UNIVERSITY OF NOTRE DAME
CONTROL NETWORK
CONDENSED REPORT

CAMPUS-WIDE CONTROL NETWORK COMPRISED OF
GEOETIC CONTROL MONUMENTS
&
BENCHMARKS

IF FOUND PLEASE RETURN TO:

JAMES E. PFEIL
SENIOR CAD TECHNICIAN
UNIVERSITY OF NOTRE DAME
UTILITIES & MAINTENANCE
100 FACILITIES BUILDING
NOTRE DAME, IN 46556
TELEPHONE: (574) 631-6594
GENERAL INFORMATION

CAMPUS-WIDE CONTROL NETWORK
AT THE
UNIVERSITY OF NOTRE DAME

CONDENSED REPORT

This control point data was prepared for University of Notre Dame Utilities Maintenance Division of Facilities Design and Operations, headquartered at 100 Facilities Building Notre Dame, Indiana 46556. The purpose of this data is to provide the University of Notre Dame with an accurate, stable, maintainable control network to serve as the backbone of the University’s CAD-based asset management system. The network is expected to provide the following benefits:

• Create a monumented coordinate system that fosters the perpetual improvement of the location information associated with existing facilities.
• Verify and sustain the vertical datum of existing benchmarks and all campus facilities.
• Provide a published set of datums for all future facility improvements on campus.
• Allow for positional commonality of work by consultants, contractors, and University staff alike.

This data is intended for use with, but not limited to:

• Survey Projects
• Field Engineering Projects
• Design Projects
• As-built Projects

The control network is comprised of nineteen (19) points. Geodetic control points 1, 5, 9, and 15 are represented with X, Y, and Z coordinate values. All other points are benchmarks and are for vertical use only. Benchmarks are represented with a published Z coordinate value only. Details about the location and coordinate values of each point are enclosed. If you have any questions or desire additional information regarding the establishment of the control network, please contact:

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Condensed Report Contents:
CONTROL NETWORK MAP (1 PAGE)
GEODETIC CONTROL POINT DATA SHEETS (4 PAGES)
OPUS and RTK OBSERVATION SUMMARY (1 PAGE)
VERTICAL CONTROL LOOP MAP (1 PAGE)
BENCHMARK SUMMARY LIST (7 PAGES)
Geodetic control points are designated by a triangle
Benchmarks are designated by a circle
GEODETIC CONTROL POINT DATA SHEET

Control Point: 1

LOCATION AND POSITION DATA

NORTHEAST SIDE OF CAMPUS NEAR THE SOUTH ENTRANCE OF STINSON RUGBY FIELD.

Northing: 2353077.4447  Latitude(N): 41° 42' 24.85042"
Easting: 173599.7928  Longitude(W): 86° 13' 56.73725"
Elevation: 729.124

REMARKS AND LOCATION DESCRIPTION

NOTRE DAME CONTROL PNT 1 (RUGBY)
4" BRASS TABLET STAMPED "UNIV. OF NOTRE DAME SURVEY CONTROL POINT"
SET IN A 12" x 48" BOTTOM FLARED CONC. POST – FLUSH WITH THE GROUND. LOCATED 400' WEST AND 200' NORTH OF THE CENTER OF THE INTERSECTION OF WILSON DR. AND STEPAN DR.; 8.3' WEST OF A 6' CHAIN-LINK FENCE RUNNING NORTH-SOUTH; 13.3' EAST OF AN 8' WIDE PAVED PATH RUNNING NORTH-SOUTH; 17.1' EAST AND 33.8' SOUTH OF THE CENTER OF THE GATE TO THE STINSON RUGBY FIELD

Horizontal Datum: NAD 83 (2011) EPOCH 2010.00
Vertical Datum: NGVD29
Unit of Measurement: US SURVEY FEET
Zone: INDIANA EAST
Observation Method: GNSS - STATIC
Correction Source: NGS OPUS
NGS Tie: G 103 (PID - DG9007)
Instrument Used: TRIMBLE R8 (II)
Crew: TURAY - RIEMKE
Weather: 79°(f) CLEAR, WINDY
**GEODE蒂C CONTROL POINT DATA SHEET**

| Control Point: | 5 |

| UND Utility Grid: | I6 |
| County and State: | ST. JOSEPH, IN |
| Sec., Twp. and Range: | 31-T38N-R3E |
| Size & Type: | 4" BRASS TABLET |
| Monumented: | FALL OF 2014 |
| GNSS Obs. Date: | 7 MAY 2015 |
| Relationship to Grade: | FLUSH |

**LOCATION AND POSITION DATA**

| Northing | 2350736.4388 |
| Latitude(N): | 41° 42' 1.69409" |
| Easting | 173154.8101 |
| Longitude(W): | 86° 14' 2.40039" |
| Elevation | 738.676 |

**REMARKS AND LOCATION DESCRIPTION**

**NOTRE DAME CONTROL PNT 5 (DECIO-GALVIN)**

4” BRASS TABLET STAMPED “UNIV. OF NOTRE DAME SURVEY CONTROL POINT”

SET IN A 12” x 48” BOTTOM FLARED CONC. POST – FLUSH WITH THE GROUND. LOCATED APPROX 330’ NORTH OF THE CENTER OF THE KNUTE ROCKNE GATE ON THE NORTH SIDE OF THE FOOTBALL STADIUM; CENTERED EAST-WEST IN THE QUAD AND 10’ SOUTH OF THE SOUTH EDGE OF A WALK RUNNING EAST-WEST

**N.D. STADIUM**

**MOOSE KRAUSE CIRCLE**

**Horizontal Datum:** NAD 83 (2011) EPOCH 2010.00

**Vertical Datum:** NGVD29

**Unit of Measurement:** US SURVEY FEET

**Zone:** INDIANA EAST

**Observation Method:** GNSS - STATIC

**Correction Source:** NGS OPUS

**NGS Tie:** G 103 (PID - DG9007)

**Instrument Used:** TRIMBLE R8 (II)

**Crew:** TURAY - RIEMKE

**Weather:** 82°(f) CLEAR, WINDY
**GEODE蒂IC CONTROL POINT DATA SHEET**

**Control Point:** 9

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<tr>
<td><strong>Sec., Twp. and Range:</strong></td>
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<tr>
<td><strong>Size &amp; Type:</strong></td>
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<td><strong>Relationship to Grade:</strong></td>
<td>FLUSH</td>
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<table>
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<tr>
<th><strong>LOCATION AND POSITION DATA</strong></th>
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<tr>
<td><strong>SOUTHEAST SIDE OF CAMPUS, NORTHEAST OF LEAHY DRIVE AND EDISON ROAD INTERSECTION, SOUTH OF TRACK FIELD.</strong></td>
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<tr>
<td><strong>Northing:</strong> 2348267.2541</td>
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<tr>
<td><strong>Easting:</strong> 174326.0906</td>
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<tr>
<td><strong>Elevation:</strong> 735.568</td>
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**NOTRE DAME CONTROL PNT 9 (EDISON)**

4" BRASS TABLET STAMPED “UNIV. OF NOTRE DAME SURVEY CONTROL POINT”

SET IN A 12" x 48" BOTTOM FLARED CONC. POST – FLUSH WITH THE GROUND. LOCATED 150’ NORTHWEST ALONG LEAHY DR. FROM ITS INTERSECTION WITH THE CENTER OF EDISON RD; THENCE 33’ NORTHEAST FROM THE CENTER OF LEAHY DR.; 7.9’ EAST OF THE SOUTHEAST COR. OF A 2’ x 2’ BRICK FENCE COR. PILLAR; 2.0’ SOUTH OF A 6’ ALUMINUM PICKET FENCE RUNNING EAST-WEST; 30.5’ NORTH-NORTHEAST OF THE NORTHEAST COR. OF A CURB INLET IN THE EAST CURB LINE OF LEAHY DR.

**REMARKS AND LOCATION DESCRIPTION**

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<td><strong>Unit of Measurement:</strong></td>
<td>US SURVEY FEET</td>
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<td><strong>Zone:</strong></td>
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<td><strong>NGS Tie:</strong></td>
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<td><strong>Instrument Used:</strong></td>
<td>TRIMBLE R8 (II)</td>
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<tr>
<td><strong>Crew:</strong></td>
<td>TURAY - RIEMKE</td>
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<tr>
<td><strong>Weather:</strong></td>
<td>79°(f) CLOUDY, WINDY</td>
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### GEODETC CONTROL POINT DATA SHEET

**Control Point:** 15

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<td>Size &amp; Type:</td>
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<td>Monumented:</td>
<td>FALL OF 2014</td>
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<td>GNSS Obs. Date:</td>
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<td>Relationship to Grade:</td>
<td>FLUSH</td>
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**LOCATION AND POSITION DATA**

- **North:** 2350620.8616
- **Latitude:** 41° 42' 0.39537"
- **East:** 170762.0917
- **Longitude:** 86° 14' 33.93153"
- **Elevation:** 728.225

**WEST SIDE OF CAMPUS, IN THE MALL EAST OF ROCKNE MEMORIAL RECREATION FACILITY.**

**REMARKS AND LOCATION DESCRIPTION**

- **NOTRE DAME CONTROL PNT 15 (THE ROCK)**
  - 2″ BRASS TABLET WITH RAISED DOME STAMPED "UNIV. OF NOTRE DAME BENCHMARK"

**Horizontal Datum:** NAD 83 (2011) EPOCH 2010.00
**Vertical Datum:** NGVD29
**Unit of Measurement:** US SURVEY FEET
**Zone:** INDIANA EAST
**Observation Method:** GNSS - STATIC
**Correction Source:** NGS OPUS
**NGS Tie:** G 103 (PID - DG9007)
**Instrument Used:** TRIMBLE R8 (II)
**Crew:** TURAY - RIEMKE
**Weather:** 52°(f) CLEAR, WINDY
### Repeatable Position Analysis Based on Different Observation Methods

#### Control Network Point #1

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<th>Duration</th>
<th>Northing (US ft)</th>
<th>Easting (US ft)</th>
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<tr>
<td>OPUS Precise</td>
<td>6 hr</td>
<td>2353077.4447</td>
<td>173599.7928</td>
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<tr>
<td>RTK Rapid</td>
<td>1 sec</td>
<td>2353077.3737</td>
<td>173599.7320</td>
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<td>RTK Topo</td>
<td>5 sec</td>
<td>2353077.3884</td>
<td>173599.7408</td>
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<td>RTK Observed Control Point</td>
<td>180 epoch (3 min)</td>
<td>2353077.4066</td>
<td>173599.7957</td>
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#### Observed coordinate differences (US ft)

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<tr>
<td>Maximum (obs. style independent)</td>
<td>0.0711</td>
<td>0.0637</td>
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<td>OPUS vs. RTK OCP</td>
<td>0.0381</td>
<td>0.0029</td>
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Note: All RTK observations were made using the Midwest RTK network maintained by Seiler Instruments.

#### QA/QC Control Point NGS G103

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<td>OPUS Precise</td>
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<td>2360616.1340</td>
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<td>Observed coordinate differences (US ft)</td>
<td>0.0640</td>
<td>0.0586</td>
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Vertical Control Loop Map
## NOTRE DAME - BENCHMARK SUMMARY

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<th>STA</th>
<th>ADJ ELEV (NGVD29)</th>
<th>REMARKS</th>
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| 1   | 729.124           | NOTRE DAME CONTROL PNT 1 (RUGBY)  
4" BRASS TABLET STAMPED “UNIV. OF NOTRE DAME SURVEY CONTROL POINT”  
SET IN A 12" x 48" BOTTOM FLARED CONC. POST – FLUSH WITH THE GROUND.  
LOCATED 400' WEST AND 200' NORTH OF THE CENTER OF THE INTERSECTION OF WILSON DR. AND STEPAN DR.;  
8.3' WEST OF A 6’ CHAIN-LINK FENCE RUNNING NORTH-SOUTH;  
13.3' EAST OF AN 8’ WIDE PAVED PATH RUNNING NORTH-SOUTH;  
17.1’ EAST AND 33.8’ SOUTH OF THE CENTER OF THE GATE TO THE STINSON RUGBY FIELD. |
| 2   | 735.523           | NOTRE DAME BM 2 (ECDC)  
2" BRASS TABLET WITH RAISED DOME STAMPED “UNIV. OF NOTRE DAME BENCHMARK”  
SET IN THE NORTHWEST COR. OF AN 8” CONC LIP BORDERING A 3.3’ x 3.3’ UTILITY TUNNEL HATCH.  
LOCATED 175’ SOUTH AND 18.5’ EAST OF THE CENTER OF THE INTERSECTION OF BULLA RD AND LEAHY DR.;  
11.7’ WEST AND 17.5’ NORTH OF A FIRE HYDRANT;  
11.5’ NORTH AND 22.4’ WEST OF THE SOUTHWEST COR. OF THE EARLY CHILDHOOD DEVELOPMENT CENTER (ECDC) BUILDING. |
| 3   | 740.540           | NOTRE DAME BM 3 (HESBURGH LIBRARY)  
2" BRASS TABLET WITH RAISED DOME STAMPED “UNIV. OF NOTRE DAME BENCHMARK”  
SET NEAR THE NORTHWEST COR. OF A 22’ x 15’ AIR EXCHANGE STRUCTURE WITH 12” CONC. WALLS.  
LOCATED 30’ EAST AND 28’ NORTH OF THE NORTHWEST COR. OF THE HESBURGH MEMORIAL LIBRARY. |
### NOTRE DAME - BENCHMARK SUMMARY

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| 4   | 740.526           | NOTRE DAME BM 4 (PASQUERILLA CENTER)  
2” BRASS TABLET WITH RAISED DOME STAMPED “UNIV. OF NOTRE DAME BENCHMARK”  
SET IN THE NORTHEAST COR. OF A 15’ x 4.3’ AIR EXCHANGE STRUCTURE WITH 12” CONC. WALLS.  
LOCATED 10’ WEST AND 5’ NORTH OF THE NORTHEAST COR. OF THE PASQUERILLA CENTER. |
| 5   | 738.676           | NOTRE DAME CONTROL PNT 5 (DECIO-GALVIN)  
4” BRASS TABLET STAMPED “UNIV. OF NOTRE DAME SURVEY CONTROL POINT”  
SET IN A 12” x 48” BOTTOM FLARED CONC. POST – FLUSH WITH THE GROUND.  
LOCATED APPROX 330’ NORTH OF THE CENTER OF THE KNUTE ROCKNE GATE ON THE NORTH SIDE OF  
THE FOOTBALL STADIUM; CENTERED EAST-WEST IN THE QUAD AND 10’ SOUTH OF THE SOUTH EDGE  
OF A WALK RUNNING EAST-WEST. |
| 6   | 742.322           | NOTRE DAME BM 6 (JOYCE)  
2” BRASS TABLET WITH RAISED DOME STAMPED “UNIV. OF NOTRE DAME BENCHMARK”  
SET IN THE SOUTHEAST COR. OF A 22’ x 8’ AIR EXCHANGE STRUCTURE WITH 12” CONC. WALLS.  
LOCATED 62’ NORTH OF THE JOYCE CENTER’S GATE 5 DOORS; EAST OF THE EAST SIDE OF THE  
JOYCE CENTER AND WEST OF THE WEST SIDE OF ROLFS AQUATIC CENTER. |
## NOTRE DAME - BENCHMARK SUMMARY

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| 7   | **738.667**      | NOTRE DAME BM 7 (TWYCKENHAM)  
2" BRASS TABLET WITH RAISED DOME STAMPED “UNIV. OF NOTRE DAME BENCHMARK”  
SET IN THE SOUTHEAST SIDE OF A 24" DIAMETER CONC LIGHT POLE FOOTING.  
LOCATED 355' SOUTH AND 90' WEST OF THE CENTER OF THE INTERSECTION TWYCKENHAM DR. AND VANESS ST.;  
41' WEST AND 18.5' NORTH OF PWP (J212/155);  
3.7’ SOUTH OF THE SOUTH EDGE OF A PAVED WALK THAT RUNS EAST-WEST. |
| 8   | **740.367**      | NOTRE DAME BM 8 (BASEBALL)  
2" BRASS TABLET WITH RAISED DOME STAMPED “UNIV. OF NOTRE DAME BENCHMARK”  
SET IN THE WEST SIDE OF A 36" DIAMETER CONC STRAIN POLE FOOTING.  
LOCATED 460' SOUTH AND 295' EAST OF THE CENTER OF THE INTERSECTION OF MOOSE KRAUSE CIR DR. AND LEAHY DR.;  
34’ WEST AND 45’ NORTH OF THE ENTRANCE TO THE FRANK ECK BASEBALL STADIUM;  
9’ SOUTH AND 26’ EAST OF A FIRE HYDRANT. |
| 9   | **735.568**      | NOTRE DAME CONTROL PNT 9 (EDISON)  
4" BRASS TABLET STAMPED “UNIV. OF NOTRE DAME SURVEY CONTROL POINT”  
SET IN A 12” x 48” BOTTOM FLARED CONC. POST – FLUSH WITH THE GROUND.  
LOCATED 150’ NORTHWEST ALONG LEAHY DR. FROM ITS INTERSECTION WITH THE CENTER OF EDISON RD;  
THENCE 33’ NORTHEAST FROM THE CENTER OF LEAHY DR.;  
7.9’ EAST OF THE SOUTHEAST COR. OF A 2’ x 2’ BRICK FENCE COR. PILLAR;  
2.0’ SOUTH OF A 6’ ALUMINUM PICKET FENCE RUNNING EAST-WEST;  
30.5’ NORTH-NORTHEAST OF THE NORTHEAST COR. OF A CURB INLET IN THE EAST CURB LINE OF LEAHY DR. |
# NOTRE DAME - BENCHMARK SUMMARY

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| 10  | 740.739          | NOTRE DAME BM 10 (COMPTON)  
2” BRASS TABLET WITH RAISED DOME STAMPED “UNIV. OF NOTRE DAME BENCHMARK”  
SET IN AN 18” THICK CONC. STAIRWELL RETAINING WALL  
LOCATED 8.6’ WEST OF THE WEST-NORTHWEST COR. OF THE COMPTON FAMILY ICE ARENA. |
| 11  | 735.177          | NOTRE DAME BM 11 (DPAC)  
2” BRASS TABLET WITH RAISED DOME STAMPED “UNIV. OF NOTRE DAME BENCHMARK”  
SET IN THE NORTHWEST COR. OF A 6” CONC. LIP BORDERING A 4’ x 4’ UTILITY TUNNEL HATCH.  
LOCATED 366’ SOUTH AND 58’ EAST OF THE CENTER OF THE INTERSECTION OF HOLY CROSS DR. AND EDDY ST.; 245’ EAST AND 63’ SOUTH OF THE SOUTHEAST COR. OF THE DEBARTOLO PERFORMING ARTS CENTER; 10’ NORTH AND 41’ EAST OF A FIRE HYDRANT. |
| 12  | 740.075          | NOTRE DAME BM 12 (IRISH GREEN)  
2” BRASS TABLET WITH RAISED DOME STAMPED “UNIV. OF NOTRE DAME BENCHMARK”  
SET IN THE NORTHEAST COR. OF A 6” CONC. LIP BORDERING A 4’ x 4’ UTILITY TUNNEL HATCH.  
LOCATED 276’ NORTH AND 77’ EAST OF THE CENTER OF THE INTERSECTION OF NOTRE DAME AVE. AND ANGELA BLVD; 63’ NORTH AND 8.5’ EAST OF A FIRE HYDRANT; 18.4’ EAST OF THE EAST EDGE. OF AN 8’ CONC. WALK RUNNING NORTH-SOUTH. |
# NOTRE DAME - BENCHMARK SUMMARY

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| 13  | 736.660          | NOTRE DAME BM 13 (ECK VISITOR)  
2” BRASS TABLET WITH RAISED DOME STAMPED “UNIV. OF NOTRE DAME BENCHMARK”  
SET IN THE NORTHWEST COR. OF A 6” CONC. LIP BORDERING A 4’ x 4’ UTILITY TUNNEL HATCH.  
LOCATED 291’ NORTH AND 60’ WEST OF THE CENTER OF THE INTERSECTION OF NOTRE DAME AVE. AND HOLY CROSS DR.; 73’ SOUTH AND 80’ EAST FROM THE SOUTHEAST COR. OF THE ECK VISITOR CENTER. |
| 14  | 734.764          | NOTRE DAME BM 14 (ECK LAW)  
2” BRASS TABLET WITH RAISED DOME STAMPED “UNIV. OF NOTRE DAME BENCHMARK”  
SET IN THE NORTHEAST COR. OF A 6” CONC LIP BORDERING A 4’ x 4’ UTILITY TUNNEL HATCH.  
LOCATED 125’ SOUTH AND 80’ EAST OF THE CENTER OF THE TRAFFIC CIRCLE AT THE NORTH END OF NOTRE DAME AVE.; 74’ NORTH OF THE CENTER OF THE WEST ENTRANCE TO THE ECK HALL OF LAW; 80’ EAST OF THE CENTER OF NOTRE DAME AVE. |
| 15  | 728.225          | NOTRE DAME CONTROL PNT 15 (THE ROCK)  
2” BRASS TABLET WITH RAISED DOME STAMPED “UNIV. OF NOTRE DAME BENCHMARK”  
SET IN THE NORTH SIDE OF AN 8” CONC. LIP; NEAR THE CENTER OF THE NORTH SIDE OF SAID LIP;  
BORDERING A 3’ x 3’ UTILITY TUNNEL HATCH.  

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| 16  | 731.465          | NOTRE DAME BM 16 (BOND)  
2" BRASS TABLET WITH RAISED DOME STAMPED “UNIV. OF NOTRE DAME BENCHMARK”  
SET IN THE NORTHEAST COR. OF A 10" CONC. LIP BORDERING A 34" x 20" UTILITY TUNNEL HATCH.  
LOCATED 137’ EAST OF THE SOUTHEAST COR. OF BOND HALL; 133’ WEST AND 10’ NORTH OF A STATUE OF A HUSBAND AND WIFE WITH A BABY. |
| 17  | 733.124          | NOTRE DAME BM 17 (CROWLEY HALL)  
2" BRASS TABLET WITH RAISED DOME STAMPED “UNIV. OF NOTRE DAME BENCHMARK”  
SET IN THE NORTHWEST QUADRANT OF A 4’ x 3.5’ CONC. PAD WITH A 24” TUNNEL ACCESS MANHOLE.  
LOCATED 10’ WEST AND 3.3’ NORTH OF THE NORTHEAST COR. OF CROWLEY HALL AND ALSO BEING 5.5’ EAST OF A FIRE DEPT. CONNECTION IN THE NORTH-MOST FACE OF CROWLEY HALL. |
| 18  | 734.850          | NOTRE DAME BM 18 (DOME)  
2" BRASS TABLET WITH RAISED DOME STAMPED “UNIV. OF NOTRE DAME BENCHMARK”  
SET IN THE NORTHEAST COR. OF A 5” CONC. LIP BORDERING A 6.3’ x 4.3’ UTILITY TUNNEL HATCH.  
LOCATED 60’ NORTH AND 61’ EAST OF THE NORTHEAST COR. OF THE NORTH-MOST FACE OF THE MAIN ADMINISTRATION BUILDING (NOT THE COR. OF THE PORCH STRUCTURE); 2.3’ SOUTH OF THE SOUTH BACK OF CURB OF A PARKING AREA; 50’ EAST AND 21’ NORTH OF A FIRE HYDRANT. |
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| 19  | 728.449          | NOTRE DAME BM 19 (HAMMES MOWBRAY)  
2’’ BRASS TABLET WITH RAISED DOME STAMPED “UNIV. OF NOTRE DAME BENCHMARK”  
SET 1.65’ NORTH OF THE SOUTHEAST COR. OF AN 8” CONC. LIP BORDERING A 3.2’ x 2.7’ UTILITY TUNNEL HATCH.  
LOCATED 45.5’ SOUTH OF THE CENTERLINE OF HOLY CROSS DRIVE; 135’ SOUTH AND 64’ EAST OF THE SOUTHWEST COR. OF HAMMES MOWBRAY HALL. |