Project Equipment

Computer—the bathymetric survey was accomplished using a Rocky II+ ruggedized notebook from AMREL Systems, Inc. The notebook is designed for field and in-vehicle applications. The laptop is certified to the MIL-STD 810C and E and is resistant to rain (4 in./hr/ 0.5-4.5 mm/drop 30 min. period), temperature (operating—0º C to 50º C; storage—20º C to 60º C), shock, vibration, salt fog (35º C 5% 48 hour period), and humidity (85-95% RH). The computer used for office related tasks was a Dell Dimension XPS T750r 750 MHz Pentium III with an 18GB SCSI hard drive. Appendix A contains complete specifications for project equipment.

Software--The software programs listed below were used during various project phases.

1. ESRI ArcInfo 8.x for Workstation
2. ESRI ArcView 3.x
3. SURVCORR and BASELINE2—tide correction programs (supplied on accompanying CD-ROM)
4. Microsoft Excel
5. Microsoft Access
6. Microsoft Word
7. Adaptec Easy CD Creator
8. Trimble Pathfinder Office 2.51
9. Trimble Asset Survey Software
10. Trimble TSIP TALKER (version 2.0)

Differential Global Positioning System—the Regional Waterway Management System, as originally designed, is intended as a planning tool. However, the bathymetric survey procedures and methods meet Class 1 standards as described in the U.S. Army Corps of Engineers (USACE) Hydrographic Survey Manual (U.S. Army Corps of Engineers 2001) and hydrographic survey specifications of the National Ocean Service (National Ocean Service 1999).

A Trimble code phase DSM212H GPS receiver with an integrated MSK dual-channel receiver with Everest™ technology (which improves results in high multipath environments and locations where other radio frequencies could jam the GPS signals) was used to record horizontal positions for the bathymetric survey. Under optimum conditions, the horizontal accuracy (RMS) for the DMS212H, using the RTCM radiobeacon transmissions, is 50 cm + 1 ppm on a second-by-second basis, which, for the 4-county area of the WCIND, is better than 1 meter (Trimble Navigation Ltd. 1998b). Under normal operating conditions the horizontal accuracy for 95 percent of feature positions is 2 meters or less, which conforms with USACE and National Ocean Service (NOS) accuracy standards.

Survey Vessel—a Key West model 1720 open fisherman with a shallow V fiberglass hull and a center console served as the survey vessel. The Key West has a 70hp, 4-stroke, Evinrude outboard; fuel capacity of 31 gallons; 8-inch draft; 17-foot, 2-inch length; 6-foot, 10-inch beam; and weighs 1050 lbs.

Depth Sounding Equipment—sounding equipment consisted of a Bathy-500MF multi-frequency, single-beam echo sounder (Ocean Data Equipment Corporation); a Standard Horizon DS150 single-beam echo sounder (Standard Communications); and a fiberglass sounding pole, calibrated and marked at 0.01-foot intervals.

Soundings from the Bathy-500MF and the DS150 were passed to HYPACK Max hydrographic survey software (Coastal Oceanographics, Inc.) loaded on the AMREL Rocky II+ notebook computer. Soundings were recorded to the nearest 0.1-foot with the Bathy-500 and to the nearest 0.1- foot with

the DS100. The sounding pole was used to verify any suspect echo sounder readings and to check depths in shallow areas (below 3.8 feet). Calibration of the depth sounders was accomplished using a bar, which consisted of a 1.25 ft. X 2.9 ft. lead-weighted aluminum plate. The bar was lowered below the transducer with 25-foot long, 1/8-inch diameter twisted stainless steel wire cables marked at 5-foot intervals, from 5 feet to 20 feet.

Tide Level Recorders and Stilling Wells—tide observations were necessary to correct soundings to chart datum (MLLW). Tide level recorders consisted of Model 220 solid-state, ultrasonic fluid level sensors manufactured by Infinities USA, Inc. Each Model 220 data logger stores 3,906 records, which allows for 16 days of tide data at a logging interval of 6 minutes. Data files were downloaded, in the field, to an HP-48GX calculator.

Each gauge was mounted on a stilling well, the dimensions of which are shown in Figure 2. All sections of the stilling well were cemented together except for the cap, which is secured to the closet flange using two padlocks to protect the tide level recorder. The stilling well was secured to a piling using wooden I-beam mounts and stainless steel worm gear clamps.

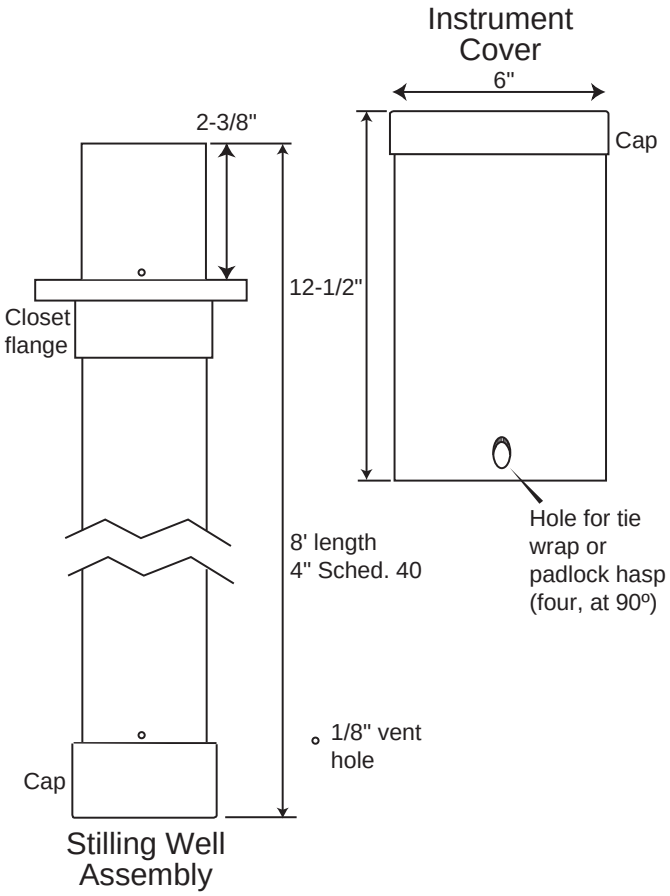

FIGURE 2. TIDE GAUGE STILLING WELL AND HOUSING