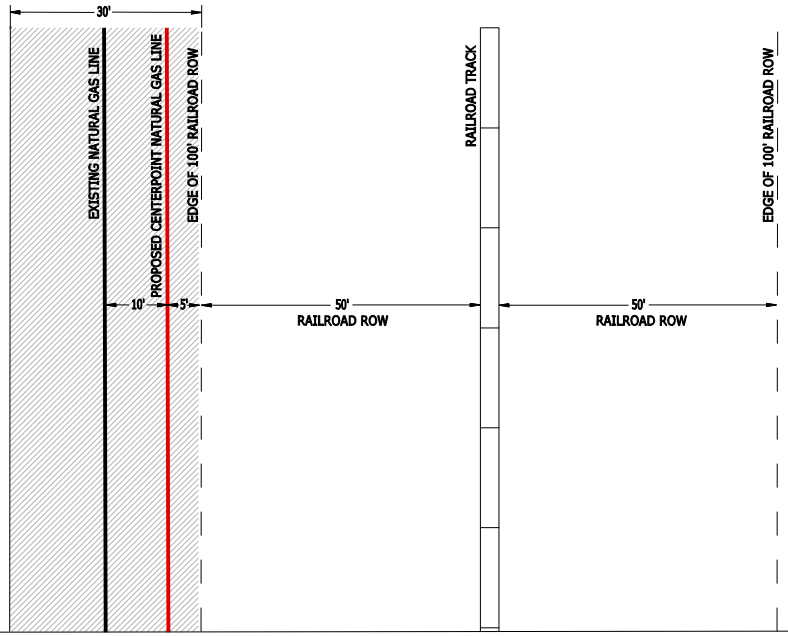
CENTERPOINT ENERGY
Riverside Pipeline Project
ProSource Project No.: 1001-00

TYPICAL RIGHT-OF WAY
ADJACENT TO ROAD

ProSource TECHNOLOGIES, INC.

PRELIMINARY ROUTE DRAWING
ADJACENT TO RAILROAD ROW





TOPVIEW - 100' RAILROAD RIGHT OF WAY

CenterPoint Energy

NOTE: THIS IS NOT A SCALE DRAWING.

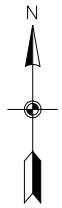
DATE: 4/3/06

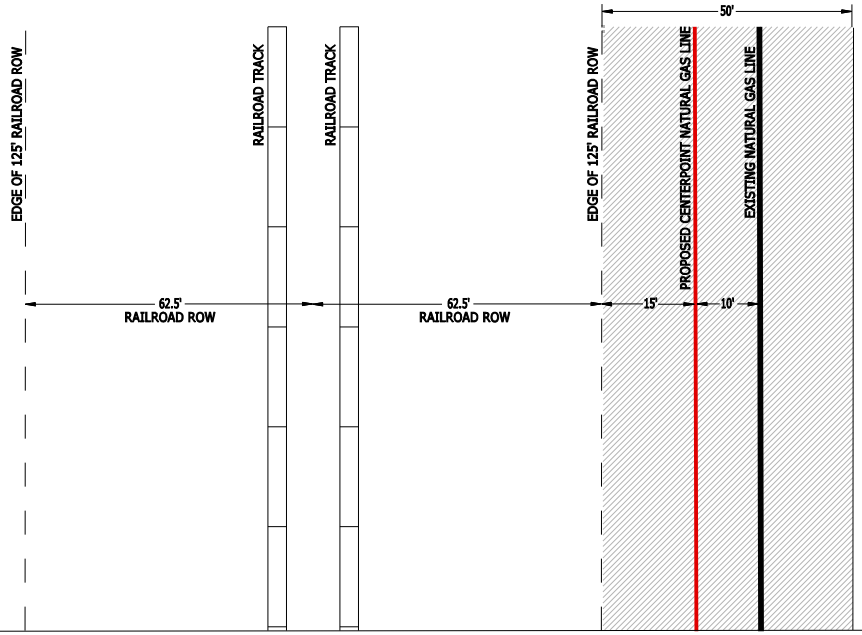
CENTERPOINT ENERGY
Riverside Pipeline Project
ProSource Project No.: 1001-00

TYPICAL PIPELINE LOCATION
ADJACENT TO WEST
SIDE OF RAIL

ProSource TECHNOLOGIES, INC.

PRELIMINARY ROUTE DRAWING
ADJACENT TO RAILROAD ROW





TOPVIEW - 125' RAILROAD RIGHT OF WAY

CenterPoint Energy

NOTE: THIS IS NOT A SCALE DRAWING.

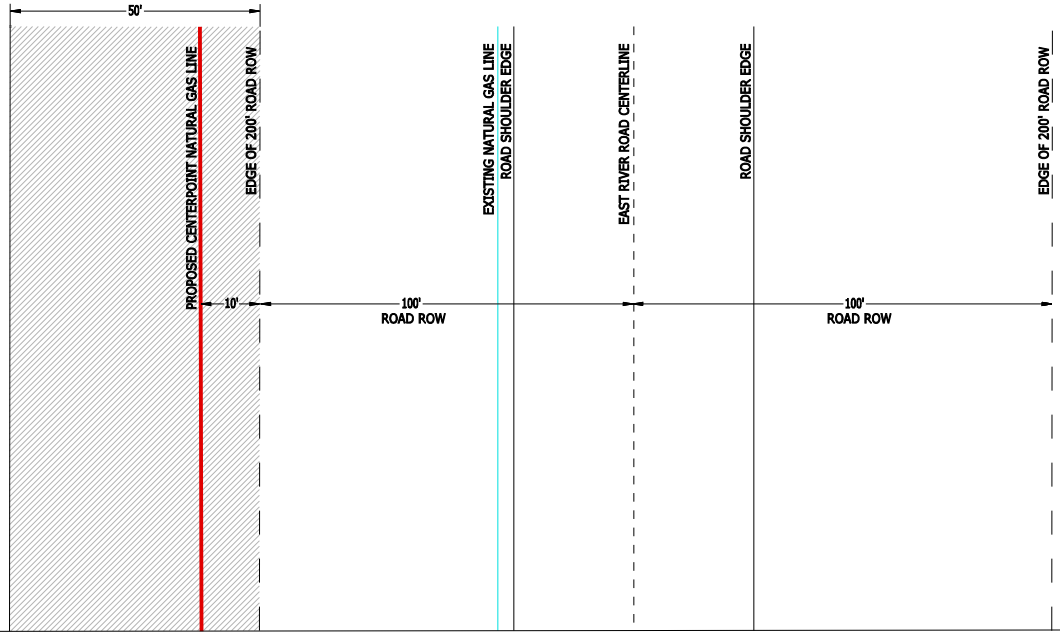
DATE: 4/3/06

CENTERPOINT ENERGY
Riverside Pipeline Project
ProSource Project No.: 1001-00

TYPICAL PIPELINE LOCATION
ADJACENT TO EAST
SIDE OF RAIL

ProSource TECHNOLOGIES, INC.

PRELIMINARY ROUTE DRAWING
ADJACENT TO EAST RIVER ROAD ROW



TOPVIEW - 200' EAST RIVER ROAD RIGHT OF WAY

CenterPoint Energy

NOTE: THIS IS NOT A SCALE DRAWING.

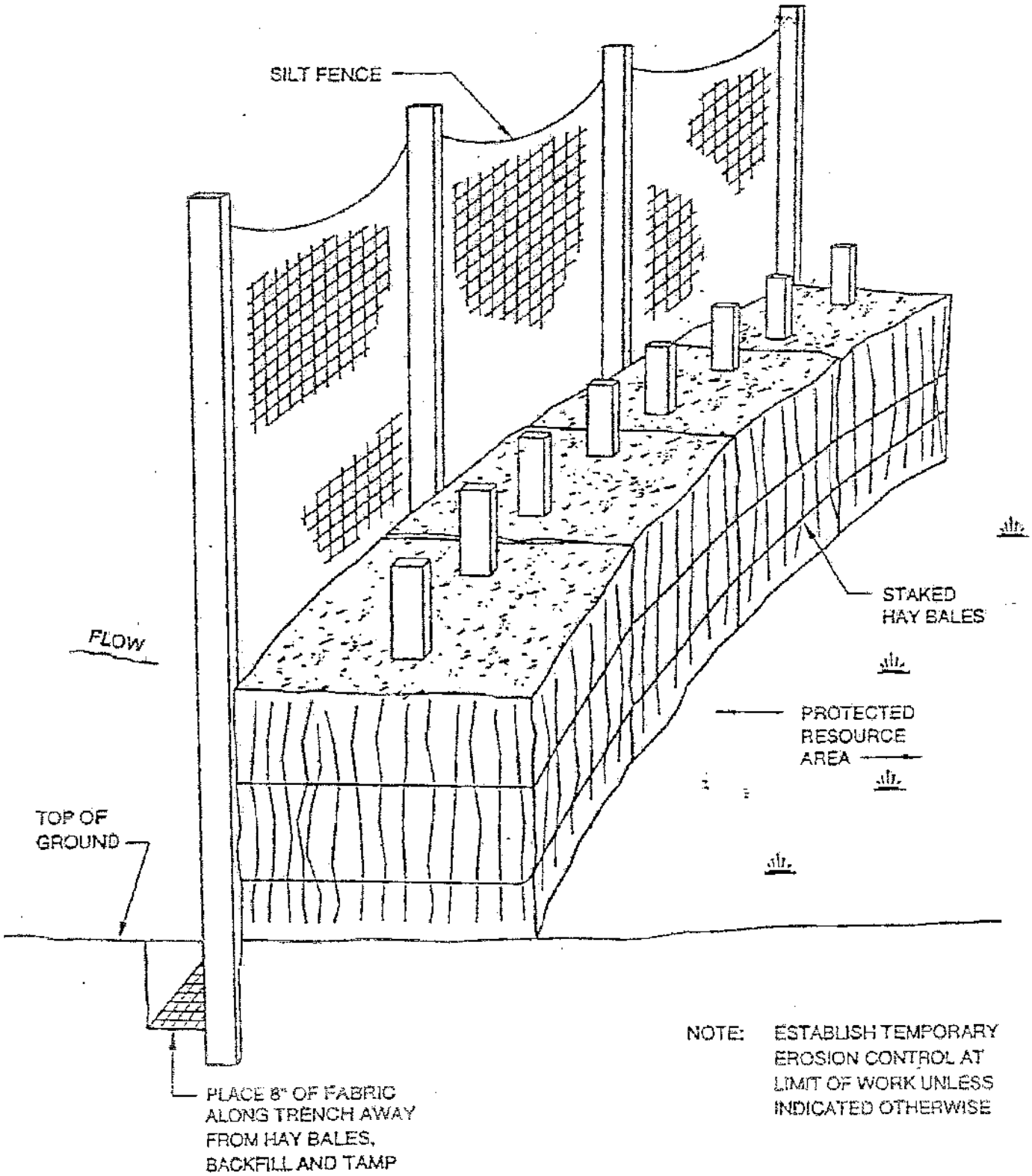
DATE: 4/3/06

CENTERPOINT ENERGY
Riverside Pipeline Project
ProSource Project No.: 1001-00

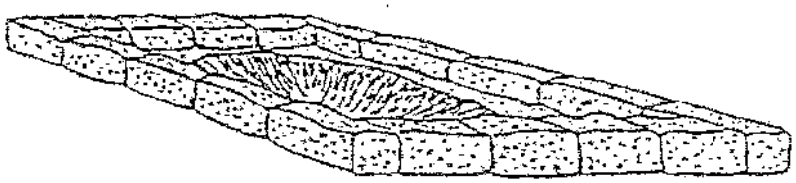
TYPICAL PIPELINE LOCATION
ADJACENT TO WEST SIDE
OF EAST RIVER ROAD

ProSource TECHNOLOGIES, INC.

Erosion Control Typical Drawings

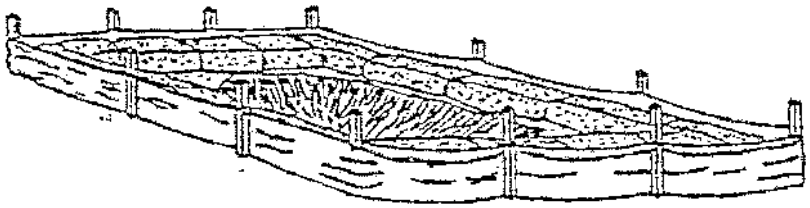


CenterPoint Energy	CENTERPOINT ENERGY Riverside Pipeline Project ProSource Project No.: 1001-00	HAY BALE & SILT FENCE EROSION CONTROL ProSource TECHNOLOGIES, INC.



STEP 1

ON LEVEL LAND, DIG A SUMP DEPENDING ON ACTUAL FLOW RATES APPROXIMATELY 200 SQ. FT., WHICH IS 2' DEEP AT THE CENTER. LAY A LAYER OF STRAW BALES AS SHOWN, TO COMPLETELY SURROUND THE SUMP.

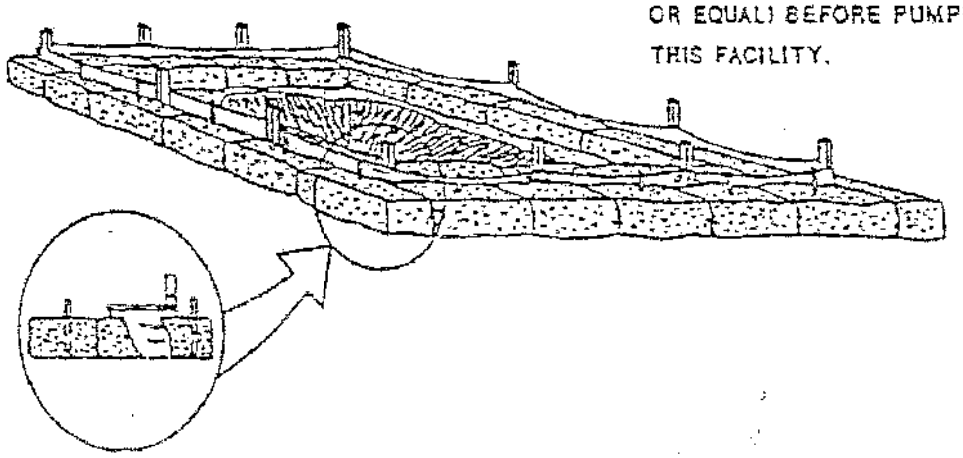


STEP 2

INSTALL SILT FENCE ALL AROUND THE HAY BALES. (IF LAND IS LEVEL) DIG IN SILT FENCE 6"

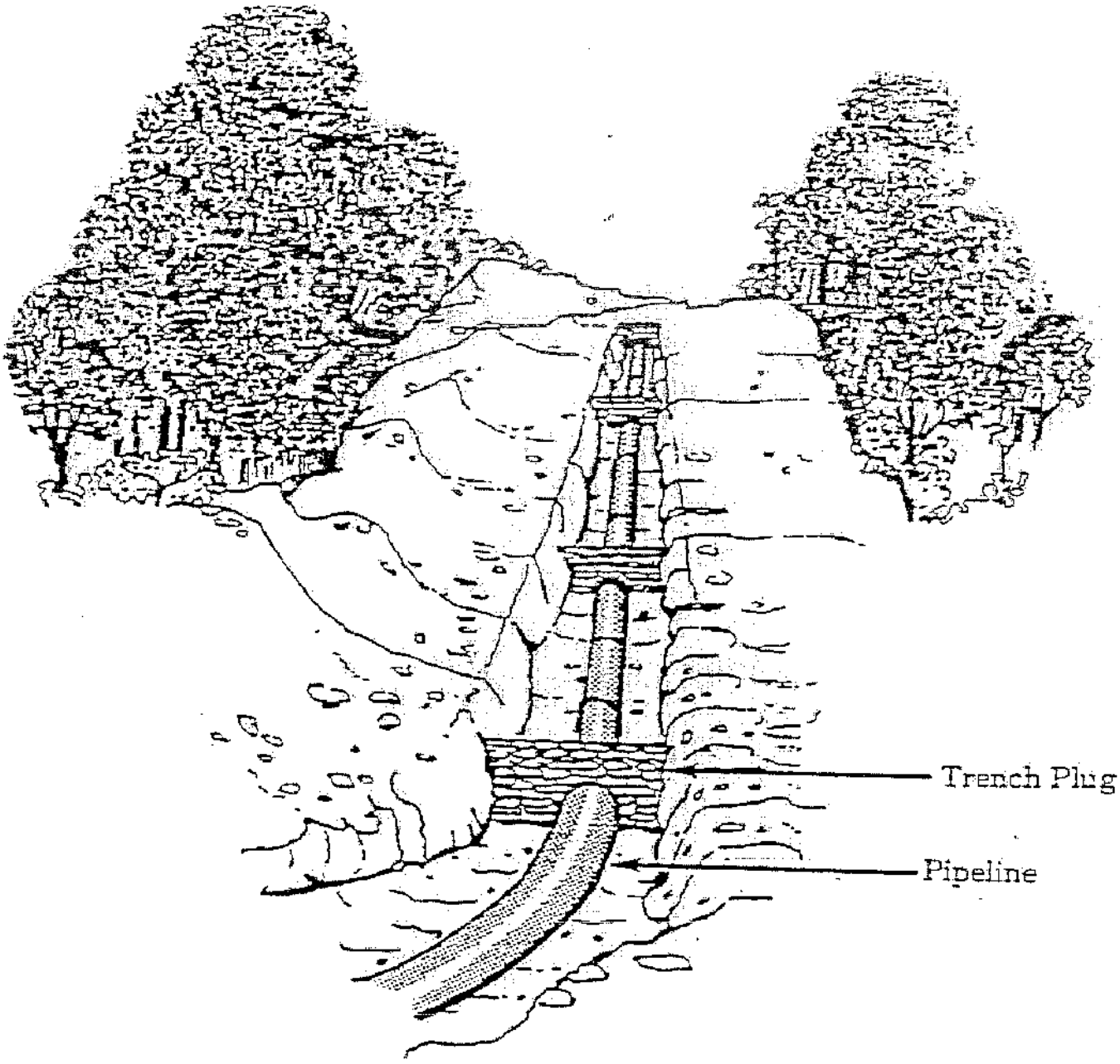
STEP 3

INSTALL AN OUTER LAYER OF BALES AROUND THE SILT FENCE, AND SECURE EACH BALE USING EITHER A REBAR OR WOODEN STAKE. COVER THE ENTIRE SUMP WITH HI-VELOCITY EROSION CONTROL FABRIC (CURLEX OR EQUAL) BEFORE PUMPING THE WATER INTO THIS FACILITY.



NOTE: PUMP INTAKE HOSE MUST NOT BE ALLOWED TO REST ON THE TRANCH BOTTOM THROUGHOUT DEWATERING. PROVISIONS MUST BE MADE TO ELEVATE THE INLET HOSE TO AT LEAST ONE FOOT ABOVE THE TRENCH BOTTOM UNTIL BOTTOM DEWATERING IS NECESSARY.

CenterPoint Energy	CENTERPOINT ENERGY Riverside Pipeline Project ProSource Project No.: 1001-00	EROSION CONTROL & HYDROSTATIC TEST DEWATERING ProSource TECHNOLOGIES, INC.



CenterPoint Energy	CENTERPOINT ENERGY Riverside Pipeline Project ProSource Project No.: 1001-00	TRENCH BREAKERS ProSource TECHNOLOGIES, INC.

Appendix D – Tables

- **Stream Crossing**
- **Wetland Crossing**
- **Soils**

Stream Crossing Table

Riverside Pipeline Project - Stream Crossing Table

Stream Name	Approximate Mile Post	Intermittent/Perennial *
Unnamed tributary	0.8	Intermittent
Unnamed tributary/County Ditch 20	0.9	Intermittent
Coon Creek	1.5	Perennial
Sand Creek	4.4	Perennial
Unnamed tributary	5.2	Intermittent
Coon Creek	5.5	Perennial
Unnamed tributary	5.8	Intermittent
Unnamed ditch	6.1	Intermittent
Unnamed tributary	6.9	Intermittent
Unnamed tributary	8.1	Intermittent
Unnamed tributary/Ditch No. 17	9.0	Intermittent
Unnamed tributary	9.8	Intermittent
Rice Creek	11.0	Perennial

* According to United States Geological Survey 7.5 – Minute Topographic Series Maps – Coon Rapids and Minneapolis North Quadrangle Maps.

Wetland Crossing Table

Riverside Pipeline Project - Wetland Crossing Table

Approximate Milepost	Wetland Type [A]	Approximate Crossing Distance (feet)	Area Affected by Temporary Workspace (acres) [B]	Area Affected by Permanent Right-of-Way (acres) [C]
0.95	PEMCd	465	.11	.53
1.53	PEMC	312	.07	.36
1.63	PEM/SS1C	300	.07	.34
2.24	PSS1/EMB	300	.07	.34
3.83	PSS6Cd	400	.09	.46
4.0	PEMCd	640	.15	.73
4.4	PSS1C	140	.03	.16
4.53	PSS1/EMB	150	.03	.17
4.58	PSS1/EMB	250	.06	.29
4.67	PEM/F01Bd	610	.14	.70
4.95	PF01/EMB	580	.13	.67
5.21	PUBF	100	.02	.11
5.45	PF01B	660	.15	.76
5.58	PSS1/EMB	700	.16	.80
5.83	PSS1B	240	.06	.28
7.0	PEM/FO1B	200	.05	.23
9.0	PEMFd	400	.09	.46
9.32	PEMCd	120	.03	.14
11.0	PUBGh	300	.07	.34
Totals		**6,867 feet**	**1.58 acres**	**7.87 acres**

Notes:

A. Cowardin Classification System:
PEM – Palustrine Emergent
PUB – Palustrine Unconsolidated Bottom
PFO – Palustrine Forested
PSS – Palustrine Scrub-shrub

Subclass – Emergent
1. Persistent
2. Non-Persistent

Subclass – Forested
1. Broad-leaved Deciduous
2. Needle-leaved Deciduous
3. Broad-leaved Evergreen
4. Needle-leaved Evergreen
5. Dead

B. Temporary Workspace - Acreage Based on 10 foot-wide temporary workspace.

Subclass - Scrub-shrub
1. Broad-leaved Deciduous
2. Needle-leaved Deciduous
3. Broad-leaved Evergreen
4. Needle-leaved Evergreen
5. Dead

C. Permanent Right-of-Way - Acreage Based on 50-foot-wide permanent right-of-way.

Soils Table

Riverside Pipeline Project – Soils Table

Approximate Beginning Milepost	Approximate Ending Milepost	Soil Code	Approximate Distance (feet)
0.00	0.53	SbB	2795
0.53	0.54	LnA	81
0.54	1.00	Rf	2380
1.00	1.47	SbB	2529
1.47	1.57	Af	508
1.57	1.59	ZmC	87
1.59	1.63	ZmB	247
1.63	1.67	Iw	204
1.67	1.70	SbC2	161
1.70	1.77	ZmB	378
1.77	2.14	SbB	1954
2.14	2.19	Iw	260
2.19	2.23	LnA	195
2.23	2.27	Iw	196
2.27	2.35	SbD2	440
2.35	2.39	SbC2	226
2.39	2.45	SbD2	290
2.45	2.54	SbB	454
2.54	2.65	SbD2	587
2.65	2.93	SbB	1488
2.93	3.08	SbC2	827
3.08	3.16	SbB	380
3.16	3.40	SbC2	1309
3.40	3.52	ZmB	590
3.52	3.54	Iw	113
3.54	3.68	ZmB	764
3.68	3.78	Rf	508
3.78	3.83	ZmB	269
3.83	3.90	Ma	352
3.90	3.92	LnA	148
3.92	3.97	Rf	229
3.97	4.04	LnA	361
4.04	4.10	ZmB	325
4.10	4.19	LnA	504
4.19	4.28	ZmB	434
4.28	4.31	Se	178
4.31	4.37	ZmB	326
4.37	4.39	ZmC	95
4.39	4.44	Af	265
4.44	4.46	ZmB	112

Approximate Beginning Milepost	Approximate Ending Milepost	Soil Code	Approximate Distance (feet)
4.46	4.52	Se	304
4.52	4.59	ZmB	386
4.59	4.63	Ma	230
4.63	4.68	ZmB	226
4.68	4.81	Ma	682
4.81	4.90	ZmB	494
4.90	4.98	Ma	409
4.98	5.08	Cu	529
5.08	5.15	ZmB	365
5.15	5.17	Se	130
5.17	5.19	ZmB	95
5.19	5.21	Ma	91
5.21	5.24	Af	174
5.24	5.40	ZmB	851
5.40	5.47	ZmD	373
5.47	5.96	Af	2565
5.96	6.03	ZmB	395
6.03	6.12	Kr	473
6.12	6.18	ZmB	295
6.18	6.28	Af	526
6.28	6.32	ZmC	208
6.32	6.36	Cu	234
6.36	6.41	ZmB	269
6.41	6.43	ZmC	100
6.43	6.49	Af	304
6.49	6.63	ZmB	760
6.63	6.73	Iw	517
6.73	6.76	LnA	168
6.76	6.81	Iw	281
6.81	6.90	LnA	451
6.90	6.97	Cu	378
6.97	7.05	ZmB	433
7.05	7.14	LnA	464
7.14	7.24	ZmB	542
7.24	7.30	Ma	274
7.30	7.71	ZmB	2172
7.71	7.78	LnA	397
7.78	7.93	Se	783
7.93	8.02	Iw	452
8.02	8.05	ZmB	155
8.05	8.23	Iw	965
8.23	8.28	ZmB	258
8.28	8.35	Iw	364
8.35	8.59	ZmB	1258
8.59	8.67	LnA	443
8.67	8.68	Iw	65
8.68	8.84	LnA	828
8.84	8.98	Uw	771
8.98	9.10	Mc	589

Approximate Beginning Milepost	Approximate Ending Milepost	Soil Code	Approximate Distance (feet)
9.10	9.15	ZmB	287
9.15	9.18	LnA	139
9.18	9.30	ZmB	645
9.30	9.47	UzB	914
9.47	9.52	Un	251
9.52	9.54	UzB	129
9.54	9.64	Un	492
9.64	9.77	UzB	717
9.77	9.82	Un	243
9.82	10.24	UzB	2205
10.24	10.29	Un	258
10.29	10.41	UzB	641
10.41	10.44	Un	194
10.44	10.63	UzB	996
10.63	10.69	Un	317
10.69	11.01	UzB	1672
11.01	11.09	Fo	438
11.09	11.10	W	57
11.10	11.14	Fo	208
11.14	11.29	UzB	786
11.29	15.22	UhuB	20765
15.22	15.24	D34B	70
15.24	15.33	D31A	494
15.33	15.52	U4A	1002
15.52	15.77	U3B	1295
15.77	16.32	U4A	2921

*** Soil Unit Name**

Sb – Sartell fine sand

LnA – Lino loamy fine sand

Rf – Rifle mucky peat

Af – Alluvial land, mixed, frequently flooded

Zm – Zimmerman fine sand

Iw – Isanti fine sandy loam

Ma – Markey muck

Se – Seelyeville muck

Cu – Cut and fill land

Kr – Kratka loamy fine sand

Uw – Urban land-Udorthent, wet substratum complex

Mc – Marsh

Un – Urban land – Lino complex

UzB – Urban land-Zimmerman complex

Fo – Fordum-Winterfield complex

W- Water

UhuB – Urban land-Hubbard complex

D34B – Urban land – Hubbard complex

D31A – Urban land – Duelm complex

U3B – Udorthents (cut and fill land), 0 – 6 percent slopes

U4A – Urban land-Udipsamments (cut and fill land) complex, 0-2 percent slopes

Appendix E – Riverside Repowering Project

Fact Sheet

RIVERSIDE REPOWERING PROJECT

Introduction

In May 2002, Xcel Energy proposed a bold and visionary plan called the Minnesota Metro Emissions Reduction Project (MERP) to significantly reduce air emissions from three Twin Cities coal-powered generating plants while increasing the amount of electricity they can produce. The Minnesota Public Utilities Commission authorized our proposal in December 2003.

Through MERP, Xcel Energy will install state-of-the-art emissions control equipment at the Allen S. King plant in Oak Park Heights, Minn., and convert the High Bridge plant in St. Paul and Riverside plant in Minneapolis from coal to natural gas. The package of improvements, valued at nearly $1 billion, will be completed in 2009.

This fact sheet provides information about the Riverside Repowering Project.

Riverside Repowering Project Summary

The Riverside generating plant has been a fixture and visible presence in Minneapolis since 1911, and it remains a critical source of electricity for downtown Minneapolis and the surrounding communities.

The Riverside Repowering Project involves repowering our existing Riverside coal fired power plant with a natural gas combined cycle power plant. The repowered plant will utilize two combustion turbines with their corresponding heat recovery steam generators to supply steam to the existing Unit 7 steam turbine. The other steam turbine as well as the existing coal fired boilers will be removed from service upon completion of the project.

The combustion turbines, heat recovery steam generators and accessory equipment will be located in previously retired areas of the plant. Xcel Energy has begun the work to prepare these areas for demolition this winter with the intent of starting new construction in the summer of 2006.

The new unit will operate cleaner and more efficiently than the existing coal-powered units. As a result, air emissions will be significantly reduced, while electricity output from the Riverside site will be increase by approximately 73 megawatts – enough electricity to supply more than 70,000 typical homes.

Environmental benefits

The Riverside project will reduce annual air emissions from the site by approximately the following amounts:

Sulfur dioxide (SO2) – 99%

Nitrogen oxide (NOx) – 96%

Particulates – 86%

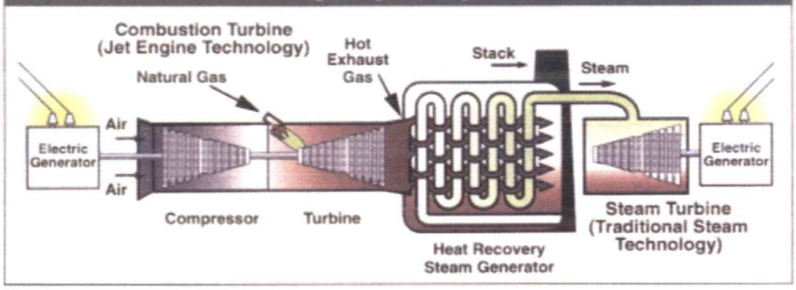
Mercury – 100%

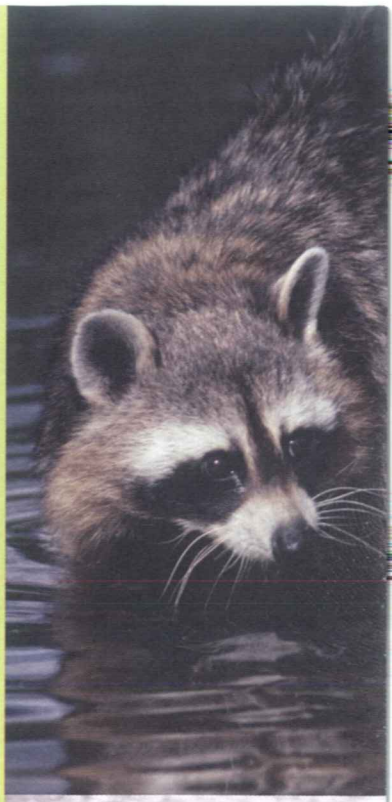
Combined cycle turbine design

A natural gas-fired, combined-cycle plant produces electricity by two processes of energy instead of one. Natural gas is used as the fuel in a combustion turbine, which operates on technical principles similar to a jet engine. Exhaust gases from the combustion turbine are also used to make steam in a heat recovery steam generator. Both processes then drive turbines and electric generators to produce electricity (see diagram).

Integrating combustion turbine and steam turbine technology provides an extremely efficient electricity production process. Combined-cycle technology is about 60 percent more efficient than a traditional coal-fired steam power plant.

How does a combined-cycle power plant work?





Xcel Energy®

Existing Riverside plant

Design concept of new Riverside plant

Project schedule	Estimated dates
Secure necessary permits	January – June 2006
Award major equipment contracts	April – December 2006
Site preparation	August 2006 – April 2007
Major equipment delivery	April – December 2007
Startup and testing	September 2008 – March 2009
Commercial operation	May 2009
Demolition and removal of old plant	June 2009 – December 2010

Site considerations

The natural gas powered combustion turbine generators will be installed in a new building on the Riverside site built over the location presently occupied by decommissioned power plant units. The new facility will be constructed to be compatible with other riverfront industrial developments, and the project will be carried out in accordance with all federal, state and city permits.

QUESTIONS OR CONCERNS

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