

ACWWA DRAWING SUBMITTAL INFORMATION - UTILITY DRAWING REQUIREMENTS

Detailed construction drawings for system extensions shall be prepared for approval with a submittal to the Authority. All construction drawings submitted shall be in strict compliance with the ACWWA Engineering Standards and shall meet special conditions that may be reasonably required. The design and installation of all facilities shall insure development of an integrated system. No work shall commence on any facilities until the construction drawings are approved in writing by the Authority General Manager. Construction drawings are only valid for six (6) months from the approval date. All final plans shall contain, but are not limited to, the following information:

I. SHEETS

The following items are the minimum required for each sheet of the plan set:

- Size - All sheets shall be 24" x 36"
- Stamped Plans - All sheets shall be signed and stamped by the Design Engineer.
- Scale - No greater than 1"=100' on any sheet. Also, a bar scale shall be shown on each sheet.
- North Arrow - All design sheets shall have the north arrow oriented toward the top or right of the sheet.
- Legend of Symbols
- Key Map
- Benchmarks

A. Title Sheet shall contain:

1. Name of Project
2. Development Name and Filing Number
3. Sheet Index
4. Legend
5. Vicinity Map
6. Agency List
7. Name and Address of Developer or Owner
8. Name and Address of Engineer
9. Signature line for Development Project Manager
10. Professional Engineer's Seal and Signature
11. Signature line for Fire Marshall on all water main construction drawings showing required fire flow.
12. "ACWWA # " to be assigned by review engineer.

B. Notes Sheet shall contain:

1. General Construction notes
2. Water notes
3. Sewer notes
4. Typical street or easement section showing location of utilities
5. Quantities List - table of quantities for water and sewer pipes, valves, manholes, and all related appurtenances.

C. Overall Utility Plan shall contain:

1. Locations, horizontal alignment, and dimensions of dedicated streets, easements (including ownership and bk/pg or reception # information) and right-of-ways.
2. Street names, or letters if names have not been assigned.
3. Lots to be served.
4. All existing or proposed curb and gutter and pavement (hatched so it is distinguishable).
5. All existing or proposed utilities with correct sizes.

ACWWA - Construction Drawing Requirements

6. All existing or proposed obstructions such as vaults or manholes, catch basins, traffic islands, etc.
7. The proposed alignment of the water mains and sewer mains and the location of all existing and proposed facilities such as valves, fire hydrants, fittings, vaults and/or manholes, cleanouts, meter pits, water service lines, sewer service lines, and taps.
 - i. For water main or water service line construction, the overall must show any existing valve that can be used to isolate the proposed mains or service lines from the existing system during construction.
8. Any gas, electric, cable TV, and/or telephone lines that will be impacted by the proposed construction.
9. Existing and proposed contours (min. 2' contours)
10. Scale shall be no smaller than 1" = 100' (i.e. 1"=200' is not acceptable)

D. Water Plan (Potable and Nonpotable) shall contain:

In plan view:

1. Locations, dimensions, ownership, and recording information of existing dedicated streets, easements, and rights-of-way.
2. Location and dimensions of proposed easements.
3. Lot lines and lot labels.
4. Lots to be served.
5. Size and location (by station) of services.
6. All existing and proposed curb & gutter, pavement (hatched to be distinguished from unpaved areas), and sidewalks.
7. All existing utilities with correct sizes (shaded lightly and dashed).
8. Nearest upstream and downstream line valve.
9. Proposed alignment of the water main and the location of all proposed water facilities such as valves, fire hydrants, fittings, kickblocks, rodding, and etc.
10. Location and size of all meters for domestic and irrigation connections. If behind fences location of remote for easy reading.
11. Key Map
12. North arrow
13. Bar Scale
14. Pipe or street centerline stationing
15. Vertical information at utility crossings (smaller than 8")
16. A minimum scale of 1"=50'

In profile view (for 8" or larger)

1. Pipe or street centerline stationing.
2. Vertical alignment of waterline and all appurtenances.
3. All other existing and proposed utilities that cross the water line.
4. Top of pipe and bottom of pipe elevations at all utility crossings.
5. Pipe sizes, lengths, depths, slopes, elevations, and top of pipe elevations on all fittings.
6. Existing and proposed ground lines
7. A minimum scale of 1"=50' horizontal and 1"=5' vertical

E. Sanitary Sewer Plan shall contain:

SAME AS WATER PLAN EXCEPT **ALL SIZES** OF SEWER MUST BE PROFILED.

ACWWA - Construction Drawing Requirements

F. Detail Sheet(s)

1. All details shall be ACWWA standard details and specifications given shall conform to the Authority Engineering Standards.
2. Detail sheets containing non-standard details shall be signed and stamped by a Colorado Professional Engineer.

II. PRECEDENCE OF CONSTRUCTION DOCUMENTS

- A. Addenda and modifications to the drawings and specifications take precedence over the original documents.
- B. Should there be a conflict within the specifications or on the drawings, the Authority Engineer or Manager shall decide which stipulation will provide the best installation for ACWWA and his or her decision shall be final.
- C. In the drawings calculated dimensions shall take precedence over scaled dimensions and noted material over graphic indication.

III. MISCELLANEOUS

- A. Dedicated streets, right-of-ways, easements and planned development complexes shall conform to the requirements of Arapahoe or Douglas County Standards as applicable. A copy of the recorded subdivision plat, easements or right-of-ways shall be furnished to the Authority.
- B. Minimum easement width for one utility shall be 30 feet. Easement width for more than one utility shall be determined by ACWWA.

IV. VARIANCES

- A. Any request for a variance from the requirements of these Standard Specifications shall be submitted in writing to the Authority Manager. Each variance request shall include a detailed description of the proposed variance together with the Customer's Professional Engineer's analysis of the impact of the variance. Variances from the "Engineering Standards" or the "Rules and Regulations" must be approved by ACWWA's Board of Directors. The decision of the Board of Directors to grant or deny any variance will be final.

ACWWA WATER STUDY REQUIREMENTS

1. Average Day Demand (No fire flow).
= 1/3 of adjusted-demand gpm from AWWA M22 Manual (fixture unit count and meter sizing manual).

Looking for
 - minimum pressure of 40 psi.
 - maximum pressure 110 psi.
 - maximum head loss of 2-foot/1,000 feet of pipe for 8-inch and 12-inch diameter pipe.
2. Maximum Day Demand (No fire flow).
= adjusted-demand Gpm from AWWA M22 Manual.

Looking for
 - same requirements as Avg. Day Demand.
3. Maximum Hour Demand or Peak Hour Demand (No fire flows).
= 2 X Maximum Day Demand.

Looking for
 - same requirements as Average Day Demand
 - maximum velocity of 6-feet/second.
4. Difference between Maximum Hour Demand and Average Day Demand.

Looking for
 - not greater than 30 psi change.
5. Maximum Day Demand and Fire Flows.
-obtain fire flow requirements from Fire Department.
-Maximum Day, see #2

Looking for
 - minimum pressure of 20 psi.
 - maximum velocity of 10-feet/second.

ACWWA SEWER STUDY REQUIREMENTS

Assumptions used to size pipe:

Non-Residential - approximately 80-gal /1000-ft² of building space.

Exceptions:

- o Centennial Airport Area, non residential - 23-gal/1000 ft² of building, or approximately 6 gpcd at 1 person/250 ft² of building space.
- o Lincoln Executive Center - -40-gal/1000 ft² of building, or approximately 10 gpcd at 1 person/250 ft² of building space.
- o Others may apply

Residential - 75 gal per capita per day X 2.9 people/single family house.

- 75 gal per capita per day X 2.2 people/multi-family unit.

Peak Factor = 3.5

Infiltration = varies depending on soil type, etc.

(Usually is between 0 and 1000 gal/day/acre)

Looking For:

Velocity minimum at Full-Flow = 2 ft/sec

Velocity maximum at Full-Flow = 12 ft/sec

Avg. Design Flow <0.1 cfs requires minimum of 0.6% slope for 8-inch diameter pipe.

Avg. Design Flow >0.1 cfs requires minimum of 0.4% slope for 8-inch diameter pipe.

Service 4-inch pipe requires minimum of 2% fall.

Service 6-inch pipe requires minimum of 1% fall.

Other:

MH 90° bends for Inv. IN and Inv. OUT require 0.3 feet of fall, or greater.

(Any drop greater than 18-inches inside a manhole requires a drop manhole).

ACWWA requires inside-drop manholes.

Legal Descriptions and Exhibits- Legal descriptions and the associated exhibits are required. ACWWA does not accept platted easements. All easements shall be granted by separate document and the easements shall be for the exclusive use of ACWWA's utilities. The minimum easement width for one utility shall be 30 feet. The minimum easement width for more than one utility shall be determined by ACWWA, but shall typically expand an additional 10 feet per utility. Fire hydrant easements shall be 15 feet wide if the fire hydrant lateral extends 15 feet or less beyond the water main easement. If the fire hydrant is located more than 15 feet from the edge of the water main easement, a 30 foot easement shall be required. In addition, the easement shall extend 5 feet beyond the hydrant.

All legal descriptions and exhibits shall conform to the following criteria:

1. Legal descriptions and exhibits must be submitted as an original document on letter size paper (8-1/2" x 11"). Descriptions may be computer generated or typewritten. Exhibits must be computer generated. Photocopies will not be accepted.
2. Each proposed easement requires a separate legal description and exhibit.
3. An introduction with the location of the property (Section, Township, Range, Principal Meridian, Municipality [if applicable], County and State), the subdivision name, filing, block, and lot (if applicable) and the intended use of the property being described, must be included.
4. Enough information must be given in the description body to avoid making assumptions or being ambiguous.
5. Legal descriptions shall be written in a metes and bounds format for the perimeter easement lines (centerline calls with a width either side will not be accepted).
6. The area shall be expressed in square feet (and acres to four (4) decimal places if over 1 acre) in the legal description.
7. The legal description shall contain a Basis Of Bearings statement that complies with Section 60.1 of "The Policies Of The State Board Of Registration for Professional Engineers and Professional Land Surveyors". The exhibit will also show the referenced Basis Of Bearings and be labeled as such.
8. Insert the following title on the top of the legal description (The exhibit letter and ACWWA number will be assigned after the first review):
"EXHIBIT _____"
"ACWWA NO. _____"
9. Each legal description shall be signed and sealed by a Professional Land Surveyor currently registered in the State Of Colorado.
10. Closure sheets must be submitted. Closure must be within 0.02 feet.
11. The exhibit must be tied to 2 Section Corners shown in the attached Arapahoe County Water and Wastewater Authority Control Diagram if the parcel is located within this area.
12. All existing easements are to be shown and labeled on the exhibit with the recording information.
13. The area shall be expressed in square feet (and acres to four (4) decimal places if over 1 acre) on the exhibit.
14. Minimum font size on the exhibit shall be 0.08 times the scale of the drawing (L80).
15. The exhibit shall show a north arrow and bar scale.
16. Insert the following title on the top of the exhibit drawing (The exhibit letter and ACWWA number will be assigned after the first review):
"Illustration for EXHIBIT _____"
"ACWWA NO. _____"
17. The following statement must appear on each exhibit: "This exhibit does not represent a monumented survey. It is intended only to depict the attached description".
18. The exhibit drawing shall not contain any screened linework or screened text.
19. An index number will be assigned to each legal description and exhibit once they have been submitted to the Authority for review.

Plat- Provide a recorded copy of the most recent final plat of development. If the plat was filed before 1975, then provide an ALTA/ACSM Land Title Survey that is no more than six months old.

Title Commitment- Provide a current copy of the title commitment and supply copies of all Schedule B Section 2 documents referenced in said title commitment.

Attachments:

ACWWA 8.5 x 11 inch Legal Description format guide.

ACWWA 8.5 x 11 inch Exhibit Example.

ACWWA Control Diagram- reduced for 11x17 inch printing.

EXHIBIT __

ACWWA NO. _____

Sheet 1 of 2

[TYPE OF] EASEMENT

PREAMBLE:

BASIS OF BEARINGS:

BODY OF LEGAL DESCRIPTION:

CONTAINING XXX SQUARE FEET OR X.XXX AC..

[SURVEYORS NAME, PROFESSIONAL LAND SURVEYOR
COLORADO NO. XXXXX
FOR AND ON BEHALF OF [COMPANY NAME]
ADDRESS
CITY, STATE AND ZIP CODE

DATE

ILLUSTRATION FOR EXHIBIT _____

ACWWA NO. _____

SHEET 2 OF 2

EAST ARAPAHOE ROAD

N 89°46'46" E 2658.23' (BASIS OF BEARINGS - ARAP. CTY. NETWORK)

N. LINE NE 1/4 SECTION 25

N 1/4 COR SEC 25
RECOVERED 3 1/4" ALUM.
CAP IN MONUMENT BOX
ALL STAMPING ILLEGIBLE
EXCEPT LS 16401

POINT OF COMMENCEMENT
NE COR SEC 25
RECOVERED 3" ALUM.
CAP IN MONUMENT BOX
STAMPED LS 11434

LINE TABLE

| | | |
|----|---------------|--------|
| L1 | - S00°13'14"E | 25.94' |
| L2 | - S89°46'46"W | 20.00' |
| L3 | - N00°13'14"W | 25.94' |
| L4 | - N89°46'46"E | 20.00' |

10' UTILITY
EASEMENT
BK 162
PG 24-26

LOT 2

LOT 3, BLOCK 1
POTOMAC PARK
BK 162,
PG 24-26

LOT 4

10' UTILITY EASEMENT
BK 162 PG 24-26

POINT OF BEGINNING

20'X25.94'
WATER LINE
EASEMENT
519 SQ. FT.

20' ARAPAHOE COUNTY WATER &
WASTEWATER AUTHORITY EASEMENT
R.N. 01234567

PRIVATE DRIVE

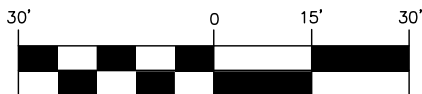
50' UTILITY, DRAINAGE, ACCESS
& PUBLIC USE EASEMENT
BK 162 PG 24-26

6 NE 1/4 SEC. 25,
T5S, R67W,
6TH P.M.

BLK 1
POTOMAC PARK
BK 162, PG 24-26

7

GRAPHIC SCALE



(IN FEET)
1 inch = 30 ft.

NOTE: THIS EXHIBIT DOES NOT
REPRESENT A MONUMENTED SURVEY.
IT IS INTENDED ONLY TO DEPICT THE
ATTACHED DESCRIPTION.

COMPANY NAME AND LOGO
ADDRESS
ADDRESS
PHONE

SCALE:

JOB NO.

DATE:

Drawing path

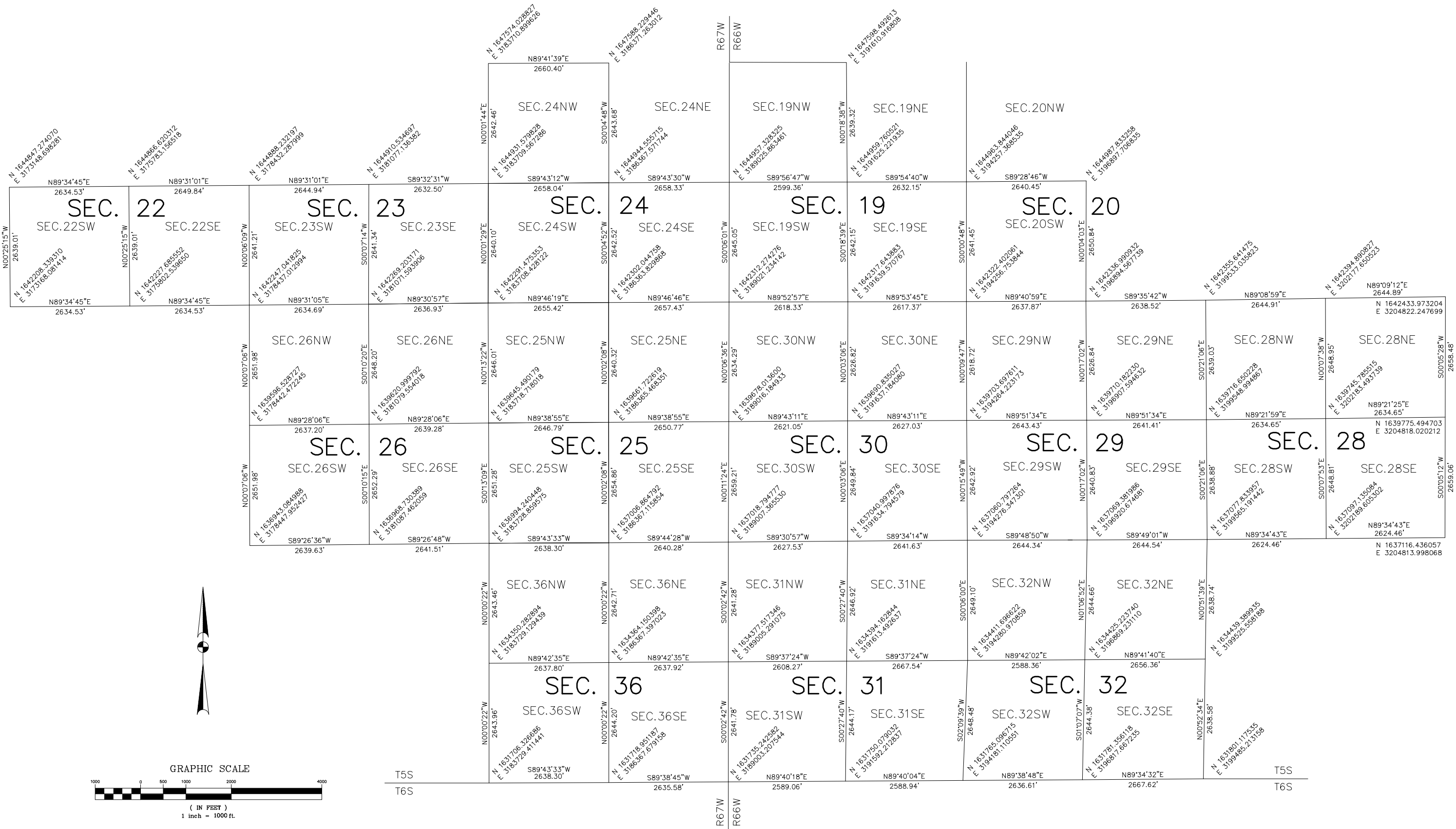
DRAWN BY:

SHEET:

2 OF 2



ARAPAHOE COUNTY WATER AND WASTEWATER AUTHORITY ARAPAHOE COUNTY SERVICE AREA CONTROL DIAGRAM



THE BEARING, DISTANCE AND COORDINATE VALUES SHOWN HEREON ARE PER THE ARAPAHOE COUNTY CONTROL NETWORK, PHASE 1 REVISED, AND ARE IN COLORADO STATE PLANE, COLORADO COORDINATE SYSTEM OF 1983-1992, CENTRAL ZONE.

DATE OF DRAWING PREPARATION: AUGUST, 2005

