RIGHT-OF-WAY CONTROL MONUMENT SHALL BE FACTORY STAMPED "CITY OF FLAGSTAFF" AND BEAR THE REGISTRATION NUMBER OF THE LAND SURVEYOR RESPONSIBLE FOR THE WORK.

2. A MONUMENT EXAMPLE ACCEPTABLE TO THE CITY: 2" LIETZ BRASS CAP PRESS-FITTED ON TO AN I.P.

3. USE TYPE C UNLESS SPECIFIED OTHERWISE ON THE PLANS, SEE SPECIFICATION 13-03-002-0007.H
1. CONCRETE SHALL BE CLASS "AA" (WITH 5-7% ENTRAINED AIR)
2. NO CONCRETE SHALL BE PLACED PRIOR TO FORM INSPECTION BY THE CITY ENGINEER OR HIS REPRESENTATIVE.
3. ASPHALTIC CONCRETE SHALL BE HELD 1/4" HIGH AT EDGE OF CONCRETE.

EXPANSION JOINT REQUIRED AT END OF RETURN (TYP.)

CONFORM TO DESIGN OR EXISTING GRADE

EXPANSION JOINT REQUIRED AT END OF RETURN (TYP.)

1/2"x24" SMOOTH STEEL DOWELS AT 18" CENTERS. WRAP OR GREASE ONE END FOR NO BAND.

8" THICK CONCRETE APRON WITH 6x6x10 GA. W.W.M. OR FIBER MESH CONC. (TYP.)

1" DEPRESSION

8" AGGREGATE BASE COURSE COMPACTED TO 100%

6" SUBGRADE COMPACTED TO 95%

12" TROWEL

INDICATES FLOWLINE

INDICATES ELEVATION IS SHOWN ON PLANS

1/2"x24" SMOOTH STEEL DOWELS AT 18" CENTERS. WRAP OR GREASE ONE END FOR NO BAND.

8" THICK CONCRETE APRON WITH 6x6x10 GA. W.W.M.

1" BATTER

FORM EDGES

FREE EDGE

8" THICK CONCRETE APRON WITH 6x6x10 GA. W.W.M. OR FIBER MESH CONC. (TYP.)
NOTES:
1. WHERE POSSIBLE SEWER SHOULD BE LOCATED AT THE CENTERLINE.
2. WATER SHOULD BE 10' NORTH OR EAST OF CENTERLINE (MIN. 6' SEPARATION FROM SEWER.)
3. STORMDRAIN SHOULD BE 10' FROM SEWER (MIN. 6') ON THE OPPOSITE SIDE OF WHERE WATER IS LOCATED.
4. NO UTILITY SHALL BE LESS THAN 4' FROM LIP OF GUTTER.

NOTES:
1. THE DIMENSIONS GIVEN IN THESE TRENCH DETAILS ARE MINIMUM. DEPENDING ON THE NUMBER AND SIZE OF UTILITIES IN A TRENCH, ADDITIONAL COVER AND/OR CLEARANCES MAY BE REQUIRED.
2. MINIMUM COVER SHALL BE MEASURED FROM THE TOP OF THE PIPE TO THE SUBGRADE UNDER EXISTING OR PROPOSED PAVEMENT.
3. MINIMUM HORIZONTAL DISTANCE BETWEEN WATER AND SEWER PIPS IS 6 FEET.
4. WHEN SEWER AND WATER LINES CROSS, REFER TO ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY (A.D.E.Q.) GUIDELINES, AND OTHER CITY STANDARDS.
5. WHILE POWER AND COMMUNICATION CABLES MAY BE INSTALLED IN SANITARY SEWER TRENCHES, A SEPARATE TRENCH MAY BE REQUIRED WHEN DEEMED NECESSARY BY UTILITY COMPANIES.
6. WATER AND ELECTRIC POWER LINES ARE NOT ALLOWED IN THE SAME TRENCH.
7. GAS AND SEWER LINES ARE NOT ALLOWED IN THE SAME TRENCH
8. TWO WORKING DAYS BEFORE YOU DIG, CALL FOR THE BLUE STAKES 1-800-STAKE-IT
9. TRACER WIRES SHALL BE INSTALLED IN ACCORDANCE WITH STANDARD 9-01-020.
10. WHEN POWER AND COMMUNICATION CABLES ARE NOT IN THE SAME TRENCH, THEY SHALL HAVE A MINIMUM HORIZONTAL SEPARATION OF 36" FROM WATER LINES AND 24" FROM SEWER LINES, AND SHALL MAINTAIN A MINIMUM OF 24" ABOVE SEWER LINES. WHEN GAS LINES ARE NOT IN THE SAME TRENCH, A MINIMUM HORIZONTAL SEPARATION OF 36" FROM SEWER LINES AND 18" FROM WATER LINES SHALL BE MAINTAINED; GAS LINES SHALL ALSO BE A MINIMUM OF 18" ABOVE WATER LINES. ALL MEASUREMENTS SHALL BE MADE FROM THE OUTSIDE EDGE OF PIPE OR CABLE.
11. MINIMUM DEPTHS FOR POWER, GAS, TELEVISION, AND COMMUNICATION ARE MEASURED FROM FINISHED GRADE.
12. ALL WATERLINE (FIRE HYDRANT LEAD LINES, FIRE LINES AND SERVICE LINES SHALL HAVE A MINIMUM HORIZONTAL SEPARATION OF 3')
NOTES:

1. LARGE TRANSFORMER AND SWITCHING CABINETS SHALL BE LOCATED SO THAT THEY DO NOT INTRUDE INTO THE CLEAR VIEW ZONES OF ADJACENT INTERSECTIONS AND DRIVEWAYS.

2. DUE TO SAFETY CONSIDERATIONS, E.G. DIGGING AROUND TRANSFORMER, AND TO PRECLUDE DAMAGE TO CABLES BY OTHERS, CABLE TELEVISION REQUIRES SEPARATING AWAY FROM THE APS TRANSFORMER LOCATION. IT IS SUGGESTED THAT TRENCHING SIMILAR TO THE "Y" TRENCH AS SHOWN BE PROVIDED, ALTHOUGH ANY ALTERNATIVE THAT PROVIDES SIMILAR SEPARATION WILL BE CONSIDERED.

3. WATER AND GAS SERVICES SHALL BE CENTERED ON THE OPPOSITE PROPERTY LINE FROM THE SEWER SERVICE PER SPECIFICATION 13-09-003-0007.H
NOTES:
1. THE UF-600 TRACER WIRE SHALL BE A MINIMUM 8 FOOT OUTSIDE OF BOX WHEN EXTENDED, IN A CAST IRON VALVE BOX WITHOUT A VALVE.
2. THE TRACER WIRE EXTENDS FROM THE MAIN ON THE FIRE HYDRANT OR METER SERVICE RUNS. THE END COIL MUST BE SET IN A SEPARATE VALVE BOX.
3. COVER SHALL BE LABELED WATER, SEWER OR RECLAIM WASTEWATER.
4. LOCATE VALVE BOX 1 FOOT BEHIND SIDEWALK WITHIN RIGHT OF WAY.
NOTES:

1. BACKFILL MATERIAL SHALL BE PER MAG SPECS.
2. THE DEPTH OF THE AC SHALL MATCH EXISTING OR TYPICAL MIN. PAVEMENT DEPTH FOR THE TYPE OF ROADWAY, WHICHERVER IS GREATER. THE TYPICAL MINIMUM PAVEMENT DEPTHS ARE AS FOLLOWS: ARTERIAL = 5", COLLECTOR = 4", LOCAL = 3"
3. NON-SHRINK BACKFILL IN ACCORDANCE WITH COF STD. 9-6-030 AND MAY BE USED FOR BACKFILL UP TO EXISTING SUBGRADE. THE NON-SHRINK BACKFILL SHALL BE PROPORTIONED AS FOLLOWS: 2600 LBS OF 3/8" MINUS AGGREGATE, 800 LBS SAND, 94 LBS CEMENT AND 11 GALLONS WATER.
4. A MIN. 2" OF UPM™ MAY BE USED FOR TEMPORARY TRENCH PAVING IF HOT MIX IS NOT AVAILABLE. UPM™ TEMPORARY PAVEMENT SHALL NOT REMAIN IN PLACE LONGER THAN 5 WORKING DAYS OR UNTIL HOT MIX ASPHALT IS AVAILABLE. AFTER 5 WORKING DAYS, THE CITY MAY PERFORM THE PERMANENT TRENCH PAVING AT THE CONTRACTORS EXPENSE. IN LIEU OF PLACING UPM™ THOUGH STILL TEMPORARY, THE CONTRACTOR MAY ELECT TO COMPLETELY BACKFILL THE TRENCH TO WITHIN 2" OF THE FINISH TRENCH GRADE WITH NON-SHRINK BACKFILL; THE FINAL 2" SHALL BE MAG CLASS "C" CONCRETE

* TRACER WIRE TAPED TO TOP CENTER OF MAIN WITH 10MIL PVC TAPE ON 4' CENTERS, SEE COF STD 9-01-020.
** WARNING TAPE

City of Flagstaff

'TRENCHING & BACKFILL' EXISTING PAVED STREET

DETAIL NO.
09-01-030

REVISION DATE:
12/30/2017

1
NOTES:

1. NATIVE BACKFILL SHALL BE PER MAG SPECS AND MAY BE SELECTED FROM THE EXCAVATION MATERIAL OR FROM A SOURCE SELECTED BY THE CONTRACTOR AND APPROVED BY THE CITY ENGINEER.

2. NON-SHRINK BACKFILL IN ACCORDANCE WITH COF STD. 9-6-030 AND MAY BE USED FOR BACKFILL UP TO EXISTING SUBGRADE. THE NON-SHRINK BACKFILL SHALL BE PROPORTIONED AS FOLLOWS: 2600 LBS OF 3/8" MINUS aggregate, 800 LBS SAND, 94 LBS CEMENT AND 11 GALLONS WATER

** TRACER WIRE TAPE TO TOP CENTER OF MAIN WITH 10MIL PVC TAPE ON 4' CENTERS, SEE COF STD 9-01-020.

** WARNING TAPE
NOTES:

1. NATIVE BACKFILL SHALL BE PER MAG SPECS AND MAY BE SELECTED FROM THE EXCAVATION MATERIAL OR FROM A SOURCE SELECTED BY THE CONTRACTOR AND APPROVED BY THE CITY ENGINEER.

2. IF THE UNPAVED STREET HAS A SURFACE MATERIAL (ABC, CINDERS, ETC) OTHER THAN NATIVE, THE SURFACE MATERIAL SHALL BE REPLACED TO ITS EXISTING DEPTH.

3. NON-SHRINK BACKFILL IN ACCORDANCE WITH COF STD. 9-6-030 AND MAY BE USED FOR BACKFILL UP TO 6" BELOW FINISH GRADE. THE FINAL 6" SHALL BE NATIVE MATERIAL 8" MAX. THE NON-SHRINK BACKFILL SHALL BE PROPORTIONED AS FOLLOWS: 2600 LBS OF 3/8" MINUS AGGREGATE, 800 LBS SAND, 94 LBS CEMENT AND 11 GALLONS WATER.

** TRACER WIRE TAPED TO TOP CENTER OF MAIN WITH 10MIL PVC TAPE ON 4' CENTERS, SEE COF STD 9-01-020.

** WARNING TAPE

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** PIPE DIA. ** "A"

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NTS

City of Flagstaff

ENGINEERING DETAIL

TRENCHING AND BACKFILL
UNPAVED EASEMENT OR STREET

DETAIL NO. 09-01-032

REVISION DATE: 12/30/2017
NOTES:
1. NATIVE BACKFILL SHALL BE PER MAG SPECS AND MAY BE SELECTED FROM THE EXCAVATION MATERIAL OR FROM A SOURCE SELECTED BY THE CONTRACTOR AND APPROVED BY THE CITY ENGINEER.
2. NEW PAVEMENT SHALL BE 2 1/2" AC OVER 4" ABC, OR 4" PORTLAND CEMENT CONCRETE, OR DEPTH OF EXISTING PAVEMENT, WHICHEVER IS GREATER.
3. NON-SHRINK BACKFILL IN ACCORDANCE WITH COF STD. 9-6-030 AND MAY BE USED FOR BACKFILL UP TO EXISTING SUBGRADE. THE NON-SHRINK BACKFILL SHALL BE PROPORTIONED AS FOLLOWS: 2600 LBS OF 3/8" MINUS AGGREGATE, 800 LBS SAND, 94 LBS CEMENT AND 11 GALLONS WATER

* TRACER WIRE TAPED TO TOP CENTER OF MAIN WITH 10MIL PVC TAPE ON 4' CENTERS, SEE COF STD 9-01-020.

** WARNING TAPE
CLASS "B" CONCRETE

45° BEND

45° TO HOUSE

BRACE PIPE WHILE BACKFILLING TRENCH

SLOPE VARIES FROM 45° HORIZONTAL TO VERTICAL FOR ROCK AREAS

BEDDING

12" MIN.

GALVANIZED OR COPPER WIRE

36"-42" OR PER PLAN

TO HOUSE

12" MIN.

FINISH GRADE

WYE

NO GLUE CAP

BRICK

R/W OR BACK OF EASEMENT

WHEN THIS DISTANCE IS 10' OR OVER, USE DEEP SERVICE UNLESS OTHERWISE DIRECTED.

City of Flagstaff

DEEP SEWER SERVICE

ENGINEERING DETAIL

DETAIL NO. 09-02-080

REVISION DATE: 12/30/2017
NOTES:

1. PIPE SIZE AND ELEVATION AS SHOWN ON PLANS
2. MIN. FLOW LINE RADIUS ON 8" PIPE IS 2 FEET

2 LEG INTERSECTION

3 or 4 LEG INTERSECTION
NOTES:

1. PIPE FITTINGS BEDDED IN GRANULAR MATERIAL 3/4" MAX. AND COMPACTION PER MAG SPEC (95% COMPACTION) WHERE DRAINAGE GRAVEL NOT REQUIRED.

2. ALL MATERIAL COMPACTED TO 95% UNDER VALVE BOXES.
NOTES:

1. PIPE FITTINGS BEDDED IN GRANULAR MATERIAL 3/4" MAX. AND COMPACTION PER MAG SPEC (95% COMPACTION) WHERE DRAINAGE GRAVEL NOT REQUIRED.

2. ALL MATERIAL COMPACTED TO 95% UNDER VALVE BOXES.

City of Flagstaff
ENGG DETAIL
09-03-054
END-OF-LINE PERMANENT BLOW-OFF

ENGINEERING DETAIL

09-03-054
REVISION DATE:
12/30/2017
1. ALL SWEAT FITTINGS PER COF DETAIL 9-3-070
2. PIPE FITTINGS BEDDED IN GRANULAR MATERIAL 3/4" MAX AND COMPACTION PER MAG SPECS. (95% COMPACTION) WHERE DRAINAGE GRAVEL NOT REQUIRED
3. ALL MATERIALS COMPACTED TO 95% UNDER VALVE BOXES.
COMPLETE VALVE BOX ASSEMBLY PER COF STD 9-03-060

ABC COMPACTED 95% PER MAG SPECS.

4" OR 6" GATE VALVE THRUST BLOCK PER MAG DETAIL 380

4" OR 6" DIP 90° ELL DIP RISER

AUTO DRAIN VALVE

24"x2'-6" CONCRETE MANHOLE RING

1" - 3" CRUSHED ROCK FOR DRAINAGE PER MAG. SPECS.

DIP/PVC WATERLINE (CL50) / (CL200, C-900)

PIPE SIZE x 4" OR 6" DIP TEE CENTERED AT BOTTOM

FLANGED CONNECTION

DIP SPOOL

4" OR 6" GATE VALVE

24" ALUMINUM FRAME & COVER PER MAG DETAIL 425 LOCATE AS SHOWN ON PLANS

CONCRETE GRADE RING PER COF DETAIL 9-03-062

4" OR 6" DIP FLG & TAPPED BLIND FLG W/2" x 2 1/2" BRASS FIRE HOSE THREADED OUTLET FITTING & PROTECTIVE CAP

THRUST BLOCK PER MAG DETAIL 380

4" OR 6" DIP 45° ELL

THRUST BLOCK PER MAG DETAIL 380

24"x2'-6" CONCRETE GRADE RING PER COF DETAIL 9-03-062

24"x2'-6" CONCRETE MANHOLE RING

1" - 3" CRUSHED ROCK FOR DRAINAGE PER MAG. SPECS.
NOTES:
1. SEE COF STD DETAIL 9-03-062 FOR NOTES RELATING TO THIS DETAIL

ABC 6' MIN. COMPACTED 95% PER MAG SPECS.
1. EXTENSION STEM: WITH SQ. SOCKET ON BOTTOM TO FIT 2" SQ. VALVE NUT. EXTENSION TO VALVE STEMS REQUIRED ON ALL VALVES INSTALLED WHERE OPERATING NUT IS OVER 7' BELOW SURFACE. LENGTH TO FIT EACH INSTALLATION OPERATING NUT TO BE HELD ON TOP OF EXTENSION WITH STOP NUT.

2. STEM PAINTING: ALL STEEL TO HAVE PRIME COAT OF PAINT NO. 1-D AND ONE HEAVY APPLICATION (FINISH COAT) OF PAINT NO. 9 AS PER MAG SECTION 790.
1. Top of valve box and concrete ring must be 1/4" below finished grade.
2. Concrete ring for valves and manholes shall have four (4) stress joints at 90° angles.
3. Depth of concrete shall be a min. 6" or same as AC and ABC section, not to exceed 8".
4. Valves and manholes located under concrete paving shall have a cold joint or expansion joint concrete collar.

Note:

Class 'A' concrete

Water valves, blowoffs and survey handholes

ABC backfill per Mag specs.
Compacted to 95%

City of Flagstaff
RING, FRAME or COVER INSTALLATION

ENGINEERING DETAIL

DETAIL NO.
09-03-062

REVISION DATE:
12/30/2017

NTS
WATER SERVICE CONNECTION
3/4" AND 1"

EXISTING OR FUTURE SIDEWALK

FINISHED GRADE

UF-600 DIRECT BURY 12 GA. MIN. OR COPPER WIRE W/BLUE INSULATION

WATER MAIN

30" - 48"

110 OR QUICK COMPRESSION UNIT

CORP. STOP WITH TAPERED OR IRON PIPE INLET THREADS PER FORD FB600/FB700 OR EQUAL

DOUBLE STRAP OR DOUBLE BAND FOR PVC SERVICE CLAMP

SERVICE TO BE ANGLED TOWARD LOT TO BE SERVED

3/4" OR 1" COPPER WATER LINE TYPE 'K'

19" - 20" TO TOP OF CURB STOP

FORD CURB STOP OR EQUAL B41 - 333WQ OR B41-444WQ BALL VALVE

30" - 48"

12"

19" - 20" TO TOP OF CURB STOP

BRICK

EXISTING OR FUTURE SIDEWALK

3/4" OR 1" COPPER WATER LINE TYPE 'K'

SERVICE TO BE ANGLED TOWARD LOT TO BE SERVED

110 OR QUICK COMPRESSION UNIT

CORP. STOP WITH TAPERED OR IRON PIPE INLET THREADS PER FORD FB600/FB700 OR EQUAL

DOUBLE STRAP OR DOUBLE BAND FOR PVC SERVICE CLAMP

WATER MAIN

19" - 20" TO TOP OF CURB STOP

BRICK

EXISTING OR FUTURE SIDEWALK

3/4" OR 1" COPPER WATER LINE TYPE 'K'

SERVICE TO BE ANGLED TOWARD LOT TO BE SERVED

110 OR QUICK COMPRESSION UNIT

CORP. STOP WITH TAPERED OR IRON PIPE INLET THREADS PER FORD FB600/FB700 OR EQUAL

DOUBLE STRAP OR DOUBLE BAND FOR PVC SERVICE CLAMP

WATER MAIN

19" - 20" TO TOP OF CURB STOP

BRICK

EXISTING OR FUTURE SIDEWALK

3/4" OR 1" COPPER WATER LINE TYPE 'K'

SERVICE TO BE ANGLED TOWARD LOT TO BE SERVED

110 OR QUICK COMPRESSION UNIT

CORP. STOP WITH TAPERED OR IRON PIPE INLET THREADS PER FORD FB600/FB700 OR EQUAL

DOUBLE STRAP OR DOUBLE BAND FOR PVC SERVICE CLAMP

WATER MAIN

19" - 20" TO TOP OF CURB STOP

BRICK

EXISTING OR FUTURE SIDEWALK

3/4" OR 1" COPPER WATER LINE TYPE 'K'

SERVICE TO BE ANGLED TOWARD LOT TO BE SERVED

110 OR QUICK COMPRESSION UNIT

CORP. STOP WITH TAPERED OR IRON PIPE INLET THREADS PER FORD FB600/FB700 OR EQUAL

DOUBLE STRAP OR DOUBLE BAND FOR PVC SERVICE CLAMP

WATER MAIN

19" - 20" TO TOP OF CURB STOP

BRICK

EXISTING OR FUTURE SIDEWALK

3/4" OR 1" COPPER WATER LINE TYPE 'K'

SERVICE TO BE ANGLED TOWARD LOT TO BE SERVED

110 OR QUICK COMPRESSION UNIT

CORP. STOP WITH TAPERED OR IRON PIPE INLET THREADS PER FORD FB600/FB700 OR EQUAL

DOUBLE STRAP OR DOUBLE BAND FOR PVC SERVICE CLAMP

WATER MAIN

19" - 20" TO TOP OF CURB STOP

BRICK

EXISTING OR FUTURE SIDEWALK

3/4" OR 1" COPPER WATER LINE TYPE 'K'
EXISTING OR FUTURE SIDEWALK
PARKWAY

12"

INSTALL METER BOX 1" ABOVE FINISH GRADE

TYPE 'K' COPPER
WATER METER
CURB STOP

TYPE 'A'
IN AREAS WHERE SIDEWALK IS TO BE INSTALLED WITH OR WITHOUT PARKWAY, USE THIS CONFIGURATION

INSTALL METER BOX 1" ABOVE FINISH GRADE

3'

TYPE 'K' COPPER
WATER METER
CURB STOP

TYPE 'B'
IN AREAS WHERE NO SIDEWALK IS REQUIRED, USE THIS CONFIGURATION

P/L
24"

TYPE 'C'
IN AREAS WHERE NO CURB, GUTTER OR SIDEWALK IS REQUIRED THE FOLLOWING REQUIREMENTS SHALL BE MET:

1. METER BOX SHALL BE SET ON FRONT PROPERTY LINE.
2. 3/4" AND 1" CURB STOP SHALL BE 24" OUTSIDE PROPERTY LINE.
3. 1 1/2" AND 2" CURB STOP SHALL BE 36" OUTSIDE PROPERTY LINE.
4. CURB STOP SHALL BE 2" FROM INSIDE OF BOX TO ALLOW FOR EASY ACCESS TO BOTH COUPLINGS

City of Flagstaff
WATER SERVICE CONNECTION
1 1/2" AND 2"

ENGINEERING DETAIL
DETAIL NO. 09-03-070
REVISION DATE: 12/30/2017
1. All fittings used in connections with 1 1/2" and 2" type K rigid copper shall be New Mueller or Ford Quick Joint couplings per Section 9-3-070.1
2. All 1 1/2" and 2" shall entail a swing type connection consisting of two 90° ells and one 1 1/2" x 2 1/2" or 2" x 2 1/2" brass nipple between the 90° ells.
3. All 1 1/2" and 2" meter valve connections shall be IPxIP ball valve type that are equal or exceed those manufactured Ford, B11-666; or Jones J-1900.
4. The curb stop shall be installed 19-20" below finished grade.

NOTE:
NOTES:
1. THE METER BOXES SHALL CONFORM TO THE DIMENSIONS AS SHOWN AND SHALL BE MADE OF HIGH DENSITY REINFORCED CONCRETE.
2. BOXES & LIDS SHALL BE MADE IN THE U.S.A. BY OLDCASTLE PRECAST OR APPROVED EQUAL.

City of Flagstaff

TRAFFIC RATED WATER METER BOX

ENGINEERING DETAIL

DETAIL NO. 09-03-080A

REVISION DATE: 12/30/2017
NOTES:

1. THE METER BOXES SHALL CONFORM TO THE DIMENSIONS AS SHOWN AND SHALL BE MADE OF LLDPE POLYMER.
2. MINIMUM 3/8" WALL THICKNESS.
3. THE METER BOXES SHALL BE BLACK EXCEPT FOR THE LID THROUGHOUT USING POLYETHYLENE MATERIALS AND SHALL NOT HAVE FOAMING OR BLOWING AGENTS.
4. LIDS SHALL BE OF THE LOCATABLE TYPE, COLORED AS FOLLOWS: BLUE ( POTABLE WATER USE ) PURPLE ( RECLAIM WATER USE )
5. BOXES & LIDS SHALL BE MADE IN THE U.S.A. BY DFW OR APPROVED EQUAL.

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<th>METER BOX DIMENSIONS</th>
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<tr>
<td>BOX NUMBER</td>
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<tr>
<td>A1C 3/4&quot; METER</td>
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<tr>
<td>A2C 1&quot; METER</td>
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<tr>
<td>A3C 1 1/2&quot; METER</td>
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<td>A4C 2&quot; METER</td>
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City of Flagstaff

POLYMER WATER METER BOX

ENGINEERING DETAIL

DETAIL NO. 09-03-080

REVISION DATE: 12/30/2017

NTS
1. Multiple water meter manifolds design configuration may vary.
2. All multiple water meter manifolds designs must be approved by the water distribution division of the utilities department.
3. Use copper brazing alloy per ASTM.

Plan views

Note:

City of Flagstaff

Multiple Meter Manifolds

Engineering Detail

Detail No. 09-03-081

Revision Date: 12/30/2017
[558x132]NTS
[286x301]BY-PASS
[47x628]FLOW
[16x31]2
[470x654]1
[452x601]2
[305x654]4
[199x654]9
[162x654]1
[219x579]2
[16x31]6" MIN
[173x693]LINK-SEAL (OR AN APPROVED EQUAL) SEAL ARE TO BE USED ON PIPE THROUGH CONCRETE WALLS
[188x493]INSULATE WATER MAIN FROM CONCRETE BOX WITH EXPANSIVE MATERIAL
[189x483](A) VARIES
[196x731]SEE TABLE OF VAULT SIZES PG. 2 of 2
[126x487]6"
[136x483]MIN.
[106x741](B) VARIES
[108x533]SEE TABLE OF VAULT SIZES PG. 2 of 2
[197x245]WOOD
[196x235]SHIMS
[163x158]24" x 24" x 4"
[137x149]CONCRETE SUPPORT
[133x139]UNDER PIPE SUPPORT
[278x155]4"
[250x146]CRUSHED
[265x136]ROCK
[321x153]4"
[381x156]24" x 24" x 4"
[381x146]CONCRETE SUPPORT
[381x136]UNDER PIPE SUPPORT
[409x277]* MATCH ADJUSTABLE PIPE SUPPORT TO SIZE OF METER
[298x249]*
[294x319]24"
[218x324]18"
[216x315]MIN.
[130x573]24"
[463x416]FINISH GRADE
[336x427]DOUBLE TORSION
[336x417]DOORS
[562x604]CUSTOMER SIDE GATE IN VALVE BOX
[384x71]REVISION DATE:
[190x70]DETAIL NO.
[110x72]ENGINEERING
[125x60]DETAIL
[79x116]City of Flagstaff
[09-03-082]
**KEYNOTE:**

1. FLANGED TEE FOR BY-PASS (SAME SIZE AS METER AND BY-PASS)
2. GATE VALVE, FLANGED WITH HAND WHEEL / OPEN LEFT (SAME SIZE AS METER AND BY-PASS)
3. STRAINER 3", 4", 6" MANUFACTURER APPROVED FOR THE METER INSTALLED
4. COMPOUND METER (CONTACT COF WATER SERVICE FOR CURRENT STYLE AND LAY LENGTH)
5. FLANGED SPOOL (3 PIPE DIAMETERS IN LENGTH)
6. FLANGED 90° BEND (SAME SIZE AS METER AND BY-PASS)
7. DIP MJ SOLID SLEEVE
8. CLASS 350 DIP BY-PASS (SAME SIZE AS THE METER)
9. PIPE SUPPORTS (4 MIN,) MATCH SUPPORT TO SIZE OF METER AND BY-PASS
10. LINK SEAL (OR APPROVED EQUAL) SEALS ARE TO BUSED ON PIPE THROUGH CONCRETE WALL

**NOTE:**

1. FOR LARGER METERS SPECIAL VAULT DESIGN IS REQUIRED.
2. USE OF REMOTE READING DEVICE AT OPTION OF UTILITY.
3. PRECAST CONCRETE VAULTS - WITH DOUBLE TORSION DOORS - SPRING ASSISTED. (CONTACT COF WATER SERVICES FOR APPROVED VAULT BEFORE INSTALLATION).
4. INLET AND OUTLET PIPES MUST BE JOINT RESTRAINED TO PERMIT REMOVAL OF FITTINGS OR METER.
5. WATER METER VAULT MUST BE A OLDCASTLE CO./COF SPEC. VAULT
   - (4484-WA)
   - (5106-WA)
   - (612-WA)
6. 8" & LARGER METERS CONTACT COF WATER SERVICES FOR SPECIAL APPLICATION
LINK-SEAL (OR AN APPROVED EQUAL) SEAL ARE TO BE USED ON PIPE THROUGH CONCRETE WALLS

DOUBLE TORSION DOORS
FINISH GRADE

* MATCH ADJUSTABLE PIPE SUPPORT TO SIZE OF METER

24" x 24" x 4" CONCRETE SUPPORT UNDER PIPE SUPPORT

4" CRUSHED ROCK

24" x 24" x 4" CONCRETE SUPPORT UNDER PIPE SUPPORT

FIRE SERVICE METER
6", 8", 10"
KEYNOTE:
1. FLANGED TEE FOR BY-PASS - SAME SIZE AS THE FIRE SERVICE METER.
2. FLANGED 90° BENDS SAME SIZE AS THE FIRE SERVICE METER
3. GATE VALVE, FLANGED WITH HAND WHEEL OPEN LEFT WITH PIPE SUPPORT SAME SIZE AS THE FIRE SERVICE METER
4. FIRE SERVICE METER (CONTACT COF UTILITIES FOR CURRENT STYLE AND LAY LENGTH)
5. STRAINER, MANUFACTURER APPROVED FOR THE METER ASSEMBLY UL/FM APPROVED
6. BY-PASS MUST MATCH THE SIZE OF THE FIRE SERVICE METER (FLANGED DIP)
7. FLANGED SPOOL (3 PIPE DIAMETERS IN LENGTH)
8. ADJUSTABLE PIPE SUPPORT MATCH PIPE SUPPORT TO SIZE OF METER
9. LINKSEAL (OR APPROVED EQUAL) ARE TO BE USED IN PIPE THROUGH CONCRETE WALLS
10. FLANGED SPOOL
11. DUCTILE IRON MECHANICAL JOINT SOLID SLEEVE - RESTRAINED

NOTE:
1. USE OF REMOTE READING DEVICE AT OPTION OF UTILITY.
2. PRECAST CONCRETE VAULTS - WITH DOUBLE TORSION DOORS - SPRING ASSISTED. (CONTACT COF UTILITIES FOR APPROVED VAULT BEFORE INSTALLATION).
3. INLET AND OUTLET PIPES MUST BE JOINT RESTRAINED TO PERMIT REMOVAL OF FITTINGS OR METER.
4. WATER METER VAULT MUST BE A UTILITY VAULT CO./COF SPEC. VAULT
   6": (612-WA) 8" & LARGER CONTACT COF UTILITIES FOR SPECIAL APPLICATION

City of Flagstaff
ENGINEERING DETAIL

FIRE SERVICE METER
6", 8", 10"

DETAIL NO. 09-03-083

REVISION DATE: 12/30/2017
DELINEATOR LOCATION

PLAN

12" SQ. x 24" DEEP CONCRETE ANCHOR

1/2" EXPANSION JOINT PER MAG STD. DETAIL 340

12" TYPICAL STEPS
NOTE: PLUMBING SHALL NOT PASS BETWEEN MANHOLE STEPS

3" PVC SLEEVE WITH 1" GROUT ALL AROUND
(MIN.) 1% SLOPE

18" DIA CENTERED DEEP SUMP FILL W/GRAVEL 1"-3" GRAVEL

PVC/DIP WATERLINE LARGER THAN 12"

PROFILE

COMBINATION AIR RELEASE VALVE
2"

City of Flagstaff

ENGINEERING DETAIL

DETAIL NO. 09-03-100

REVISION DATE: 12/30/2017
ALL BELOW GROUND PIPE & FITTINGS SHALL BE WRAPPED W/2 LAYERS (50% LAP EACH) OF 10 MIL PVC TAPE W/PRIMER PER MANUFACTURER'S RECOMMENDATIONS.

2" IP x SWEAT COPPER ADAPTOR IP THREADS, SWEAT WITH BRAZING ROD AS PER COF STD FOR SWEAT FITTINGS, 110 or QUICK

2" TYPE "L" RIGID COPPER

2" BRASS UNION

2" BRASS NIPPLE

2" BALL CURB STOP, LOCATE CURB STOP ON IT'S SIDE SO THAT IT IS ACCESSIBLE FROM MH OPENING

2" BRASS 90° ELL

ADJUSTABLE PIPE SUPPORT - - - ELCEN NO. 48, 50 AND 268 FLOOR FLANGE BOLT TO SLAB WITH WEDGE ANCHOR BOLTS

2" COMBINATION AIR RELEASE VALVE

2" 90° ELL - - - GALVANIZED STEEL STANDARD WEIGHT

2" GALVANIZED UNION

2" x 1/2" GALVANIZED TEE

1/2" GALVANIZED DRAIN TUBE

2" SCHEDULE 40 GALVANIZED STEEL PIPE

2" AWWA CLASS "B" FLANGES (THREADED) WITH MINIMUM 2 THREADED BOLTS

2" AWWA CLASS "B" FLANGES (THREADED) W/NO. 18 STAINLESS STEEL WIRE MESH BETWEEN FLANGES

1/2" CHECK VALVE

STANDARD DELINEATOR PER COF STD DETAIL 10-06-011 SET IN A 12" x 24" BASE FACING ONCOMING TRAFFIC (2 EA)

NOTE:
1. ALL BELOW GROUND PIPE & FITTINGS SHALL BE WRAPPED W/2 LAYERS (50% LAP EACH) OF 10 MIL PVC TAPE W/PRIMER PER MANUFACTURER'S RECOMMENDATIONS.
2. ALL COPPER FITTINGS OUTSIDE OF MANHOLE TO BE BEDDED IN FINE CINDERS.
1. SHOP DRAWINGS REQUIRED ON ALL COMPONENTS OF AIR RELEASE VALVE ASSEMBLY VAULT.
2. SERVICE SADDLE AND CORP STOP PER COF STANDARD DETAIL 9-03-070-1

NOTE:

1. SHOP DRAWINGS REQUIRED ON ALL COMPONENTS OF AIR RELEASE VALVE ASSEMBLY VAULT.
2. SERVICE SADDLE AND CORP STOP PER COF STANDARD DETAIL 9-03-070-1

*CALL OUT MODEL/MAKE OF THE APPROVED ARV
1. The end of the dip pipe is restrained mechanically joint and not to rest on the casing.
2. All casing spacers shall run the length of the MJ dip pipe.
3. Casing spacers to be by Advance Products & Systems, Inc. or approved equal.
4. Seal ends of casing w/end seals by Advance Products & Systems, Inc. or approved equal.

**NOTES:**

**SECTION A - A**

**STAINLESS STEEL CASING SPACERS SPACED PER MANUFACTURER’S RECOMMENDATIONS.**

**8” DIA DIP**

**16” DIA, 1/4” THICK STEEL PIPE**

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>SLEEVE SIZE (MIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10”</td>
<td>20”</td>
</tr>
<tr>
<td>12”</td>
<td>24”</td>
</tr>
</tbody>
</table>


WATER/SEWER LINE CASING

**City of Flagstaff**

**ENGINEERING DETAIL**

**DETAIL NO.** 09-06-010

**REVISION DATE:** 12/30/2017
1. COLD MIX ASPHALT MAY BE USED FOR TEMPORARY PATCH IF HOT MIX ASPHALT IS NOT AVAILABLE.
2. A MINIMUM OF 2" OF UPM™ MAY BE USED FOR TEMPORARY TRENCH PAVING IF HOT MIX IS NOT AVAILABLE. UPM™ TEMPORARY PAVEMENT SHALL NOT REMAIN IN PLACE LONGER THAN 5 WORKING DAYS OR UNTIL HOT ASPHALT IS AVAILABLE. AFTER 5 WORKING DAYS, THE CITY MAY PERFORM THE PERMANENT TRENCH PAVEMENT AT THE CONTRACTOR'S EXPENSE. IN LIEU OF PLACING UPM™ THOUGH STILL TEMPORARY, THE CONTRACTOR MAY ELECT TO COMPLETELY BACKFILL THE TRENCH TO WITHIN 2" OF THE FINISHED TRENCH GRADE WITH NON-SHRINK BACKFILL, THE FINAL 2" SHALL BE MAG CLASS 'C' CONCRETE.
3. WHEN PIPE IS ENCASED IN NON-SHRINK BACKFILL, THE PIPE SHALL BE WRAPPED PER MAG SPECIFICATION 610.6.2

NON-SHRINK SLURRY BACKFILL

NOTES:

City of Flagstaff

09-06-030

12/30/2017
1. A correct reduced pressure backflow assembly (RPA) installation is shown above. There must not be any connections on the service line between the RPA and the water meter.
2. Protective cages are optional, and when installed must meet clearance requirements in addition to providing side and top access.
3. Cages must not retain water.
4. The assembly must be accessible at all times.
5. The RPA must be installed above ground and as close to the water meter as possible.
6. The assembly must be protected from freezing.
7. Distance from the bottom of pressure relief valve to the drain opening must be a minimum of twice the diameter of the assembly piping.
8. Installation must meet uniform plumbing codes in addition to Flagstaff water standard details.
9. Installation must be left exposed until inspected and approved by Flagstaff City Utilities.
10. In cases where water supply may not be interrupted during normal working hours, two assemblies installed in parallel are required.
11. The assembly must be approved by the city utilities prior to installation.
12. For an updated list of approved assemblies or additional questions contact the city utilities department at (928) 213-2117.

NOTES:
- Adequate drainage sized to MFG. recommendations
- Thrust block as required per MAG 380
- No obstructions allowed
- Double check valve assembly installation

City of Flagstaff
ENGINEERING DETAIL
DETAIL NO. 09-06-071
REVISION DATE: 12/30/2017

NTS
1. A CORRECT REDUCED PRESSURE BACKFLOW ASSEMBLY (RPA) INSTALLATION IS SHOWN ABOVE. THERE MUST NOT BE ANY CONNECTIONS ON THE SERVICE LINE BETWEEN THE RPA AND THE WATER METER.
2. PROTECTIVE CAGES ARE OPTIONAL, AND WHEN INSTALLED MUST MEET CLEARANCE REQUIREMENTS IN ADDITION TO PROVIDING SIDE AND TOP ACCESS.
3. CAGES MUST NOT RETAIN WATER.
4. THE ASSEMBLY MUST BE ACCESSIBLE AT ALL TIMES.
5. THE RPA MUST BE INSTALLED ABOVE GROUND AND AS CLOSE TO THE WATER METER AS POSSIBLE.
6. THE ASSEMBLY MUST BE PROTECTED FROM FREEZING.
7. DISTANCE FROM THE BOTTOM OF PRESSURE RELIEF VALVE TO THE DRAIN OPENING MUST BE A MINIMUM OF TWICE THE DIAMETER OF THE ASSEMBLY PIPING.
8. INSTALLATION MUST MEET UNIFORM PLUMBING CODES IN ADDITION TO FLAGSTAFF WATER STANDARD DETAILS.
9. INSTALLATION MUST BE LEFT EXPOSED UNTIL INSPECTED AND APPROVED BY FLAGSTAFF CITY UTILITIES.
10. IN CASES WHERE WATER SUPPLY MAY NOT BE INTERRUPTED DURING NORMAL WORKING HOURS, TWO ASSEMBLIES INSTALLED IN PARALLEL ARE REQUIRED.
11. THE ASSEMBLY MUST BE APPROVED BY THE CITY UTILITIES PRIOR TO INSTALLATION.
12. FOR AN UPDATED LIST OF APPROVED ASSEMBLIES OR ADDITIONAL QUESTIONS CONTACT THE CITY UTILITIES DEPARTMENT AT (928) 213-2117
13. THREE SETS OF PLANS SHALL BE SUBMITTED TO CITY UTILITIES DEPARTMENT FOR APPROVAL BY SIGNATURE PRIOR TO INSTALLATION.
1. CONTACT CITY OF FLAGSTAFF UTILITIES DEPARTMENT FOR LATEST APPROVED LIST OF BACKFLOW PREVENTOR ASSEMBLIES.
2. TWO TEST COCKS SHALL BE INSTALLED PER U.S.C.*
3. ASSEMBLY MUST BE INSTALLED 12 INCHES ABOVE THE HIGHEST OUTLET ON THE SYSTEM. IF THIS DISTANCE EXCEEDS 36 INCHES A REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY MUST BE UTILIZED.
4. ASSEMBLY MUST BE PROTECTED FROM FREEZING.
5. 3 SETS OF PLANS SHALL BE SUBMITTED TO THE CITY UTILITIES DEPARTMENT FOR APPROVAL BY SIGNATURE PRIOR TO INSTALLATION.
6. ALL SHUT OFF VALVES MUST BE RESILIENT SEATED.
7. FLANGES OR UNIONS TO BE AS CLOSE TO THE ASSEMBLY AS POSSIBLE.
8. DEVICE MAY BE REMOVED FOR WINTER THEN REINSTALLED AND TESTED IN THE SPRING.

WATER TRUCK/TANK

FILL PIPE PERMANENTLY MOUNTED ON TANK.

2x DIA. OF FILL PIPE ABOVE FLOOD RIM

FLOOD RIM

Hose connection

City of Flagstaff

AIR GAP BACKFLOW PROTECTION FOR WATER TANKS

DETAIL NO.
09-06-074

REVISION DATE:
12/30/2017
City of Flagstaff

FIRE HYDRANT METER
BACKFLOW PROTECTION

ENGINEERING DETAIL

DETAIL NO. 09-06-075

REVISION DATE: 12/30/2017
1. ROADSIDE DELINEATOR SHALL BE PLACED AT THE DIRECTION OF THE TRAFFIC ENGINEER OR IN ACCORDANCE WITH THE GUIDELINES PRESENTED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

2. ON DEAD END STREET, DELINEATORS SHALL BE PLACED AT THE END OF PAVING ON PAVED STREET AND AT THE END OF THE TRAVELED WAY ON UNPAVED STREETS. USE MAG STD 130 TYPE 'A' or 'B' ON TEMPORARY DEAD ENDS.

NOTES:

1. ROADSIDE DELINEATOR SHALL BE PLACED AT THE DIRECTION OF THE TRAFFIC ENGINEER OR IN ACCORDANCE WITH THE GUIDELINES PRESENTED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

2. ON DEAD END STREET, DELINEATORS SHALL BE PLACED AT THE END OF PAVING ON PAVED STREET AND AT THE END OF THE TRAVELED WAY ON UNPAVED STREETS. USE MAG STD 130 TYPE 'A' or 'B' ON TEMPORARY DEAD ENDS.

City of Flagstaff

STANDARD DELINEATOR

ENGINEERING DETAIL

DETAIL NO. 10-06-011

REVISION DATE: 12/30/2017

1/1
1. THIS STANDARD SHALL BE APPLIED TO EACH MINOR LEG OF AN INTERSECTION AS DETERMINED BY THE CITY ENGINEER.
2. GRADES SHOWN ARE AT MINOR STREET CENTERLINE. INDIVIDUAL CONSIDERATION SHALL BE GIVEN AT THE CURB LINE TO INSURE POSITIVE DRAINAGE AT THE VALLEY GUTTER. SUITABLE MEASURES SHALL BE TAKEN WHERE NECESSARY TO INSURE THAT PROPER DRAINAGE PATTERN IS OBTAINED AT THE INTERSECTION. LARGER SCALE INTERSECTION DETAILS MAY BE REQUIRED.

NOTES:

COLLECTOR STREET

LOCAL STREET

STOP RAMP PARAMETERS
**Loop Installation in Multi-Lane Roadway**

- **Installation for Counters**
  - 16'

- **Installation for Classification/Speed**

**Loop Installation in 2-Lane Roadway**

- **Drilling Detail**
  - Drill Detector Loop corners 2 in. deep, then cut loop ducts to form loop
  - Overlap saw cut to assure full depth at hole

**WEEP HOLE**

- See plans for size

**SECTION A - A**

**SECTION B - B**

- Typical No. 7 Pull Box
  - Installation for Traffic Counter

**SECTION C - C**

- Saw cut pattern for counter loops

---

**City of Flagstaff**

**Engineering Detail**

**Detail No.** 10-06-013

**Revision Date:** 12/30/2017

---

**NTS**
1. One detector loop per lane shall be installed and centered in the travel lane.

2. Speed monitoring and vehicle classification systems require 2 loops per lane, centered in the lane, with 16 feet from leading edge to leading edge. The leading edge of both loops must be parallel to each other with no more than 1 inch of variation across the face of the loops.

3. Loops of 6 ft. x 6 ft. are standard for lanes up to 12 feet wide. For wider lanes, adjust the width of the loop to maintain 3 feet from the center stripe and 3 feet from the edge of pavement, edge line, or the lip of gutter. For lanes narrower than 12 feet, adjust the width to maintain 3 feet from the center stripe and at least 1 ft. from edge of pavement, edge line, or the lip of gutter while maintaining 6 ft. length of loop.

4. Three turns of sheathes, THHN stranded 14 AWG single conductor copper wire (in PVC tubing) is the standard for counter and classification / speed loops.

5. Backfill pull box with excavated material and thoroughly tamp.

6. Pull boxes installed in concrete areas shall use ½ inch felt as an expansion joint.

7. All unused excavation material shall be properly disposed.

8. Saw cuts shall be sealed with an approved sealer as per the current Arizona Department of Transportation standards and specifications for roadway and bridge construction.

9. Emulsified crack filler (CRF or approved equal) and silica sand mixture are to be used on all installations in asphaltic concrete, with or without an overlay.

10. When a pull box is installed in sidewalk, install pull box flush with the top of sidewalk.

NOTES:

City of Flagstaff

ENGINEERING DETAIL

DETAIL NO. 10-06-013

REVISION DATE: 12/30/2017

NTS
60' - 90'
USE 60' REVERSE CURVE FOR SPEEDS UP TO 40 MPH
USE 90' REVERSE CURVE FOR SPEED GREATER THAN 40 MPH

VERTICAL CURB MAG 222 TYPE A (TYP.)
USE MAG 220 TYPE 'A' WHEN NECESSARY TO ACCOMMODATE DRAINAGE

MEDIAN NOSE TRANSITION PER MAG STD. DTL. 223

POINT OF REVERSE CURVE

11'
3'

MEDIAN WITH 90' or 60' TAPER
* THE MINIMUM DEPTH OF THE AC VARIES, DEPENDING ON THE TYPE OF ROADWAY. THE TYPICAL MINIMUM PAVEMENT DEPTHS ARE AS FOLLOWS, OR MATCH EXISTING, WHICHEVER IS GREATER.

**ARTERIALS = 5"**
**COLLECTORS = 4"**
**LOCALS & ALLEYS = 3"**

**OFF-STREET PARKING MINIMUM DEPTH OF AC IS 2 1/2"**
PARKING LOTS MAY BE PAVED WITH 4" PORTLAND CEMENT CONCRETE UPON COMPACTED SUBGRADE.

**ALTERNATIVE SECTIONS:**
1. FOR PARKING LOTS, ALTERNATIVE SECTIONS OF PAVEMENT WILL BE CONSIDERED (i.e. PAVERS, POROUS ASPHALT AND CONCRETE, GRASS CRETE, GRAVEL PAVE, ETC.)

**NOTES:**
1. ALTERNATIVE SECTIONS SHALL BE LIMITED TO THE PARKING AREAS AND DRIVE AISLES THAT DO NOT SERVE AS FIRE ACCESS AISLES.
2. THE PROFESSIONAL ENGINEER MAY RECOMMEND PAVEMENT STRUCTURAL SECTION THAT ARE EQUIVALENT TO THE MINIMUM SECTIONS ABOVE.
City of Flagstaff

MINOR COLLECTOR

ENGINEERING DETAIL

DETAIL NO. 10-09-035

REVISION DATE: 12/30/2017
SLOPE AND DRAINAGE EASEMENT

ROW

12' TRAVEL LANE

5' SIDEWALK

5' PARKWAY

2' SIDEWALK

2' SIDEWALK

2' SIDEWALK

SLOPE AND DRAINAGE EASEMENT

28'

26'

52' MIN.

3" ABC MIN. (TYP.)

ROW

TRAVEL LANE

5' PARKWAY

5' PARKWAY

ROW

5' PARKWAY

5' PARKWAY

5' PARKWAY

5' PARKWAY

10-09-036

12/30/2017

City of Flagstaff

ENGINEERING DETAIL

COMMERCIAL LOCAL

DETAIL NO.

REVISION DATE:

1

1

NTS
MINOR ARTERIAL "COMMERCIAL CENTER"

ROW - BUILDING LINE

1' OFFSET

10' SIDEWALK

3' FURNISHING

2' PARKING

6' BIKE LANE

5' TRAVEL LANE

12' TRAVEL LANE

12' TRAVEL LANE

11'-15' TURN LANE

ROADWAY & ROW

RAISED LANDSCAPE MEDIAN (WHEN NEEDED)

1% - 2%

3" ABC MIN. (TYP)

10' TRAVEL LANE

5' BIKE LANE

6' PARKING

2' FURNISHING

3' STRIP

10' SIDEWALK

1' OFFSET

85' OR 89'

12' TRAVEL LANE

56.5' - 58.5'

113' - 117'

56.5' - 58.5'
Notes:

* Travel lanes shall be 12' along truck routes or when design speed is 40 MPH or greater.
** When truck lanes are used these dimensions will increase accordingly.
1' OFFSET
10' SIDE WALK 3' FURNISHING
6' PARKING 5' BIKE LANE 11' TRAVEL LANE
11'-15' SHARED TURN LANE
81' OR 85'
11' TRAVEL LANE 5' BIKE LANE 6' PARKING 3' FURNISHING
10' SIDE WALK

1% - 2%

3" ABC MIN. (TYP)

43.5' - 45.5'

87' - 91' MIN.

City of Flagstaff
MINOR COLLECTOR "COMMERCIAL CENTER"

REVISION DATE: 12/30/2017
SLOPE AND DRAINAGE EASEMENT

TRAVEL LANE

NOTE:
1% - 2%

C ROADWAY & ROW

SLOPE AND DRAINAGE EASEMENT

THICKENED EDGE PER MAG 201 SAFETY EDGE

Curb, gutter, and sidewalk are optional.

City of Flagstaff

RURAL ARTERIAL

ENGINEERING DETAIL

DETAIL NO. 10-09-045

REVISION DATE: 12/30/2017

1/1
City of Flagstaff

RURAL LOCAL "NARROW"

ENGINEERING DETAIL

DETAIL NO. 10-09-048

REVISION DATE: 12/30/2017

1
1. On fill sections where collection and transportation of surface runoff is not required, the maximum slope is 2:1.
2. In rural shoulder sections, guard rails or other protections will be required on fill sections of slopes greater than 4:1, or per AASHTO requirements.
3. Drainage calculations may show such increased drainage as to require additional right-of-way.
4. Right-of-way total varies with combinations of street and shoulder sections.
5. Slope easements will be required where slopes are out of the right-of-way.

NOTES:
RESIDENTIAL ALLEY CROSS-SECTION

City of Flagstaff

ENGINEERING DETAIL

DETAIL NO. 10-09-050

REVISION DATE: 12/30/2017

NTS
NOTES:

1. DRIVEWAY - NO DIRECT PARKING ACCESS.
2. AISLE - DIRECT PARKING ACCESS.
3. THIS DETAIL DOES NOT APPLY FOR SINGLE FAMILY RESIDENCE.
4. PARKING - THE MAXIMUM SLOPES SHOWN FOR AISLES AND SPACES MAY BE EXCEEDED FOR UP TO 30% OF THE TOTAL NUMBER OF SPACES FOR A SINGLE PROJECT. THIS 30% SHOULD BE IN 3 OR MORE LOCATIONS AROUND THE PROJECT AND SHOULD BE IN OUTLYING AREAS THAT WILL BE USED LEAST. IN THE 30% AREAS, THE AISLES SLOPES SHALL NOT EXCEED 8%, THE SPACES SLOPE SHALL NOT EXCEED 6% LONGITUDINALLY OR 8% LATERALLY.
5. ACCORDING TO THE FEDERAL REGISTER/VOL. 56, NO. 144/FRIDAY, JULY 26, 1991/RULES AND REGULATIONS: HANDICAPPED PARKING SPACES AND ACCESS AISLES SHALL BE LEVEL WITH SURFACE SLOPES NOT EXCEEDING 1:50 (2%) IN ALL DIRECTIONS.

City of Flagstaff

PARKING, DRIVEWAY & AISLE SLOPE PARAMETERS

DETAIL NO. 10-10-010

REVISION DATE: 12/30/2017

1/1
PLAN VIEW

SECTION A-A'

City of Flagstaff

BUS PULLOUT

ENGINEERING DETAIL

DETAIL NO.

10-10-019

REVISION DATE:

12/30/2017

1/1
NOTES:

1. REFER TO 16-06-010 FOR PAVEMENT MARKING DETAILS.
2. THIS DETAIL APPLIES ONLY WITH SPEEDS OF 35 MPH OR LESS.
3. WHERE THE SPEED LIMIT EXCEEDS 35 MPH, REFER TO ADOT STANDARDS FOR TURN LANE DETAIL (THE DESIGN SPEED IS THE GREATER OF THE POSTED SPEED OR THE 85TH PERCENTILE SPEED).

TABLE 1

<table>
<thead>
<tr>
<th>DESIGN SPEED (MPH)</th>
<th>DECELERATION LANE LENGTH, L (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>90</td>
</tr>
<tr>
<td>35</td>
<td>120</td>
</tr>
</tbody>
</table>

Per 2010 AASHTO:
Stopping Sight Distance on Level Roadways
SECTION A-A'

SAWCUT ROUNDED EDGE OF EXISTING PAVEMENT

MATCH NATURAL EXISTING FLOWLINE

14 GA. CULVERT WITH 12" MIN. COVER. CULVERT SIZE AS NOTED ON PERMIT OR PLANS. 18" MIN.

TYPICAL STRAIGHT DRIVEWAY
FOR USE WITH CULVERTS

SECTION A-A'

SAWCUT ROUNDED EDGE OF EXISTING PAVEMENT

TYPICAL VALLEY GUTTER DRIVEWAY

DRIVEWAY WITHOUT CULVERT

NOTES:

1. W - INDICATES WIDTH OF PAVED SURFACE OF DRIVEWAY
   L - INDICATES LENGTH OF PAVED SURFACE DRIVEWAY P.L. to E.P.
   R - RADIUS 10' MIN., 20' DESIRABLE
   EOP - EDGE OF EXISTING PAVEMENT
   PL - PROPERTY LINE

2. SIZE AND TYPE OF DRIVEWAY SHALL BE NOTED ON PLANS

3. DRIVEWAYS SHALL BE PERPENDICULAR TO THE STREET WITHIN THE RIGHT OF WAY

4. A.C. AND BASE MATERIAL THICKNESS FOR DRIVEWAYS SHALL BE
   2.5" A.C. 4" A.B.C. or 6" CLASS "A" P.C.C. on 3" A.B.C. FOR RESIDENTIAL and 8" CLASS "A" P.C.C. ON 3" A.B.C. FOR COMMERCIAL

5. DRIVEWAYS ARE TO BE PLACED WHERE SHOWN ON PLANS OR AS DIRECTED BY THE CITY ENGINEER

6. DRAINAGE STRUCTURES SHALL BE PROVIDED UNDER DRIVEWAYS WHERE NECESSARY 12" MIN. COVER TO FINISH GRADE REQUIRED UNLESS OTHERWISE NOTED ON PLANS

City of Flagstaff

PAVED TURNOUTS

ENGINEERING DETAIL

DETAIL NO. 10-10-031

REVISION DATE: 12/30/2017
1. CONTROL ELEVATIONS SHOWN ARE IN RELATION TO THE GUTTER AND ARE LOCATED RADIALY. GUTTER ELEVATION = 0'
2. RAMP CURBS MAY BE POURED MONOLITHIC WITH A CONSTRUCTION JOINT. CLASS "A" CONCRETE TO BE USED AS PER SECTION 725
3. EXPANSION JOINT FILLERS SHALL BE PREFORMED 1/2" BITUMINOUS TYPE PER A.S.T.M. D-1751
4. THE MAXIMUM CROSS SLOPE MAY BE GREATER THAN 2% WHEN THE TOPOGRAPHY IS EXTREME
5. SEE 10-10-043 FOR DETECTABLE WARNING DETAIL

NOTES:

15' RADIUS CURB RETURN
SIDEWALK RAMP DETAIL
WITH LANDSCAPE PARKWAY

T.S/W=8-3/8"

6" HIGH VERTICAL CURB & GUTTER

TC=0' TC=6"

TC=6" TC=0' TC=6"

TOP OF RAMP=6"

SIDEWALK RAMP DETAIL
WITH NO LANDSCAPE PARKWAY

T.S/W=6-3/8"

6" HIGH VERTICAL CURB & GUTTER

TC=0' TC=6"

TC=6" TC=0' TC=6"

TOP OF RAMP=6"

GROOVE SLOPING RAMP FACE PER MAG
SEE MAG 234 (DETAILS)

SECTION A-A'

City of Flagstaff

ENGINEERING DETAIL

DETAIL NO. 10-10-034

REVISION DATE: 12/30/2017

15' RADIUS CURB RETURN
1. Construct the contraction joints as shown on concrete apron for the radius required.
2. When plans call for a Class "A" concrete valley gutter the contraction joints shall be spaced symmetrical with at least one joint every 10 feet.
3. When plans call for a 7' valley gutter, make a 7' square instead of a 3' square.
1. Depressed curb shall be paid for as combined curb & gutter.
2. Expansion joint material shall be secured in place prior to pouring concrete and shall completely separate the driveway slab from the sidewalk, extending from the surface to the subgrade.
3. Control elevations shown are in relation to gutter. Gutter elevation = 0'
EXPANSION JOINT FILLER SHALL BE 1/2" BITUMINOUS TYPE PREFORMED EXPANSION JOINT FILLER, ASTM D-1751
2. CONTROL & EXPANSION JOINTS SHALL ALIGN WITH EXISTING JOINTS IN DRIVEWAY
3. EXPANSION JOINT MATERIAL SHALL BE SECURED IN PLACE PRIOR TO POURING CONCRETE AND SHALL COMPLETELY SEPARATE THE DRIVEWAY SLAB FROM THE SIDEWALK, EXTENDING FROM THE SURFACE TO THE SUBGRADE.
4. EXPANSION JOINT MATERIAL SHALL BE USED WHEN NEW POURING IS ADJACENT TO EXISTING DRIVEWAY AREA.
1. CONTROL ELEVATIONS ARE IN RELATION TO THE GUTTER AND ARE LOCATED RADICALLY. GUTTER ELEVATION = 0"
2. RAMP CURBS MAY BE POURED MONOLITHIC WITH A CONSTRUCTION JOINT. CLASS "A" CONCRETE TO BE USED AS PER SECTION 725.
3. EXPANSION JOINT FILLER SHALL BE 1/2" BITUMINOUS TYPE PREFORMED EXPANSION JOINT FILLER A.S.T.M. D-1751
4. MEASUREMENT AND PAYMENT FOR CONCRETE DRIVEWAY SHALL BE BY THE SQUARE FOOT OF 9" CLASS "A" CONCRETE PLACED. MEASUREMENT AND PAYMENT FOR THE CURB RETURNS AND THE SIDEWALK AT THE RETURNS SHALL BE MADE UNDER THEIR SEPARATE PAY ITEMS.
5. SEE MAG 251 FOR DETACHED CONDITION

NOTES:
1. IF A PAVEMENT EDGE TAPER OVERLAPS THE TAPER FROM ANOTHER WIDENING, OR EXTENDS INTO A STREET INTERSECTION, THEN THE NEW PAVEMENT EDGE SHALL BE CONSTRUCTED TO MATCH THE FULL WIDTH OF THE WIDENING, OR TO MATCH THE CURB RETURN OF THE INTERSECTION.

2. TAPERS ARE CONSTRUCTED OFF THE FRONTAGE OF THE DEVELOPING PARCEL UNLESS ADEQUATE RIGHT-OF-WAY IS NOT AVAILABLE.

3. WIDENING AND DEPARTURE TAPER FOR CASE 1 MAY REQUIRE LANE MARKINGS AND WARNING SIGNS. ALL CURBED DEPARTURE TAPERS REQUIRE TYPE 2 OBJECTMARKERS (TRIPLE VERTICAL).

4. SAWCUT MAYBE REQUIRED.

NOTES:

<table>
<thead>
<tr>
<th>CASE 1</th>
<th>CASE 2</th>
<th>CASE 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONDITION</td>
<td>W+P ≥ 26'</td>
<td>W ≥ 8'</td>
</tr>
<tr>
<td></td>
<td>L ≥ 250'</td>
<td>L ≤ 250'</td>
</tr>
<tr>
<td>T(d)</td>
<td>WS^2 / 120</td>
<td>4W</td>
</tr>
<tr>
<td>(NOTE 3)</td>
<td>WS^2 / 310</td>
<td></td>
</tr>
</tbody>
</table>

\(T\) = LENGTH OF APPROACH TAPER
\(T\) = LENGTH OF DEPARTURE TAPER

\(W\) = WIDTH OF PAVEMENT WIDENING, TO FACE OF CURB (FT.)
\(L\) = LENGTH OF PAVEMENT WIDENING (FT.)
\(S\) = SPEED OF TRAFFIC (M.P.H.)
\(P\) = WIDTH OF ADJACENT TRAFFIC LANE TO EDGE OF EXISTING PAVEMENT (FT.)

City of Flagstaff

PAVEMENT EDGE TAPERS
FOR ISOLATED STREET WIDENINGS

ENGINEERING DETAIL
DETAIL NO. 10-10-042
REVISION DATE: 12/30/2017
IN THE CASE OF WIDENING WITHOUT A CURB THE DIMENSION 'W' IS TO THE NEW EDGE OF PAVEMENT. IN THE CASE OF WIDENING AN ALREADY CURBED SECTION THE TAPER LENGTHS ARE THE SAME BUT THE EDGE OF THE TAPER IS THE EXTENSION OF A TYPE 'A' CURB.

**CASE 1**

\[
\begin{align*}
W+P & \geq 26' \\
L & \geq 250'
\end{align*}
\]

THE WIDENING IS LONG ENOUGH AND WIDE ENOUGH THAT IT CREATES or APPEARS TO BE AN ADDITIONAL TRAFFIC LANE WHICH COULD BE USED BY THROUGH TRAFFIC FOR DECELERATION, OR PASSING. THE SPEED OF THE TRAFFIC IS A CRITICAL FACTOR AND SAFE TAPER LENGTHS ARE DERIVED FROM THE MUTCD AND AASHTO FOR THE DIVERGING AND MERGING MANEUVERS AT EACH END.

**CASE 2**

\[
\begin{align*}
W & \geq 8' \\
L & \leq 250'
\end{align*}
\]

THE WIDENED AREA IS NOT A FULL ADDITIONAL TRAFFIC LANE, BUT CAN SERVE FOR PASSING AT REDUCED SPEED, MANEUVERING INTO ON-STREET PARKING OR IN AND OUT OF DRIVEWAYS ALONG THE WIDENED SECTION. TAPERS SERVE TO PROTECT THE EDGE OF PAVEMENT BEYOND THE WIDENING. THE DEPARTURE TAPER IS LONG ENOUGH TO ACCOMMODATE SWEEPING TURNS OUT OF DRIVEWAYS.

**CASE 3**

\[
\begin{align*}
W & < 8'
\end{align*}
\]

THE WIDENED AREA IS NOT USED BY TRAFFIC EXCEPT TO ENTER AND EXIT DRIVEWAYS ALONG THE WIDENED SECTIONS. THE TAPERS PROTECT THE EDGE OF THE PAVEMENT.

NOTES:

1. COVERS THE COMMON SITUATION WHERE A WIDENING IS NEAR BUT NOT ADJACENT TO ANOTHER WIDENING OR AN INTERSECTION RETURN. THE MATCH ACROSS THE INTERVENING PROPERTY ELIMINATES THE RAGGED/RANDOM APPEARANCE OF THE EDGE OF PAVEMENT AND MAKES PLOWING AND SWEEPING MUCH EASIER.

2. CLARIFIES AND STANDARDIZES THE CITY RESPONSE TO THE QUESTION OF HOW MUCH WIDENING IS NECESSARY. IT ALSO PRECLUDES THE CASES WE HAVE HAD IN THE PAST WHERE THE TAPER IS ACCOMPLISHED WITHIN THE WIDENING USING EDGE LINE STRIPING AND DELINEATORS INSTALLED IN THE PAVEMENT.

3. REQUIRES TRAFFIC CONTROL DEVICES TO WARN DRIVERS AND MAINTENANCE OPERATORS IN CASES WHERE THE DEPARTURE TAPES COULD BE A HAZARD TO TRAFFIC OR CURBED TAPERS COULD BE DAMAGED DURING PLOWING.

4. THIS STANDARD DOES NOT COVER THE SITUATIONS WHERE THERE IS NOT ENOUGH RIGHT OF WAY IN FRONT OF THE PROPERTIES NEXT TO THE DEVELOPMENT TO ACCOMMODATE THE REQUIRED TAPER. THESE AND OTHER UNUSUAL CONDITIONS NEED TO BE REVIEWED ON A CASE BY CASE BASIS.
1. DETECTABLE WARNING STRIPS SHALL BE USED ON ALL NEW AND RETRO-FIT RAMPS, PEDESTRIAN REFUGES AND OTHER LOCATIONS AS OUTLINED IN THE CURRENT ACCESS BOARD GUIDELINES FOR RIGHT OF WAY DEVELOPMENT.

2. DETECTABLE WARNING STRIPS SHALL BE MECHANICALLY ATTACHED FOR NEW RAMP INSTALLATIONS.

3. DIMENSIONS ARE SUBJECT TO SITE CONDITIONS AND ADA REGULATIONS.

NOTES:

1. DETECTABLE WARNING STRIPS SHALL BE USED ON ALL NEW AND RETRO-FIT RAMPS, PEDESTRIAN REFUGES AND OTHER LOCATIONS AS OUTLINED IN THE CURRENT ACCESS BOARD GUIDELINES FOR RIGHT OF WAY DEVELOPMENT.

2. DETECTABLE WARNING STRIPS SHALL BE MECHANICALLY ATTACHED FOR NEW RAMP INSTALLATIONS.

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KEYNOTES:

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>11/16&quot; MINIMUM (TYP.) (0.65&quot; MINIMUM ADA ACTUAL)</td>
</tr>
<tr>
<td>B</td>
<td>1-5/8&quot; to 2-3/8&quot; (TYP.) (1.6&quot; to 2.4&quot; ADA ACTUAL)</td>
</tr>
<tr>
<td>C</td>
<td>7/8&quot; to 1-3/8&quot; (TYP.) (0.9&quot; to 1.4&quot; ADA ACTUAL)</td>
</tr>
<tr>
<td>D</td>
<td>50% to 65% OF ‘C’</td>
</tr>
</tbody>
</table>

MATERIALS:

- CAST GRAY IRON CONFORMING TO ASTM A-48 CLASS 30A MINIMUM
NOTES:
1. RIGHT-OF-WAY CONTROL MONUMENT SHALL BE FACTORY STAMPED "CITY OF FLAGSTAFF" AND BEAR THE REGISTRATION NUMBER OF THE LAND SURVEYOR RESPONSIBLE FOR THE WORK.
2. A MONUMENT EXAMPLE ACCEPTABLE TO THE CITY: 2" LIETZ BRASS CAP PRESS-FITTED ON TO AN I.P.
3. USE TYPE C UNLESS SPECIFIED OTHERWISE ON THE PLANS, SEE SPECIFICATION 13-11-001-0002.A.
DRAIN HOLES MUST BE KEPT CLEAR

CLASS 'A' CONCRETE PAD AROUND HYDRANT BARREL 4"-6" THICK 3'x3' WIDE

DRAIN HOLES MUST BE KEPT CLEAR

1" TO BACK OF SIDEWALK

1" MAX. FROM TOP OF PAD TO TOP OF CURB OR SIDEWALK

BURY 6' MAX.

2" MIN. 6" MAX.

1/4 CUBIC YARD GRAVEL (3/4") AROUND DRAIN HOLES

THRUST BLOCKS PER MAG DETAIL NO. 380 (TYP.)

COMPLETE VALVE BOX ASSEMBLY PER COF STD. 9-03-060

FLANGED X MJ 6" GATE VALVE

MJ DIP WATERLINE

FLANGED TEE

TAPPING SLEEVE AND VALVE PER MAG DET. No. 340

FOR SPECIFICATIONS, INSTALLATION, AND TESTING REFER TO SECTION 13-09-006-0006 (FIRE HYDRANTS).
NOTES:
1. GROUT SHALL CONFORM TO MAG SECTION 776
2. * COLOR SHALL BE OSHA SAFETY YELLOW (WITH YELLOW REFLECTIVE TAPE) WHEN SPECIFIED ON THE PLANS
DRAINAGE or SLOPE EASEMENT IF REQUIRED

BOLLARDS SHALL NOT BE PLACED IN THE WAY OF VEHICULAR TRAFFIC

NOTE:

EDGE OF PAVEMENT

FLOW OF DRAINAGE DITCH

6' SHOULDER

DRAINAGE DITCH

2%

EDGE OF PAVEMENT

6'

3' MIN.

FIRE HYDRANT

FIRE HYDRANT PROTECTION POST PER DETAIL 13-03-012

SHOULDER WIDENING AT IFRE HYDRANTS FOR UNCURBED ROADS

City of Flagstaff

ENGINEERING DETAIL

DETAIL NO. 13-03-013

REVISION DATE: 12/30/2017
1. BOLLARD IS TO BE PAINTED AS FOLLOWS:
   1.1. PRIMER: TWO (2) COATS - COMPONENT ETCHING WASH PRIMER
   1.2. INTERMEDIATE: TWO (2) COATS - COMPONENT EPOXY PRIMER
   1.3. FINISH: ONE (1) COAT - "FRAZEE - 7636N LUSH VERANDA" HEAVY DUTY ENAMEL (ALKYD BASED) OR EQUAL
2. FOOTINGS AND BOLLARDS TO BE INSTALLED PRIOR TO POURING CONCRETE
3. BOLLARDS SHALL NOT BE IN THE WAY OF VEHICULAR TRAFFIC

NOTES:

REMOVABLE BOLLARD

City of Flagstaff

ENGINEERING DETAIL

DETAIL NO. 13-03-014

REVISION DATE: 12/30/2017

NTS NTS
1. 50’ MAX DISTANCE BETWEEN EXPANSION JOINTS per ADOT DETAIL C-07.01 (E JOINT)
2. 10’ MAX DISTANCE BETWEEN CONTRACTION JOINT (SAWCUT TO 1 1/2" DEPTH AND FILL JOINT per ADOT DETAIL C-07.01)

* PER ANTICIPATED MIX USES, AREA TYPE AND ENVIRONMENT, LANE STRIPING WILL BE REQUIRED ON 14 FT WIDTHS AND MAY BE REQUIRED ON 10’ AND 12’ WIDTHS TO INDICATE CENTERLINE OR USER SEPARATION. IF IT IS DETERMINED THAT THE CITY WILL UTILIZE THE FUTS TRAIL AS ACCESS FOR MAINTENANCE VEHICLES, THE DESIGN ENGINEER MAY BE REQUIRED TO DESIGN A THICKER PAVEMENT SECTION THAT WILL SUPPORT MAINTENANCE VEHICLES THAT ARE ANTICIPATED TO USE THE FUTS FOR ACCESS. WHEN A FUTS TRAIL IS CONSTRUCTED ADJACENT TO A PUBLIC STREET (IN LIEU OF A SIDEWALK) IT SHALL BE CONSTRUCTED OF PCC
1. WHERE THE SLOPE OF THE TRAIL EXCEEDS 10% THE STRUCTURAL SECTION SHALL BE PCC OR AC PER SHEET 1/4
2. SEED ALL DISTURBED AREAS PER COF STD. 13-17-002

NOTES:

1. 50' MAX DISTANCE BETWEEN EXPANSION JOINTS per ADOT DETAIL C-07.01 (E JOINT)
2. 10' MAX DISTANCE BETWEEN CONTRACTION JOINT (SAWCUT TO 1 1/2" DEPTH AND FILL JOINT) per ADOT DETAIL C-07.01

* PER ANTICIPATED MIX USES, AREA TYPE AND ENVIRONMENT, LANE STRIPING WILL BE REQUIRED ON 14 FT WIDTHS AND MAY BE REQUIRED ON 10' AND 12' WIDTHS TO INDICATE CENTERLINE OR USER SEPARATION. IF IT IS DETERMINED THAT THE CITY WILL UTILIZE THE FUTS TRAIL AS ACCESS FOR MAINTENANCE VEHICLES, THE DESIGN ENGINEER MAY BE REQUIRED TO DESIGN A THICKER PAVEMENT SECTION THAT WILL SUPPORT MAINTENANCE VEHICLES THAT ARE ANTICIPATED TO USE THE FUTS FOR ACCESS. WHEN A FUTS TRAIL IS CONSTRUCTED ADJACENT TO A PUBLIC STREET (IN LIEU OF A SIDEWALK) IT SHALL BE CONSTRUCTED OF PCC
NOTES:
1. USE ONE OR TWO SECTIONS OF 5"x5" POSTS AND 3"x3" RAILS FOR ENTRY FEATURES.
2. USE 56.5" POSTS AND 4" RAILS IN HIGH HAZARD AREAS
3. SET POST 3' DEEP ON SLOPES GREATER THAN 2:1

4"x4"x44.5" ABOVE GRADE, 3/16" UNPAINTED STEEL SQUARE TUBING, PEAKED CAP TO DRAIN

City of Flagstaff
FLAGSTAFF URBAN TRAILS
SYSTEM DETAILS

14-01-010
12/30/2017
AGGREGATE SURFACE MATERIAL (FOR UNPAVED SECTION):

1. HERBICIDE SHALL BE SURFLAN ® OR EQUAL FOR PRE-EMERGENT CONTROL AND ROUNDUP ® FOR POST EMERGENT CONTROL.

2. AGGREGATE SURFACE MATERIAL SHALL BE A COLOR COMPATIBLE WITH NATURAL SURROUNDINGS AND ACCEPTABLE TO THE CITY OR COUNTY. WHITE, LIGHT GREY OR OTHER VISUALLY INCOMPATIBLE COLORED AGGREGATES WILL NOT BE ACCEPTED.

3. AGGREGATE SURFACE MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF MAG SECTION 702, EXCEPT THAT THE GRADATION SHALL BE AS FOLLOWS:

<table>
<thead>
<tr>
<th>SIEVE SIZE (SQUARE OPENINGS)</th>
<th>PERCENT BY WEIGHT PASSING SIEVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>100</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>96-100</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>85-99</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>79-98</td>
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<tr>
<td>No. 4</td>
<td>68-87</td>
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<tr>
<td>No. 8</td>
<td>52-74</td>
</tr>
<tr>
<td>No. 30</td>
<td>27-50</td>
</tr>
<tr>
<td>No. 100</td>
<td>16-33</td>
</tr>
<tr>
<td>No. 200</td>
<td>13-27</td>
</tr>
</tbody>
</table>

4. HERBICIDES SHALL BE MIXED IN ACCORDANCE WITH THE MANUFACTURER’S INSTRUCTIONS FOR NON-CROP LAND USE. PRE-EMERGENT HERBICIDE SHALL BE APPLIED TO THE SUBGRADE SURFACE AT A RATIO OF 1.5 GALLONS TO 100 GALLONS OF WATER PER ACRE. CARE SHALL BE GIVEN TO CONTAINING THE HERBICIDES TO THE FUTS TRAIL LIMITS ONLY. THE AGGREGATE SURFACE MATERIAL SHALL BE TREATED WITH LIGNIN SULFONATE IN ACCORDANCE WITH MAG SPECIFICATION 792.2.

5. HERBICIDES SHALL BE MIXED IN ACCORDANCE WITH THE MANUFACTURER’S INSTRUCTIONS FOR NON-CROP LAND USE. POST EMERGENT HERBICIDES SHALL BE APPLIED TO THE SUBGRADE AFTER THE SUBGRADE HAS BEEN SCARIFIED AND BEFORE SHAPING AND COMPACTING THE BASE. THE POST EMERGENT HERBICIDE SHALL BE APPLIED AT A RATIO OF 1.5 GALLONS OF WATER PER ACRE. CARE SHALL BE GIVEN TO CONTAINING HERBICIDES TO THE FUTS TRAIL LIMITS ONLY.

6. LIGNIN SULFONATE SHALL BE DELIVERED TO THE CONTRACTOR IN A CONCENTRATED FORM WITH 50% SPENT SUFLIDE LIQUOR (SSL). THE CONTRACTOR SHALL FURTHER DILUTE THE LIGNIN SULFONATE WITH AN EQUAL PART OF WATER PRIOR TO SPREADING.

7. PLACEMENT OF AGGREGATE SURFACE MATERIAL WITH DILUTED LIGNIN SULFONATE SHALL BE ACCORDANCE WITH THE MANUFACTURER’S SPECIFICATIONS IN OTHER APPROVED METHODS, INCLUDING APPLICATION OF WATER TO THE SUBGRADE AS REQUIRED BY THE MANUFACTURER. THE FUTS TRAIL SHALL RECEIVE A TOTAL APPLICATION OF 0.7 GALLONS PER SQUARE YARD OF 50% SSL AND SHALL BE APPLIED IN THE FOLLOWING MANNER:

   a. THE AGGREGATE SURFACE MATERIAL SHALL BE THOROUGHLY MIXED WITH DILUTED LIGNIN SULFONATE AT A RATE OF 0.5 TO 0.6 GALLONS PER SQUARE YARD OF TRAIL.

   b. THE CONTRACTOR SHALL APPLY A "TOP SHOT" TO THE FINISHED TRAIL SURFACE BY SURFACE SPRAYING 0.1 TO 0.2 GALLONS OF DILUTED LIGNIN SULFONATE PER SQUARE YARD OF TRAIL NO SOONER THAN 2 DAYS AND NO LATER THAN 3 DAYS AFTER THE PLACEMENT OF THE TREATED AGGREGATE SURFACE COURSE.

DIRTY CINDER GRADATION SPECIFICATION

<table>
<thead>
<tr>
<th>SIEVE SIZE (SQUARE OPENINGS)</th>
<th>PERCENT BY WEIGHT PASSING SIEVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4&quot;</td>
<td>90-100</td>
</tr>
<tr>
<td>No. 4</td>
<td>58-78</td>
</tr>
<tr>
<td>No. 8</td>
<td>37-67</td>
</tr>
<tr>
<td>No. 30</td>
<td>13-35</td>
</tr>
<tr>
<td>No. 100</td>
<td>4-15</td>
</tr>
<tr>
<td>No. 200</td>
<td>0-12</td>
</tr>
</tbody>
</table>
WIDTH OF UNDERPASS SHOULD BE INFLUENCED IN PART BY LENGTH. FOR TUNNEL STRUCTURES UP TO 50' LONG, THE WIDTH SHOULD BE EITHER:
   a) 14'
   b) THE WIDTH OF THE APPROACH PATHWAY PLUS A 24" "SHY ZONE" ON EITHER SIDE (i.e., 10'+2'+2'=14'),
WHICHEVER IS GREATER.
FOR TUNNEL STRUCTURES LONGER THAN 50', THE WIDTH SHOULD BE INCREASED BY ONE FOOT (1') FOR ANY PORTION OF EACH 10' BEYOND 50'. (FOR 51' TO 60' USE 15' WIDTH; FOR 61' TO 70' USE 16'; AND SO FORTH)
THE HEIGHT/CLEARANCE OF THE UNDERPASS SHOULD BE A MINIMUM OF 9' WITH THE PREFERRED HEIGHT OF 10' (ESPECIALLY FOR LONGER UNDERPASSES)
NOTE:
CONSTRUCT APPROPRIATE EDGE RETENTION CURB AS SHOWN (BELOW)
1.5% SLOPE
3" ABC MIN.
1" SAND

NOTE: 8" BASE AT DRIVEWAY CUTS
COMPACTED SUBGRADE, 95%

TYPICAL CROSS SECTION

TYPICAL LAYOUT

EX. LINE OF BUILDING or PROPERTY ROW
EDGE RETENTION CURB
REMOVE EXISTING SIDEWALK
SAWCUT EXISTING SIDEWALK
6" TYP.

FULL WIDTH OR AS SHOWN
CONCRETE PAVERS (TYP. ARRAY)

NOTE:
1. 1/2" RADIUS ALL EXPOSED EDGES
2. CONTRACTION JOINTS IN ALL CURBS, 10' MAX SPACING
3. THIS WORK SHALL MEET ALL REQUIREMENTS OF M.A.G. SECTION 342 "DECORATIVE PAVEMENT CONCRETE PAVING STONE or BRICK"

EDGE RETENTION CURB DETAILS

EXISTING BUILDING or STRUCTURE LINE
1/4" FIBER EXPANSION JOINT
EDGE RETENTION CURB
CONCRETE PAVERS

1" SAND
3" ABC MIN.

6" TYPE "A"

EXISTING GROUND or PAVING
EDGE RETENTION CURB
CONCRETE PAVERS

1" SAND
3" ABC MIN.
6" TYPE "B"

VARIES
EDGE RETENTION CURB
CONCRETE PAVERS

3" ABC MIN.
1" SAND
12"
6"

TYPE "C"

City of Flagstaff

CONCRETE PAVING STONE or BRICK SIDEWALK

ENGINEERING DETAIL

DETAIL NO.
16-01-240

REVISION DATE:
12/30/2017

1
1
SECTION A - A

NOTE:
THIS WORK SHALL MEET ALL REQUIREMENTS OF MAG SECTION 342 "DECORATIVE PAVEMENT CONCRETE PAVING STONE OR BRICK".

CONCRETE CURB
RESTRAINT TYPE B
(SEE DETAIL 16-01-240)
TYP. BOTH SIDES

1" SAND LEVELING BED

CONCRETE PAVING STONE or
BRICK DRIVEWAY

COMPACTED SUBGRADE; 95%
1. EACH LOCATION (CROSSING 1 AND CROSSING 2) IS AN INDEPENDENT CROSSING AND SHALL HAVE ITS OWN ACTUATED CONTROLLER.
2. EACH CROSSING SHALL HAVE TWO (2) PUSH BUTTONS, SIX (6) 12" LED CIRCULAR RAPID FLASHING BEACON SIGNAL HEADS, AND TWO (2) LED INDICATOR LIGHTS.
3. ALL INDICATORS AND DETECTORS ARE TO BE HARDWIRED TO THE CONTROLLERS.
1. ADVANCED WARNING SIGNS (MUTCD W11-2 AND W16-9P) ARE TO BE PLACED IN ACCORDANCE WITH SECTION 2C.05 OF THE MUTCD.
NOTES:

1. FOR ALL TRAFFIC SIGNAL CONSTRUCTION WORK REFER TO SECTION 13-16-004-0004.
2. FOR POLE, FOUNDATION, AND BOLTS REFER TO ADOT STANDARD DRAWINGS T.S. 4-1 AND 4-23 AND ADOT STANDARD SPECIFICATIONS SECTION 731-1.
3. FOR MOUNTING ASSEMBLY REFER TO ADOT TYPE VII MOUNTING ASSEMBLY STANDARD DRAWING.
4. FOR SIGNAL FACE REFER TO ADOT FLASHING BEACON SIGNAL FACE ASSEMBLY; TYPE "D" STANDARD DRAWING; ALSO INCLUDE 2" FLUORESCENT YELLOW PRISMATIC RETROREFLECTIVE BORDER AROUND THE ENTIRE PERIMETER OF THE BACKPLATE.
5. FOR BREAKAWAY BASE REFER TO ADOT TYPE 2 BREAKAWAY BASE STANDARD DRAWINGS.
6. A 25' COIL OF #4 AWG BARE COPPER CONDUCTOR OR 14" SQUARE COPPER GROUND PLATE SHALL BE INSTALLED BEFORE THE CONCRETE IS POURED AND CONNECTED TO POLE GROUNDING LUG IN THE HAND HOLE. THE GROUND OR COIL SHALL BE COVERED WITH 6" OF FILL.
NOTES:
1. FOR ALL TRAFFIC SIGNAL CONSTRUCTION WORK REFER TO SECTION 13-16-004-0004.
2. SIZE OF THE FOUNDATION, POLE, AND MAST ARM ARE DEPENDENT ON THE NUMBER AND LAYOUT OF LANES AND SHALL BE DETERMINED USING ADOT STANDARD SPECIFICATIONS AND DRAWINGS.
3. FOR SIGNAL MOUNTING ASSEMBLY REFER TO ADOT TYPE VII MOUNTING ASSEMBLY STANDARD DRAWING.
4. FOR SIGNAL FACE REFER TO ADOT FLASHING BEACON SIGNAL FACE ASSEMBLY; TYPE "D" STANDARD DRAWING; ALSO INCLUDE 2" FLUORESCENT YELLOW PRISMATIC RETROREFLECTIVE BORDER AROUND THE ENTIRE PERIMETER OF THE BACKPLATE.
5. FOR OVERHEAD SIGNAL MOUNTING ASSEMBLY REFER TO PELCO ASTRO-BRAC AS-0124 (DUAL SIGNAL SECTION).
6. A 25' COIL OF #4 AWG BARE COPPER CONDUCTOR OR 14" SQUARE COPPER GROUND PLATE SHALL BE INSTALLED BEFORE THE CONCRETE IS POURED AND CONNECTED TO POLE GROUNDING LUG IN THE HAND HOLE. THE GROUND OR COIL SHALL BE COVERED WITH 6" OF FILL.

See Note 4
See Note 5
See Note 6

MUTCD W11-2 (36" x 36")
MUTCD W16-7P (24" x 12")

Drill Hole 116°
38" To Button
See Note 3
See Note 4

For Street Lighting
Refer to Section 13-12

For Street Lighting
Refer to Section 13-12
NOTES:
1. FOR PAVEMENT MARKING MATERIAL TYPES, SEE CHAPTER 13-16-006.
2. 8" WIDE STRIPING IS TO BE A MINIMUM LENGTH OF 100 FEET, OR MATCH EXISTING TURN LANE.
3. LAYOUT OF MINI SKIPS THROUGH INTERSECTION AND SETBACK OF LEFT TURN LANE STOP BAR SHALL BE APPROVED BY TRANSPORTATION ENGINEERING STAFF.
NOTES:
1. USED WHEN A BIKE LANE APPROACHES AN INTERSECTION, STRIPE A SKIP SECTION OF 50 FEET ENDING AT CURB RETURN.
   SOLID BIKE STRIPING SHALL CONTINUE ACROSS DRIVEWAYS.
3. WHEN PARKING APPROACHES AN INTERSECTION, STRIPE A SKIP SECTION OF 50 FEET ON THE TRAVEL LANE SIDE OF THE BIKE LANE AND A 25 FOOT SECTION ON THE PARKING SIDE OF THE BIKE LANE.
4. DOUBLE YELLOW STRIPING SHALL BE A 4" WIDE STRIPE, A 6" WIDE GAP, AND A 4" WIDE STRIPE.
5. BIKE LANE SYMBOLS SHALL BE 15 FEET FROM THE CURB RETURN ON THE DOWNSTREAM LEG OF ALL INTERSECTIONS.
6. THE GAPS BETWEEN BIKE SYMBOLS SHALL BE RELATIVELY STANDARD SPACING OF NO MORE THAN 1/2 MILE LONG.
7. TYPICAL BIKE LANE WIDTH = 4.5', EXCEPT WHEN ADJACENT TO ON-STREET PARKING AND/OR WHEN BIKE LANE TRAVERSES BETWEEN TURN LANES, THEN WIDTH = 5'.

City of Flagstaff

INTERSECTION STRIPING

ENGINEERING DETAIL

DETAIL NO. 16-06-010

REVISION DATE: 12/30/2017
NOTES:
1. FOR ROADWAYS WITH MORE OR LESS LANES, SAME CONFIGURATION APPLIES. KEEP CROSSWALK BARS CENTERED ON LANE LINES, IN CENTER OF TRAVELED PORTION OF LANE TO MINIMIZE WEAR ON CROSSWALK STRIPES, AND PARALLEL TO WHEEL PATHS. DETAIL IS INTENDED TO BE REPRESENTATIVE ONLY. FINAL LAYOUT OF PAVEMENT MARKINGS IS DEPENDENT ON SPECIFIC LANE CONFIGURATION OF STREET.
2. CITY INSPECTOR SHALL INVOLVE TRAFFIC ENGINEERING SECTION FOR REVIEWING NONSTANDARD LAYOUTS PRIOR TO INSTALLING MARKINGS, FOR WHICH AT LEAST 24-HOURS NOTICE IS REQUIRED.
3. FOR MORE THAN TWO (2) 20 FOOT PARALLEL PARKING STALLS, ONE (1) PARKING MANEUVERING BOX IS REQUIRED BETWEEN THE SECOND AND THIRD STALL.
STEP 1:
PLACE FIRST ARROW FLUSH WITH THE END OF THE TURN LANE LINE, AS SHOWN

STEP 2:
WHEN STORAGE LENGTH IS 76' OR GREATER, PLACE ANOTHER ARROW 20' FROM THE STOP BAR, OR IF NO STOP BAR EXISTS 20' FROM BEGINNING OF THE TURN LANE LINE

STEP 3:
PLACE SUPPLEMENTAL ARROW CENTERED FOR STORAGE LENGTHS OF 200' OR GREATER.

NOTES:
1. FOR STORAGE LENGTHS OF 400' OR GREATER, ADD A 4TH ARROW EQUALLY SPACED.
2. ARROWS SHALL BE EVEN WITH ADJACENT TURN LANE ARROWS WHEN APPLICABLE.

TURN LANE PAVEMENT MARKINGS
DECOMPOSED GRANITE

NOTES:
Refer to COS Detail 2210 for finish grade height of decomposed granite in relation to top of curbs & sidewalks.

FORM TEMPORARY IRRIGATION BORDER JUST OUTSIDE OF ROOT BALL. USE WATER TO SETTLE BACKFILL. DO NOT PACK BACKFILL.

BACKFILL WITH NATIVE SOIL (NO ROCKS GREATER THAN 1") APPLY SLOW-RELEASE FERTILIZER TO SURFACE AWAY FROM TRUNK PER MANUFACTURER’S SPECIFICATIONS.

SHRUB PLANTING

NOTES:
1. SUFFICIENT CLEARANCE SHALL BE MAINTAINED BETWEEN SHRUBS AND UTILITY FACILITIES SO AS TO NOT HINDER USE OF THESE FACILITIES.
2. PLANT PIT BASINS WITHIN SLOPED PLANTING AREAS SHALL BE CONSTRUCTED WITH A MAX. 2:1 SLOPE. PROVIDE SMOOTH TRANSITION TO SURROUNDING FINISH GRADE.

PRUNE TREE AT TIME OF STAKE REMOVAL

(2) 2” DIAMETER x 10’ LONG LODGEPOLE PINE TREE STAKES. BURY 3’ IN GROUND AND CUT OFF STAKE 12” ABOVE TIE WIRE. STAKES SHALL REMAIN IN PLACE FOR 2 YEARS UNLESS REMOVAL IS APPROVED BY MAINTENANCE DIRECTOR

SET TOP OF ROOT BALL AT SOIL SURFACE

BACKFILL WITH NATIVE SOIL (NO ROCKS GREATER THAN 1") APPLY SLOW-RELEASE FERTILIZER TO SURFACE AWAY FROM TRUNK PER MANUFACTURER’S SPECIFICATIONS.

SCARIFY SIDES OF ROOT BALL PRIOR TO PLANTING

TREE PLANTING AND STAKING
≤ 36” BOX or 2” CALIPER

NOTES:
1. SUFFICIENT CLEARANCE SHALL BE MAINTAINED BETWEEN SHRUBS AND UTILITY FACILITIES SO AS TO NOT HINDER USE OF THESE FACILITIES.
2. PLANT PIT BASINS WITHIN SLOPED PLANTING AREAS SHALL BE CONSTRUCTED WITH A MAX. 2:1 SLOPE. PROVIDE SMOOTH TRANSITION TO SURROUNDING FINISH GRADE.
3. SEE DETAIL 18-04-050 FOR CONIFER TREE PLANTING.
1 1/2" NYLON MESH STRAND AT FIRST BRANCHING

3-3/8" GALVANIZED GUY WIRE PER TREE AT EQUAL SPACING

SET TOP OF ROOT BALL EVEN W/ ADJACENT GRADE

3 - 2" DIA. LODGEPOLE TREE STAKES - BURY 3' IN UNDISTURBED GROUND AND CUT OFF STAKE FLUSH WITH GRADE

SOIL SAUCER

EXISTING GRADE

ROOT BALL

EXISTING SOIL

FERTILIZER TABLETS

45° REMOVED BURLAP AND TIES FROM TOP OF BALL ONLY. WIRE BASKETS ARE NOT ALLOWED.
1. IF WYE STRAINER OR PRESSURE REGULATOR IS SPECIFIED, INSTALL ON EITHER THE HORIZONTAL PIPING OR ON THE DOWNSTREAM LEG AS SPACE PERMITS.
2. ALL PIPE & FITTINGS TO BE TYPE "L" COPPER.
3. ASSEMBLY SHALL BE APPROVED BY U.S.C. FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH.
4. INSTALL BACKFLOW PREVENTION ASSEMBLY W/ RELIEF PORT FACING TOWARD THE GROUND.
5. BACKFLOW PREVENTION ASSEMBLY MUST BE LEVEL AND INSTALLED A MIN. OF 12" FROM RELIEF PORT TO GRADE.
6. TEST COCKS (4) SHALL BE FITTED W/ BRASS PLUGS AND INSTALLED W/ TEFLON TAPE.
7. SHUTOFF CALCS TO BE RESILIENT BALL TYPE W/ REMOVABLE HANDLES.
8. COMPRESSION TYPE FITTINGS ARE NOT ALLOWED.
9. STAKE LOCATION OF ASSEMBLY FOR APPROVAL BY THE ENGINEER BEFORE INSTALLATION BEGINS.
10. ALL PIPES AND FITTINGS SHALL BE COPPER.
11. PROVIDE TEST CERTIFICATE FROM CITY APPROVED TESTING COMPANY PRIOR TO APPROVAL.
12. COPPER FITTINGS SHALL BE INSTALLED W/ LEAD FREE SOLDER JOINTS.
SWING JOINT ASSEMBLY ELEVATION

SWING JOINT ASSEMBLY PLAN

NOTES:
1. SWING JOINT TO BE THE SAME SIZE AS SPRINKLER HEAD INLET.
2. NO PRE-FAB SWING JOINTS.
3. NO MARLEX FITTINGS.
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3. NO MARLEX FITTINGS.

SWING JOINT ASSEMBLY ELEVATION

SWING JOINT ASSEMBLY PLAN
SWING JOINT ASSEMBLY ELEVATION

SWING JOINT ASSEMBLY PLAN

NOTES:
1. SWING JOINT TO BE THE SAME SIZE AS SPRINKLER HEAD INLET.
2. SWING JOINT SHALL BE CONNECTED TO BOTTOM OUTLET.
3. NO PRE-FAB SWING JOINTS.
4. NO MARLEX FITTINGS.
CARSON/BROOKS VALVE BOX WITH LOCKING "T" STYLE COVER (SUPPLY WITH STAINLESS STEEL BOLTS). INSTALL H-20 TRAFFIC RATED BOX IN HIGH TRAFFIC AREAS AS DETERMINED BY THE COS.

INLINE WYE FILTER W/200 MESH STAINLESS STEEL SCREEN AND FLUSHING CAP. PROVIDE ROOM FOR SCREEN REMOVAL. AGRICULTURAL PRODUCTS INC. "SPIN CLEAN" MODEL OR APPROVED EQUAL

SCH. 40 PVC FEMALE ADAPTER (SLIP x THREAD)

SCH. 40 PVC DRIP LATERAL LINE FROM CONTROL VALVE, CLASS 315 FOR 1/2" LINE

PVC Emitter Lateral Line

SCH. 40 COUPLER

BRICK PAVER (TYP. 4)

6" MIN. DEPTH PEA GRAVEL

PRESET SENNIGER PRESSURE REGULATOR

SCH. 80 TOE NIPPLE

FINISH GRADE

Inline Wye Filter & Pressure Regulator

City of Flagstaff

DRIP FILTER & PRESSURE REGULATOR

ENGINEERING DETAIL

DETAIL NO. 19-02-004

REVISION DATE: 12/30/2017
EMITTER FLUSH CAP ASSEMBLY

EMITTER FLUSH CAP ASSEMBLY

3/4" SCH. 40 PVC CAP WITH WASHER (FHT)

3/4" SCH. 40 PVC PIPE (LENGTH AS REQUIRED)

BALL VALVE

SCH. 40 PVC 90ELL

PVC EMITTER LATERAL PIPE

4" MIN. DEPTH OF PEA GRAVEL

CARSON/BROOKS
6" ROUND VALVE BOX

3/4" SCH. 40 PVC MALE ADAPTER (MHTxSLIP)

3"
1. EACH QUICK COUPLER SHALL BE IN A SEPARATE VALVE BOX.
2. SWING JOINT SHALL BE THE SAME SIZE AS QUICK COUPLER VALVE.
3. NO PRE-FAB SWING JOINTS.
4. U-BOLT TO BE SECURED WITH LOCK WASHERS AND BACK-UP LOCKING NUT.
5. VALVE BOX LID EMBOSST WITH "QC" OR AS DIRECTED.

NOTE:

FINISH GRADE

CARSON/BROOKS 10" ROUND VALVE BOX WITH LOCKING "T" STYLE COVER (SUPPLY WITH STAINLESS STEEL BOLTS)

QUICK COUPLING VALVE (44K/1" KEY OPERABLE)

1/8" x 1 1/2" x 1 1/2" x 24" ANGLE IRON WITH STAINLESS STEEL U BOLT

1" x 1/8" x 24" ANGLE IRON WITH STAINLESS STEEL U BOLT

BRICK PAVER (TYP. 3)

6" MIN DEPTH PEA GRAVEL

PVC MAINLINE PIPE

MAINLINE SERVICE TEE

SCH. 80 PVC SWING JOINT

SCH. 80 TBE NIPPLE (LENGTH AS REQUIRED)

SCH. 80 MAINLINE SERVICE TEE

SCH. 40 STREET ELL (1 of 3)

30-60 RISE

BRONZE BALL VALVE (FULL PORT)

FINISH GRADE

QUICK COUPLER ASSEMBLY
1. BALL VALVE SHALL MATCH NOMINAL SIZE OF MAINLINE PIPE.

NOTE:

1. CARSON/BROOKS STANDARD BOX WITH LOCKING "T" STYLE COVER (SUPPLY WITH STAINLESS STEEL BOLTS)
INSTALL H-20 TRAFFIC RATED BOX IN HIGH TRAFFIC AREAS AS DETERMINED BY THE CITY OF FLAGSTAFF.

FINISH GRADE

BRONZE BALL VALVE (FULL PORT)

10" SCH. 80 PVC TOE NIPPLE
(TYP. 1 of 2)

FLOW

BRICK PAVER
(TYP. 1 of 4)

SCH. 80 PVC 45 ELBOW
(TYP. 1 of 4)

2" LAYER OF PEA GRAVEL WITH 1" MIN. CLEARANCE TO BOTTOM OF VALVE

City of Flagstaff

ENGINEERING DETAIL

DETAIL NO. 19-02-007

MAINLINE BALL VALVE 1-1/2" & SMALLER

REVISION DATE: 12/30/2017

NTS
1. BALL VALVE SHALL MATCH NOMINAL SIZE OF MAINLINE PIPE.
2. BOX TO BE INSTALLED AS TO ALLOW FOR PROPER OPERATION OF BALL VALVE INSTALL AT RIGHT ANGLE TO HARDSCAPE EDGE, INSTALL VALVE OFF-CENTER IN BOX.
3. INSTALL VALVE BOX EXTENSIONS AS REQUIRED TO ACHIEVE PROPER VALVE INSTALLATION AT MAIN LINE DEPTH.
4. EMBoss COVER WITH "IV" IN 1-INCH HIGH STENCIL LETTERS USING STYLUS TIP TORCH.

KEYNOTE:
1. CARSON/BROOKS STANDARD BOX WITH LOCKING "T" STYLE COVER. SUPPLY WITH STAINLESS STEEL BOLTS.
2. FINISH GRADE
3. BRONZE FULL PORT BALL VALVE
4. SCH 80 PVC 45º ELBOW
5. BRICK PAVER
6. 2" LAYER OF PEA GRAVEL
7. LANDSCAPE FABRIC
8. MALE ADAPTER
9. PRESSURE SUPPLY LINE. DEPTH AS PER SPECS.

NOTE:
1. BALL VALVE SHALL MATCH NOMINAL SIZE OF MAINLINE PIPE.
2. BOX TO BE INSTALLED AS TO ALLOW FOR PROPER OPERATION OF BALL VALVE INSTALL AT RIGHT ANGLE TO HARDSCAPE EDGE, INSTALL VALVE OFF-CENTER IN BOX.
3. INSTALL VALVE BOX EXTENSIONS AS REQUIRED TO ACHIEVE PROPER VALVE INSTALLATION AT MAIN LINE DEPTH.
4. EMBoss COVER WITH "IV" IN 1-INCH HIGH STENCIL LETTERS USING STYLUS TIP TORCH.

City of Flagstaff

ENGINEERING DETAIL

DETAIL NO. 19-02-008

REVISION DATE: 12/30/2017

BALL VALVE DETAIL
NOTE:

1. GATE VALVE SHALL MATCH NOMINAL SIZE OF MAINLINE PIPE.
2. PROTECT VALVE BODY WITH 10MIL PLASTIC PRIOR TO INSTALLATION OF REBAR & SUPPORT BLOCK.
3. RESILIENT WEDGE GATE VALVE MAY HAVE EITHER MECHANICAL JOINT, PUSH-ON ENDS, OR FLANGE ENDS. THE OPERATOR IS A WRENCH NUT.
4. EMBOSSED COVER WITH "I.V." IN 1" HIGH STENCIL LETTERS USING STYLIST TIP TORCH.
5. SET VALVE BOX FLUSH WITH FINISH GRADE IN NATIVE AREAS. ½ INCH ABOVE FINISH GRADE IN TURF AREAS.
6. SUPPLY 2" KEY HANDLE FOR VALVE OPERATION.
1. PROVIDE 30" SLACK WIRE IN 3/4" COILS FOR EACH WIRE ENTERING VALVE BOX.
2. INSTALL VALVE I.D. TAG WITH CONTROLLER IDENTIFICATION AND STATION NUMBER WHICH CORRESPONDS TO THE PLANS.
3. MAINTAIN 2" MIN.-4" MAX. DISTANCE BETWEEN TOP OF CONTROL VALVE AND BOTTOM OF BOX LID.
4. CONTROL AND SIGNAL WIRE FROM MASTER VALVE TO CONTROLLER TO BE SEPARATE COLOR FROM OTHER VALVE WIRE. (CONTROL AND SIGNAL COMMONS TO BE SEPARATE FROM ANY OTHERS COMMONS IN THE SYSTEM.)
5. EACH MASTER VALVE REQUIRES A TOTAL OF EIGHT WIRES - FOUR CONTROL WIRES (TWO OF WHICH ARE SPARES) AND FOUR COMMON WIRES (TWO OF WHICH ARE SPARES).
6. ALL WIRES SHALL BE IN CONDUIT
7. DO NOT REST VALVE BOX ON MAIN LINE, PROVIDE CUTOUTS AS NECESSARY.
8. 6" MIN / 24" MAX BETWEEN TOP OF MASTER VALVE AND BOTTOM OF VALVE BOX LID.
CARSON /BROOKS VALVE BOX WITH LOCKING "T" STYLE COVER (SUPPLY WITH STAINLESS STEEL BOLTS). INSTALL H-20 TRAFFIC RATED BOX IN HIGH TRAFFIC AREAS AS DETERMINED BY THE COS.

EPOXY FILLED TWO PIECE CYLINDER WIRE CONNECTOR (TYP. 1 of 2)

3" MIN CLEARANCE BETWEEN BOTTOM OF LID AND VALVE FLOW STEM

FINISH GRADE

NO. 12 COMMON WIRE

NO. 12 CONTROL WIRE

NO. 12 SPARE WIRES LOOPED INTO EACH VALVE BOX (BLUEx2)

ELECTRIC REMOTE CONTROL VALVE

BRONZE BALL VALVE (FULL PORT) SAME SIZE AS CONTROL VALVE

SCH. 80 PVC 45° (SxS)(TYP 1 of 2)

SCH. 80 PVC PIPE SAME SIZE AS CONTROL VALVE

SCH. 80 PVC PIPE (SCH. 80 PVC TEE CONNECTION - SxSxS) SCH. 80 TOE NIPPLE (DUCTILE TEE CONNECTION)

PVC MAINLINE PIPE WITH SCH 80 PVC or DUCTILE IRON SERVICE TEE

6" MIN DEPTH OF PEA GRAVEL (BELOW VALVE BODY)

SCH. 80 PVC TEE NIPPLE (PLASTIC VALVE ONLY) 3" BRASS NIPPLE FOR BRASS VALVES

PVC LATERAL PIPE

1. PROVIDE 30" SLACK WIRE IN 3/4" COILS FOR EACH WIRE ENTERING VALVE BOX.
2. INSTALL VALVE ID TAG WITH CONTROLLER IDENTIFICATION AND STATION NUMBER WHICH CORRESPONDS TO THE PLANS.
3. MAINTAIN 2" MIN - 4" MAX DISTANCE BETWEEN TOP OF CONTROL VALVE AND BOTTOM OF BOX LID.
4. INSTALL D.C. LATCHING SOLENOIDS W/ DC CONTROLLERS.
5. FOR BRASS CONTROL VALVES, INSTALL 3" BRASS TEE NIPPLE BETWEEN BALL VALVE AND CONTROL VALVE.
6. LOWER LATERAL PIPE TO PROPER DEPTH OUTSIDE OF VALVE BOX USING SCH 40 PVC 45° ELBOWS.
7. INSTALL WITHIN PURPLE VALVE BOX WITH LID MARKED "CAUTION - RECLAIMED WATER - DO NOT DRINK"
1. PIPE CEMENT & PRIMER SHALL BE USED FOR FLEXIBLE AND RIGID PIPE CONNECTIONS.
2. EMMITTER TUBING EMISSION POINTS SHALL BE EQUALLY SPACED AND LOCATED TO DIRECT WATER FLOW TO THE PERIMETER OF THE DRIPIE LINE.
3. NUMBER OF OPENINGS AND EMMITTER TUBES REQUIRED IS BASED ON PLANT SIZE. SEE COF DET. 19-02-013
4. MAXIMUM EMMITTER TUBING LENGTH = 6 FEET.
5. NO EMMITTER LATERALS OR PIPING SHALL BE INSTALLED THROUGH OR BENEATH PLANT PITS. MINIMUM DISTANCE BETWEEN PLANT PIT PERIMETER AND PIPING SHALL BE 12".

NOTES

LIST OF MATERIALS

1. BOWSITH SL - SERIES SINGLE PORT EMMITTER OR APPROVED EQUAL. LOCATE ON UPHILL SIDE OF PLANT CENTERLINE
2. 1/4" POLY FLEX HOSE EMMITTER TUBING (6’ MAX)
3. 1/2" PVC SCH 40 MALE ADAPTOR
4. AG. PRODUCTS - 1/2" I.P.S. FLEXIBLE VINYL PVC PIPE OR APPROVED EQUAL
5. 1/2" PVC SCH 40 90° ELBOW
6. 1/2" PVC SCH 40 PIPE
7. 1/2" PVC SCH 40 FITTING
8. ALL PVC SHALL BE SCH 40
9. INSTALL BUSHING AS REQUIRED.
1. PIPE CEMENT & PRIMER SHALL BE USED FOR FLEXIBLE AND RIGID PIPE CONNECTIONS.
2. EMMITTER TUBING EMMISSION POINTS SHALL BE EQUALLY SPACED AND LOCATED TO DIRECT WATER FLOW TO THE PERIMETER OF THE DRAIN LINE.
3. NUMBER OF OPENINGS AND EMMITTER TUBES REQUIRED IS BASED ON PLANT SIZE. SEE COF DET. 19-02-013
4. MAXIMUM EMMITTER TUBING LENGTH = 6 FEET.
5. NO EMMITTER LATERALS OR PIPING SHALL BE INSTALLED THROUGH OR BENEATH PLANT PITS. MINIMUM DISTANCE BETWEEN PLANT PIT PERIMETER AND PIPING SHALL BE 12".
**Irrigation Emitter Layout**

**Tree Emitter - Multi Outlet**
- 15 gal. to 42" box trees (see Emitter Schedule)
- 48" box to 60" box trees (see Emitter Schedule)
- 66" box to 84" box trees (see Emitter Schedule)

EMITTER SCHEDULE

<table>
<thead>
<tr>
<th>Tree Size</th>
<th>Number of Multi Outlet Emitters - Outlet Quantity = Emitter GPH Total</th>
<th>Distance from Trunk</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 gal</td>
<td>1-1 GPH=6 GPH</td>
<td>3 @ 12&quot;</td>
</tr>
<tr>
<td>24&quot; box</td>
<td>1-1 GPH=6 GPH</td>
<td>4 @ 18&quot;</td>
</tr>
<tr>
<td>30&quot; box</td>
<td>1-1 GPH=6 GPH</td>
<td>6 @ 21&quot;</td>
</tr>
<tr>
<td>36&quot; box</td>
<td>1-2 GPH=12 GPH</td>
<td>6 @ 24&quot;</td>
</tr>
<tr>
<td>42&quot; box</td>
<td>1-2 GPH=12 GPH</td>
<td>6 @ 27&quot;</td>
</tr>
<tr>
<td>48&quot; box</td>
<td>2-2 GPH=24 GPH</td>
<td>6 @ 27&quot;</td>
</tr>
<tr>
<td>54&quot; box</td>
<td>2-2 GPH=24 GPH</td>
<td>6 @ 27&quot;</td>
</tr>
<tr>
<td>60&quot; box</td>
<td>2-2 GPH=24 GPH</td>
<td>6 @ 27&quot;</td>
</tr>
<tr>
<td>66&quot; box</td>
<td>3-2 GPH=36 GPH</td>
<td>6 @ 30&quot;</td>
</tr>
<tr>
<td>72&quot; box</td>
<td>3-2 GPH=36 GPH</td>
<td>6 @ 30&quot;</td>
</tr>
<tr>
<td>78&quot; box</td>
<td>4-2 GPH=48 GPH</td>
<td>8 @ 33&quot;</td>
</tr>
</tbody>
</table>
| > 90" box | 4-2 GPH=48 GPH                                                 | 8 @ 33"             | 16 @ 60"

**Tree Emitter - Single Outlet**
- 72" box to 96" box trees (see Emitter Schedule)
END LINE FLUSH

DECOMPOSED GRANITE
SEE SPECS.

1/2" MAX.

1 1/2" MAX.

TURF

FINISH GRADE

VALVE BOX SEE SPECS.

COMPRESSION
x 3/4" MHT ADAPTER

1/2" MIN.

3/4" FHT x FHT BALL VALVE

SCHEDULE 80 90° SLIP FIPT
ELBOW AND NIPPLE

WASHED GRAVEL FILL,
6" DEEP x 16" SQUARE

City of Flagstaff

ENGINEERING DETAIL

DETAIL NO. 19-02-014

REVISION DATE: 12/30/2017

1 NTS
1. PROVIDE 30" SLACK WIRE IN 3/4" COILS FOR EACH WIRE ENTERING VALVE BOX.
2. INSTALL VALVE I.D. TAG WITH CONTROLLER IDENTIFICATION AND STATION NUMBER WHICH CORRESPONDS TO THE PLANS.
3. MAINTAIN 2" MIN.-4" MAX. DISTANCE BETWEEN TOP OF CONTROL VALVE AND BOTTOM OF BOX LID.
4. CONTROL AND SIGNAL WIRE FROM MASTER VALVE TO CONTROLLER TO BE SEPARATE COLOR FROM OTHER VALVE WIRE. (CONTROL AND SIGNAL COMMONS TO BE SEPARATE FROM ANY OTHERS COMMONS IN THE SYSTEM.)
5. ALL WIRES SHALL BE IN CONDUIT.
STANDARD RECTANGULAR VALVE BOX EVERY 250' MAX.

FINISH GRADE

ENDS OF CONDUIT SEALED WITH WATERPROOF SILICONE (IF REQUIRED)

PAVER BRICK (1 of 4)

1 1/2" CONDUIT (MIN.)

MAXICOM CABLE

90° SWEEP ELL (IF REQUIRED)

24" MIN

3/4" ROCK 3" FROM TOP OF CONDUIT

36" LOOP OF MAXICOM CABLE IN PULL BOX

MAXICOM CABLE PULL BOX
KEYNOTES

① PE-CABLE (36-INCH LOOP)
② PREFORMED SUPER SERVISEAL WATERPROOF WIRE SPLICE KIT
③ 3M UAL CONNECTORS (SPlice ALL WIRE PAIRS)
④ ALL WIRE MUST BE PLACED IN CONDUIT 3" ABOVE 3/4" ROCK
1. PROVIDE 30" SLACK WIRE IN 3/4" COILS FOR EACH WIRE ENTERING VALVE BOX.
2. INSTALL VALVE I.D. TAG WITH CONTROLLER IDENTIFICATION AND STATION NUMBER THAT CORRESPONDS TO THE PLANS.
3. MAINTAIN 2" MIN.-4" MAX. DISTANCE BETWEEN TOP OF CONTROL VALVE AND BOTTOM OF BOX LID.
4. INSTALL D.C. LATCHING SOLENOIDS W/ D.C. CONTROLLERS.
5. FOR BRASS CONTROL VALVES, INSTALL 3" BRASS TBE NIPPLE BETWEEN BALL VALVE AND CONTROL VALVE
6. INSTALL CONTROL VALVES A MINIMUM OF 1' APART IN SHRUB AREAS UNLESS OTHERWISE NOTED.
7. USE TEFLON TAPE ON ALL THREADED FITTINGS.
8. VALVE BOX SHALL BE SET PARALLEL W/ GRADE.

KEYNOTES
1. VALVE BOX
2. EBOXY FILLED TWO PIECE CYLINDER WIRE CONNECTOR
3. ID TAG
4. ELECTRIC REMOTE CONTROL VALVE AS NOTED ON PLANS.
5. SCH 80 PVC LATERAL
6. BRICK PAVER (TYP.)
7. 6" MIN. DEPTH PEA GRAVEL (BELOW VALVE BODY)
8. 3" SCH 80 PVC NIPPLE (PLASTIC VALVE ONLY).
9. SCH 80 PVC MAINLINE PIPE WITH HDPE SERVICE TEE
10. SCH 80 PVC PIPE SAME SIZE AS CONTROL VALVE
11. 24-VOLT WIRES FROM CONTROLLER
12. BRONZE BALL VALVE (FULL PORT), SAME SIZE AS
13. SPARE WIRES LOOPED INTO EACH VALVE BOX (BLUE) (2)
14. CONTROL WIRE
15. COMMON WIRE
16. FINISH GRADE
17. PRESET PRESSURE REGULATOR (AS NOTED ON PLANS)
18. WYE FILTER (AS NOTED ON PLANS)

NOTES
1. PROVIDE 30" SLACK WIRE IN 3/4" COILS FOR EACH WIRE ENTERING VALVE BOX.
2. INSTALL VALVE I.D. TAG WITH CONTROLLER IDENTIFICATION AND STATION NUMBER THAT CORRESPONDS TO THE PLANS.
3. MAINTAIN 2" MIN.-4" MAX. DISTANCE BETWEEN TOP OF CONTROL VALVE AND BOTTOM OF BOX LID.
4. INSTALL D.C. LATCHING SOLENOIDS W/ D.C. CONTROLLERS.
5. FOR BRASS CONTROL VALVES, INSTALL 3" BRASS TBE NIPPLE BETWEEN BALL VALVE AND CONTROL VALVE
6. INSTALL CONTROL VALVES A MINIMUM OF 1' APART IN SHRUB AREAS UNLESS OTHERWISE NOTED.
7. USE TEFLON TAPE ON ALL THREADED FITTINGS.
8. VALVE BOX SHALL BE SET PARALLEL W/ GRADE.
1. FOR WIRE SIZES NO. 14, 12 AND 10, ALL CONNECTIONS IN VALVE BOXES ONLY.
2. INSTALL SPEARS DS-100 DRI-SPLICE CONNECTORS WITH DS-300 SEALANT.
MAXIMUM NUMBER OF WIRES TO BE INSTALLED IN A SCHEDULE 40 PVC SLEEVE

<table>
<thead>
<tr>
<th>WIRE SIZE (AWG)</th>
<th>2&quot;</th>
<th>2-1/2&quot;</th>
<th>3&quot;</th>
<th>WIRE SIZE (AWG)</th>
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<tr>
<td>14</td>
<td>25</td>
<td>40</td>
<td>56</td>
<td>14</td>
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<tr>
<td>12</td>
<td>20</td>
<td>33</td>
<td>50</td>
<td>12</td>
</tr>
</tbody>
</table>

NOTES

ALL WIRE SLEEVES TO BE SHC. 40 PVC AND SHALL BE INSTALLED WITH A MINIMUM OFFSET AT THE JOINTS TO PERMIT EASY INSTALLATION AND REMOVAL OF CONTROL AND COMMON WIRES. ALL WIRES SHALL BE INSTALLED IN SLEEVES UNDER THE PAVED AREAS. SLEEVES SHALL EXTEND AT LEAST 12" BEYOND THE EDGES OF THE PAVEMENT. SIZE OF SLEEVES SHALL BE AS SHOWN.
12" MAIN

RIGID COPPER PIPE

CONTROLLER "A"
SEE IRRIGATION LEGEND

M

WATER METER
(SEE IRRIGATION LEGEND/SCHEDULE AND GENERAL NOTES)

BLOW OUT STUB
SEE ENLARGEMENT

RPBP

ISOLATION BALL VALVE

MAINLINE, SIZE PER PLAN

LATERAL LINE, SIZE PER PLAN

EMITTERS PER IRRIGATION LEGEND

MANUAL FLUSH VALVE ASSEMBLY

3/4" WINTERIZING BLOWOUT STUB

METER POC

ISOLATION BALL VALVE

BLOW OUT STUB
1. INSTALL WIRE OF APPROPRIATE GAUGE, CONNECTORS, SEALANT, AND ADAPTORS PER MANUFACTURER'S INSTRUCTIONS.

2. D.C. LATCHING SOLENOIDS ON REMOTE CONTROL VALVES TO BE COMPATIBLE WITH CONTROLLER.

3. MASTER VALVE TO BE INSTALLED AND WIRED TO CONTROLLER WITH DC LATCHING SOLENOID COMPATIBLE WITH CONTROLLER (IF REQUIRED).

4. PROGRAMMING/ACCESS KEY TO BE SUPPLIED WITH CONTROLLER.

5. INSTALL MANUFACTURER'S STAINLESS STEEL ENCLOSURE FOR CONTROLLER.

6. PROVIDE 12" EXPANSION COIL FOR EACH WIRE SPLICE INSIDE SPLICE BOX WHEN SPLICES ARE REQUIRED BY MANUFACTURER.

7. THE CONTROLLER SHALL BE SECURED INSIDE THE MANUFACTURER'S STAINLESS STEEL ENCLOSURE IF NOT INSTALLED INSIDE THE BACKFLOW PREVENTER ENCLOSURE.

8. ALL WIRES ARE TO BE IN CONDUIT.
1. INSTALL WIRING OF APPROPRIATE GAUGE, CONNECTORS, SEALANT, AND ADAPTORS PER MANUFACTURER'S INSTRUCTIONS.
2. INSTALL CONTROL WIRES, SPLICES, AND MOUNTING COLUMN AS FURNISHED/SPECIFIED BY THE CONTROLLER MANUFACTURER.
3. LABEL ALL WIRES IN CONTROLLER.
4. D.C. LATCHING SOLENOIDS ON REMOTE CONTROLS VALVES TO BE COMPATIBLE WITH CONTROLLER.
5. MASTER VALVE TO BE INSTALLED AND WIRED TO CONTROLLER, WITH D.C. LATCHING SOLENOID COMPATIBLE WITH CONTROLLER.
6. ALL WIRES TO BE IN CONDUIT.
7. PROGRAMMING/ACCESS KEY TO BE PROVIDED WITH CONTROLLER.
8. PROVIDE 12" EXPANSION COIL FOR EACH WIRE SPLICE INSIDE SPLICE BOX WHEN SPLICES ARE REQUIRED BY MANUFACTURER.

NOTES

1. INSTALL WIRING OF APPROPRIATE GAUGE, CONNECTORS, SEALANT, AND ADAPTORS PER MANUFACTURER'S INSTRUCTIONS.
2. INSTALL CONTROL WIRES, SPLICES, AND MOUNTING COLUMN AS FURNISHED/SPECIFIED BY THE CONTROLLER MANUFACTURER.
3. LABEL ALL WIRES IN CONTROLLER.
4. D.C. LATCHING SOLENOIDS ON REMOTE CONTROLS VALVES TO BE COMPATIBLE WITH CONTROLLER.
5. MASTER VALVE TO BE INSTALLED AND WIRED TO CONTROLLER, WITH D.C. LATCHING SOLENOID COMPATIBLE WITH CONTROLLER.
6. ALL WIRES TO BE IN CONDUIT.
7. PROGRAMMING/ACCESS KEY TO BE PROVIDED WITH CONTROLLER.
8. PROVIDE 12" EXPANSION COIL FOR EACH WIRE SPLICE INSIDE SPLICE BOX WHEN SPLICES ARE REQUIRED BY MANUFACTURER.
NOTE: USE EITHER 9 PIN OR 25 PIN CABLE CONNECTION

MAXICOM CCU (6 or 28) WALL MOUNT
KEYNOTES

1. FINISH GRADE
2. RAIN BIRD WALL MOUNT CLUSTER CONTROL UNIT (CCU)
3. 25 PIN CONNECTOR (USE RS232 CABLE)
4. INTERFACE BOARD
5. COMPUTER COMPORT
6. COMMON WIRE (BLACK) FROM MAXICABLE TO MSP-1 SURGE ARRESTER AND FROM MSP-1 SURGE ARRESTER TO CCU COMMON WIRE TERMINAL POST
7. GROUND WIRE (GREEN) TO GROUNDING BUSS BAR
8. HOT WIRE (RED) FROM MAXICABLE TO MSP-1 SURGE ARRESTER AND FROM MSP-1 SURGE ARRESTER TO CCU HOT WIRE TERMINAL POST
9. 120 VOLT 60 CYCLE POWER SUPPLY
10. RAIN BIRD MSP-1 RECOMMENDED SURGE ARRESTER
11. RS232 SERIAL CABLE (TO MODEM), MAXIMUM 50 FEET
12. JUNCTION BOX - SIZE AS REQUIRED
13. CONDUIT (SIZE AS REQUIRED)
14. SET SWITCH AS NEEDED
15. REFER TO LOCAL ELECTRIC CODE FOR CONNECTIONS
16. RAIN BIRD WARRANTY REQUIRES PROPER SURGE PROTECTION. USE INTERMATIC AG2401 OR TRIPPLITE ISOBAR
17. CCU GROUNDING BUSS BAR
18. #10 COPPER GROUND WIRE FROM CCU GROUNDING BUSS BAR TO GROUNDING GRID

NOTE:
CONTRACTOR MUST CONFER WITH MAXICOM REPRESENTATIVE FOR PROPER INSTALLATION.
1. FINISH GRADE
2. RAIN BIRD ESP-SAT WALL MOUNT (METAL) FIELD SATELLITE CONTROLLER
3. RAINSAFE STRONGBOX VANDAL-RESISTANT ENCLOSURE
4. WIRE TERMINAL CONNECTORS TO REMOTE CONTROL VALVES
5. COMMUNICATION CABLE CONDUIT - SIZE AS REQUIRED
6. COMMON WIRE (BLACK) FROM MSP-1 SURGE ARRESTOR TO MAXICOM INTERFACE BOARD (MIB)
7. ALL GROUND WIRES (GREEN) TO GROUNDING BUSS BAR
8. #10 COPPER GROUND WIRE FROM ESP FIELD SATELLITE CONTROLLER GROUNDING BUSS BAR TO GROUNDING GRID
9. HOT WIRE (DASHED/RED) FROM MSP-1 SURGE ARRESTOR TO MAXICOM INTERFACE BOARD (MIB)
10. ESP FIELD SATELLITE CONTROLLER GROUNDING BUSS BAR
11. JUNCTION BOX - SIZE AS REQUIRED
12. 120 VOLT POWER SUPPLY
13. REFER TO LOCAL ELECTRIC CODE FOR CONNECTIONS
14. RAIN BIRD MSP-1 RECOMMENDED SURGE ARRESTOR
15. TO TWO WIRE PATH WHEN REQUIRED.
16. RAIN BIRD WARRANTY REQUIRES PROPER SURGE PROTECTION. USE INTERMATIC AG2401 OR TRIPPLITE ISOBAR
KEYNOTES

1. FINISH GRADE
2. RAIN BIRD ESP-SAT STAINLESS STEEL PEDESTAL FIELD SATELLITE CONTROLLER
3. ESP-SAT MAXILINK MAXICOM INTERFACE BOARD (MIB)
4. WIRE TERMINAL CONNECTORS FOR CONTROL AND COMMON WIRES TO REMOTE CONTROL VALVES
5. PVC CONDUIT FOR CONTROL AND COMMON WIRES - SIZE AS REQUIRED.
6. 3/4" PVC CONDUIT FOR 120 VAC POWER SUPPLY
7. RAIN BIRD WARRANTY REQUIRES PROPER SURGE PROTECTION. USE INTERMATIC AG2401 OR TRIPPLITE ISOBAR
8. REFER TO LOCAL ELECTRIC CODE FOR CONNECTIONS
9. #10 COPPER GROUND WIRE FROM ESP FIELD SATELLITE CONTROLLER GROUNDING BUSS BAR TO GROUNDING GRID
10. ESP FIELD SATELLITE CONTROLLER GROUNDING BUSS BAR
11. MAXILINK ANTENNA. CONNECT TO RAIN BIRD RADIO MODEM KIT (RMK) (IF REQUIRED) NOT SHOWN. USE PROPER ANTENNA SURGE PROTECTION POLYPHASER MODEL IS-IE50LN-C1
12. 9-PIN CABLE CONNECTION TO RAIN BIRD RAIDO MODEM KIT (RMK) NOT SHOWN
13. Poured concrete base
1. IF THE FLOW SENSOR IS LOCATED MORE THAN 150 FEET FROM THE FLOW TRANSMITTED, INCLUDE AN ADDITIONAL FSSURKIT AND GROUND ROD AT THE FLOW SENSOR LOCATION.

**KEYNOTES**

1. TO RAIN BIRD ESP-SAT OR ESP-SITE-SAT SENSOR INPUT
2. RAIN BIRD FS SERIES FLOW SENSOR
3. RAIN BIRD MODEL PT1502 TRANSMITTER
4. RAIN BIRD PTPWRSUPP POWER SUPPLY
5. RAIN BIRD FSSURKIT SURGE PROTECTOR
6. TO RAIN BIRD FSSURKIT
7. TO RAIN BIRD PTPWRSUPP POWER SUPPLY
8. GREEN WIRE TO GROUND

**NOTES:**

1. IF THE FLOW SENSOR IS LOCATED MORE THAN 150 FEET FROM THE FLOW TRANSMITTED, INCLUDE AN ADDITIONAL FSSURKIT AND GROUND ROD AT THE FLOW SENSOR LOCATION.
1. POWER SOURCE FOR CONTROLLER TO BE HARD WIRED FROM CIRCUIT BREAKER MOUNTED INSIDE CABINET TO CONTROLLER.

2. LOCATION OF POWER SOURCE TO BE NOTED ON CIRCUIT BREAKER PANEL.

3. REMOTE CONTROL VALVES FOR D.C. APPLICATIONS MUST HAVE D.C. LATCHING SOLENOIDS AND APPROVED SOLAR PANEL FOR POWER SOURCE.

KEYNOTES

1. VENTS W/ BAFFLE
2. 3 POINT LATCH W/ LOCKABLE HANDLE
3. 2" MALE ADAPTER W/ LOCK RING
4. 2" PE3408 SDR 9 SLEEVE W/ 2" SWEEP FOR 24 VOLT CONTROL WIRE. SECURE TO WALL W/ CONDUIT STRAP, TOP AND BOTTOM
5. CONTROL WIRES IN MAINLINE TRENCH
6. FINISH GRADE
7. 8" COPPER CLAD GROUND ROD W/ 10 GAUGE NON-INSULATED GROUND WIRE CONNECTED TO GROUND TERMINAL BLOCK
8. 1/2" E.M.T. CONDUIT FOR 110-V POWER SUPPLY
9. LOCKABLE STAINLESS STEEL CABINET (OR APPROVED EQUAL)
10. 4" x 4" ELECTRICAL JUNCTION BOX W/ 120 VOLT POWER SURGE ARRESTER
11. ELECTRICAL JUNCTION BOX AS REQUIRED
12. STAINLESS "J" BOLTS (OPTION: ZINC-PLATED STEEL EMBEDDED BASE)
13. RAINSAFE™ STRONGBOX VANDAL-RESISTANT ENCLOSURE

NOTES:
1. POWER SOURCE FOR CONTROLLER TO BE HARD WIRED FROM CIRCUIT BREAKER MOUNTED INSIDE CABINET TO CONTROLLER.
2. LOCATION OF POWER SOURCE TO BE NOTED ON CIRCUIT BREAKER PANEL.
3. REMOTE CONTROL VALVES FOR D.C. APPLICATIONS MUST HAVE D.C. LATCHING SOLENOIDS AND APPROVED SOLAR PANEL FOR POWER SOURCE.
NOTES:
REFER TO RAIN BIRD CENTRAL CONTROL TECHNICAL BULLETIN TB-9001-MULTI FOR INSTALLATION GUIDELINES.

MAXICOM FIELD SATELLITE, WEATHER STATION OR CCU ASSEMBLY
SOLID BARE COPPER WIRE (#10 AWG) FROM GROUNDING ROD TO SATELLITE OR CCU. MAKE WIRE AS SHORT AND STRAIGHT AS POSSIBLE
COVER GROUNDING ROD WITH #10 ROUND VALVE BOX AS SHOWN
5/8-INCH X 8 FT COPPER CLAD GROUNDING ROD OR GROUNDING PLATE. INSTALL RODS IN SOIL IN A TRIANGULAR PATTERN SPACED A MINIMUM OF 16 FT APART FROM EACH OTHER. GROUNDING GRID TO HAVE A RESISTANCE OF TEN (10) OHMS OR LESS TO MEET MANUFACTURERS SPECIFICATIONS.
BARE COPPER WIRE (#10 AWG MIN.) BETWEEN GROUNDING RODS
GROUND ROD CLAMP OR WELDS
FINISH GRADE

KEYNOTES

1. MAXICOM FIELD SATELLITE, WEATHER STATION OR CCU ASSEMBLY
2. SOLID BARE COPPER WIRE (#10 AWG) FROM GROUNDING ROD TO SATELLITE OR CCU. MAKE WIRE AS SHORT AND STRAIGHT AS POSSIBLE
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5. BARE COPPER WIRE (#10 AWG MIN.) BETWEEN GROUNDING RODS
6. GROUND ROD CLAMP OR WELDS
7. FINISH GRADE

NOTES:
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5. BARE COPPER WIRE (#6 AWG MIN.) BETWEEN GROUNDING ROD AND GROUNDING PLATE
6. GROUND ROD CLAMP OR WELDS
7. COPPER GROUNDING PLATE
8. GROUND ENHANCEMENT MATERIAL (IF REQUIRED)
9. FINISH GRADE
KEYNOTES

1. 12-INCH X 12-INCH ENCLOSURE (NEMA 3)
2. 120/16 VAC TRANSFORMER
3. WIRE NUT CONNECTORS
4. FINISH GRADE
5. TWO (2) LONG SWEEP ELBOWS (ONE HIDDEN WITH COMMUNICATION WIRE). ORIENT PROPERLY FOR WIRING (SIZE AS REQUIRED)
6. TELEPHONE LINE OR DIRECT CONNECT CABLE TO HIDDEN LONG SWEEP ELBOW
7. 16 VAC TO WEATHER STATION THROUGH LONG SWEEP ELBOW
8. GROUND WIRE TO GROUND RODS. SEE MAXICOM DETAIL 305
9. CONDUITS
10. 120 VAC POWER SUPPLY
11. WEATHER STATION TEMPLATE
12. 4-INCH X 4-INCH POST (TREATED)
13. WEATHER STATION ANCHOR BOLTS
14. CONCRETE PAD. REFER TO MAXICOM DETAIL 300
15. CONCRETE
Rain Bird Model PT1502 Pulse Transmitter

Rain Bird PTPWRSUPP Power Supply

To Wind Sensor

See Detail For Wiring

**KEYNOTES**

1. To Rain Bird ESP-Sat or ESP-Site-Sat Sensor Input
2. Rain Bird Anemometer Wind Speed Sensor on Pole in Unobstructed Area
3. Rain Bird Model PT1502 Pulse Transmitter
4. Rain Bird PTPWRSUPP Power Supply
5. To Wind Sensor
6. To Rain Bird PTPWRSUPP Power Supply

Rain Bird Maxicom Variable Wind Speed Detection

City of Flagstaff Engineering Detail

DETAIL NO. 19-02-034

REVISION DATE: 12/30/2017
NOTES:

1. BUNDLE WIRING AND WRAP W/ ELECTRICAL TAPE @ 10’ INTERVALS.
2. ALL MAINLINE PIPING TO BE INSTALLED IN ACCORDANCE W/ MANUFACTURER’S INSTALLATION SPECIFICATIONS.
3. ALL MAINLINE, LATERAL LINES AND CONTROL WIRES SHALL BE SLEEVED BELOW ALL HARDSCAPE ELEMENTS WITH HDPE PE 3408, SDR 11 PIPE, 2.5 TIMES THE DIAMETER OF THE PIPE OR WIRE BUNDLE CARRIED.
4. ALL CURBS SHALL BE MARKED W/ A “SCORE” MARK TO DESIGNATE SLEEVE LOCATION, TYPICAL.

SECTION VIEW

KEYNOTES

1. PAVING
2. LATERAL LINES IN HDPE SLEEVE
3. SAND BACKFILL COMPACTED TO THE DENSITY OF EXISTING SOIL
4. UNDISTURBED SOIL
5. CONTROL WIRES IN HDPE SLEEVE
6. PRESSURE MAINLINE IN HDPE SLEEVE. HDPE SLEEVES TO BE TWICE THE DIAMETER OF THE PIPE OR WIRE BUNDLE CARRIED.
NOTES

1. BEDDING SHALL BE PLACED AND LEVELED PRIOR TO INSTALLATION OF BURY ITEM.
2. BACKFILL SHALL BE PLACED IN MAXIMUM 6" Lifts.
3. SLEEVE ALL PIPE AND WIRE SEPARATELY. SLEEVE 2 x DIA. OF PIPE (MIN 2"). ONE PIPE PER SLEEVE. SLEEVES TO BE PRIMED AND SOLVENT WELDED.
4. ALL PIPE TO BE INSTALLED PER MANUFACTURES SPECIFICATIONS WITH PIPE LABELING FACING UP FOR INSPECTION PURPOSES. PROVIDE A MINIMUM OF 2" CLEARANCE TO SIDE OF TRENCH AND BETWEEN PIPES.
5. ALL 120 V. WIRING SHALL BE INSTALLED IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS.
6. TAPE AND BUNDLE IRRIGATION CONTROL WIRES EVERY 10'. PROVIDE LOOSE 20" LOOP AT ALL CHANGES OF DIRECTION OVER 30°.
7. ALL REMOTE CONTROL VALVE WIRING SHALL BE INSTALLED IN A MINIMUM 2" SCHEDULE 40 GREY ELECTRICAL CONDUIT OR AS APPROVED.
8. "NON-POTABLE" WARNING TAPE TO BE INSTALLED ON ALL PRESSURIZED MAINLINES 12" ABOVE THE PIPE.
9. INSTALL ONE ADDITIONAL SLEEVE SIZED TO MATCH THE LARGEST REQUIRED SLEEVE WITH ENDS TAPED FOR FUTURE USE.
10. SLEEVES TO EXTEND A MINIMUM OF 12" PAST HARDSCAPE PLANTERS, CURBS, SIDEWALKS, ETC. SLEEVES TO BE STAGGERED/OFFSET SO THAT SLEEVE USE IS NOT OBSTRUCTED BY OTHER PIPES.
11. WHERE PRESSURE SUPPLY PIPING IS INSTALLED WITHOUT CONTROL WIRING, A 14 GA. TRACKING WIRE SHALL BE INSTALLED.

City of Flagstaff

IRRIGATION TRENCHING

ENGINEERING DETAIL

DETAIL NO. 19-02-036

REVISION DATE: 12/30/2017

nts
NOTES

1. MINIMUM THRUST BLOCK AREAS ARE BASED ON A SOIL BEARING CAPACITY OF 3000 LBS/SF

2. THRUST BLOCK SHALL EXTEND INTO UNDISTURBED SOIL.

3. THRUST BLOCK SHALL BE MAG SECT. 725-CLASS C.

4. MAINLINE PIPING 4" AND LARGER SHALL HAVE MEGA/LUG JOINT RESTRAINTS INSTALLED AT ALL FLOW DIRECTION CHANGES (CONCRETE THRUST BLOCK NOT REQUIRED).

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<tr>
<td>3&quot;</td>
<td>TEE, DEAD END 90°BEND</td>
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PER MAG DETAIL 380 PER MAG DETAIL 380
DOUBLE ENCLOSURE

6" CONCRETE SLAB
FLUSH WITH A.C. (TYP) WITH
10' FRONT APRON

8"x8"x16" CMU WALL WITH #4 HORIZ. REINF. @ 16' O.C.
and #4 VERT. @ 48" O.C. TO FOOTINGS

#4 HORIZ. TOP and BOTTOM COURSE

6" STL. BOLLARD
4" FROM WALL (TYP)

SINGLE ENCLOSURE

6" CONCRETE SLAB
FLUSH WITH A.C. (TYP)

FILL WITH GROUT
and CROWN TOP

6" SCHEDULE 40 GALV.
STEEL POST

CONCRETE POST
BASE

4" MIN. OUTSIDE POST

NOTES:
WHEN THE ENCLOSURE INCLUDES GATES, THE PLANS SHALL PROVIDE A WAY TO SECURE THE GATES OPEN AND CLOSED.

City of Flagstaff
SINGLE and DOUBLE TRASH ENCLOSURE

ENGINEERING DETAIL
PW-50-10

REVISION DATE:
12/30/2017

1/2
GATE HINGE DETAIL

6" DIA. BOLLARD

2x2x1/4 TS GATE FRAME

1xWD GATE FACING

HEAVY DUTY U-BOLT

PIVOT HINGE

186°

REVISION DATE:
12/30/2017

DETAIL NO.
PW-50-10

ENGINEERING DETAIL

City of Flagstaff