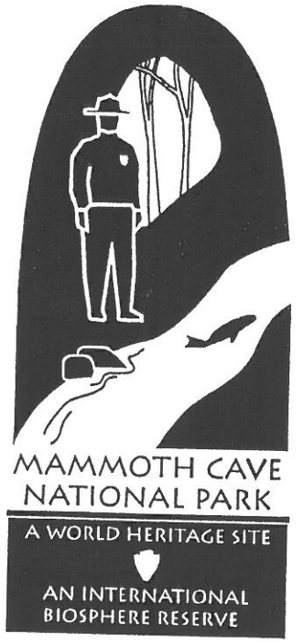
GROUNDWATER HAZARD MAP OF THE TURNHOLE SPRING KARST GROUNDWATER BASIN





Natural Resources and
Environmental Protection Cabinet



a product of:

MAMMOTH CAVE AREA INTERNATIONAL BIOSPHERE RESERVE

WHY USE THESE MAPS

THE MAJORITY OF THE WATER FLOWING THROUGH MAMMOTH CAVE ORIGINATES BEYOND PARK BOUNDARIES. FROM EAST TO CAVE CITY, SOUTH NEARLY TO GLASGOW, AND WEST TO ROCKY HILL, SURFACE WATER IS USED BY PLANTS AND ANIMALS, EVAPORATES, OR FLOWS INTO THE GROUND, THROUGH CAVES AND INTO MAMMOTH CAVE NATIONAL PARK. INTERSTATE 65, THE CUMBERLAND PARKWAY, AND THE CSX RAILROAD CROSS THE PARK'S GROUNDWATER BASIN. EACH YEAR MANY SPILLS OCCUR ALONG THESE MAJOR TRANSPORTATION CORRIDORS. IF A SPILL OF HAZARDOUS MATERIAL OCCURS, ONLY A RAPID AND EFFICIENT EMERGENCY RESPONSE WILL KEEP THESE MATERIALS FROM THE CAVE. ONCE A SPILL ENTERS THE SUBSURFACE, IT CANNOT BE RECOVERED. MILES OF CAVE STREAMS WITH ITS UNIQUE LIFE, AS WELL AS NUMEROUS WATER WELLS WILL BE CONTAMINATED. IF A SPILL IS TO BE EFFECTIVELY CONTAINED AND MITIGATED, THE EMERGENCY RESPONDER MUST HAVE DETAILED KNOWLEDGE ABOUT THE HYDROLOGY OF THE SPILL AREA. THESE MAPS CAN BE USED TO QUICKLY LOCATE THE SPILL RELATIVE TO DRAINAGE DITCHES, CULVERTS, COLLAPSES, AND SINKHOLES. THEY WILL ENABLE THE RESPONDERS TO QUICKLY LAY OUT AN EFFECTIVE PLAN TO CONTAIN AND MITIGATE THE SPILL.

HOW TO USE THESE MAPS

WHEN THE RESPONDER IS CALLED, LOCATE THE DETAILED MAP FROM THE INDEX MAP BASED UPON HIGHWAY MILE MARKERS. FOR EXAMPLE, IF A SPILL OCCURS NEAR MILE MARKER 47 ON I-65, THE INDEX MAP WILL TELL THE RESPONDER TO LOOK AT MAP SHEETS I65-9 AND I65-10. THE MAP SHOWS DETAILED LANDMARKS, SUCH AS GUARDRAILS, SIGNS, BRIDGES, AND OUTCROPS, THAT WILL HELP DETERMINE THE EXACT LOCATION OF THE SPILL. ONCE DETERMINED, THE MAPS PROVIDE DETAILED SURFACE HYDROLOGY, DRAINAGE BASINS, PAVED DITCHES, DROP BOXES, CULVERTS, AND SINKHOLES. THE RESPONDER WILL KNOW EXACTLY WHERE THE SPILL IS HEADED AND THUS KNOW EXACTLY WHERE TO POSITION MATERIALS AND PERSONNEL.

DESCRIPTION OF MAPPED FEATURES

SINKHOLE CLASSIFICATION

IN ORDER TO DISPLAY THE RELATIVE SPEED AT WHICH A SINKHOLE WILL DRAIN, A SIMPLE CLASSIFICATION WAS DEVELOPED. THE FOLLOWING ARE IN ORDER FROM THE LEAST VULNERABLE (POORLY DRAINED) TO THE MOST VULNERABLE (WELL DRAINED):

TYPE V SOIL COVERED SINKHOLE WITH NO OBVIOUS SINKPOINT. POORLY DRAINED. MAY POND AFTER RAINFALLS. MAY CONTAIN WATER TOLERANT PLANTS.

TYPE IV SOIL COVERED SINKHOLE WITH NO OBVIOUS SINKPOINT. NO SIGNS OF PONDING. FAIRLY WELL DRAINED.

TYPE III EXPOSED BEDROCK SINKHOLE WITH NO OBVIOUS SINKPOINT. NO SIGNS OF PONDING. FAIRLY WELL DRAINED.

TYPE II SOIL COVERED SINKHOLE. OBVIOUS SINKPOINT. VERY WELL DRAINED.

TYPE I EXPOSED BEDROCK SINKHOLE. OBVIOUS SINKPOINT. VERY WELL DRAINED.

CLASS V INJECTION WELL A SINKHOLE, CRACK, OR FISSURE THAT HAS BEEN MODIFIED OR IMPROVED BY MAN TO ALLOW EFFICIENT DRAINAGE OF SURFACE WATERS.

THE MAP SHEETS ALSO INCLUDE OTHER HYDROLOGIC FEATURES THAT MAY AFFECT THE MOVEMENT OF A SPILL.

SWALE A SHALLOW DEPRESSION ADJACENT TO A ROADWAY WITH NO OBVIOUS SINKPOINT. WATER DRAINS DIFFUSELY INTO THE GROUND.

STREAMS ALTHOUGH NOT COMMON, THERE ARE A FEW STREAMS WITHIN THE MAPPED AREA. ALL STREAMS EVENTUALLY SINK INTO THE GROUND. ULTIMATE SINKPOINTS ARE NOTED IN MAP SHEET TEXT.

PONDS PONDS ARE MAPPED AS EPHEMERAL AND PERENNIAL. AN EPHEMERAL POND IS A VERY POORLY DRAINED TYPE V SINKHOLE. IT WILL USUALLY CONTAIN WATER DURING THE WETTER PARTS OF THE YEAR. A PERENNIAL POND CONTAINS WATER YEAR-ROUND, HOWEVER, THESE PONDS ARE SUBJECT TO SUDDEN FAILURES, TYPICALLY FOLLOWING HEAVY RAINS.

POTENTIAL HAZARDS

IT IS COMMON THAT OVER THE YEARS MANY OF THE DRAINAGE FEATURES SUCH AS PAVED DITCHES, DROP BOXES, AND CULVERTS HAVE EXPERIENCED STRUCTURAL FAILURE. THESE FAILURES HAVE BEEN NOTED ON THE MAPS AS POTENTIAL HAZARDS. POTENTIAL HAZARDS WILL GREATLY AFFECT THE MOVEMENT OF WATER. FOR EXAMPLE, A CRACK IN A PAVED DITCH WILL CAUSE SURFACE WATER TO ENTER THE GROUND AT THAT POINT, RATHER THAN ITS INTENDED ROUTE. ALL POTENTIAL HAZARDS MUST BE EVALUATED WHEN A SPILL CONTAINMENT PLAN IS DEVELOPED. IT WILL BE OF LITTLE USE TO POSITION A SORBENT BOOM AT THE FOOT OF A PAVED DITCH IF THE SPILL IS DIVERTED INTO A POTENTIAL HAZARD FURTHER UPSTREAM. IT MUST BE NOTED THAT ADDITIONAL POTENTIAL HAZARDS MAY HAVE DEVELOPED AFTER THESE MAPS WERE MADE. THE RESPONDER MUST ALWAYS BE ON THE LOOK-OUT FOR THESE NEW HAZARDS.

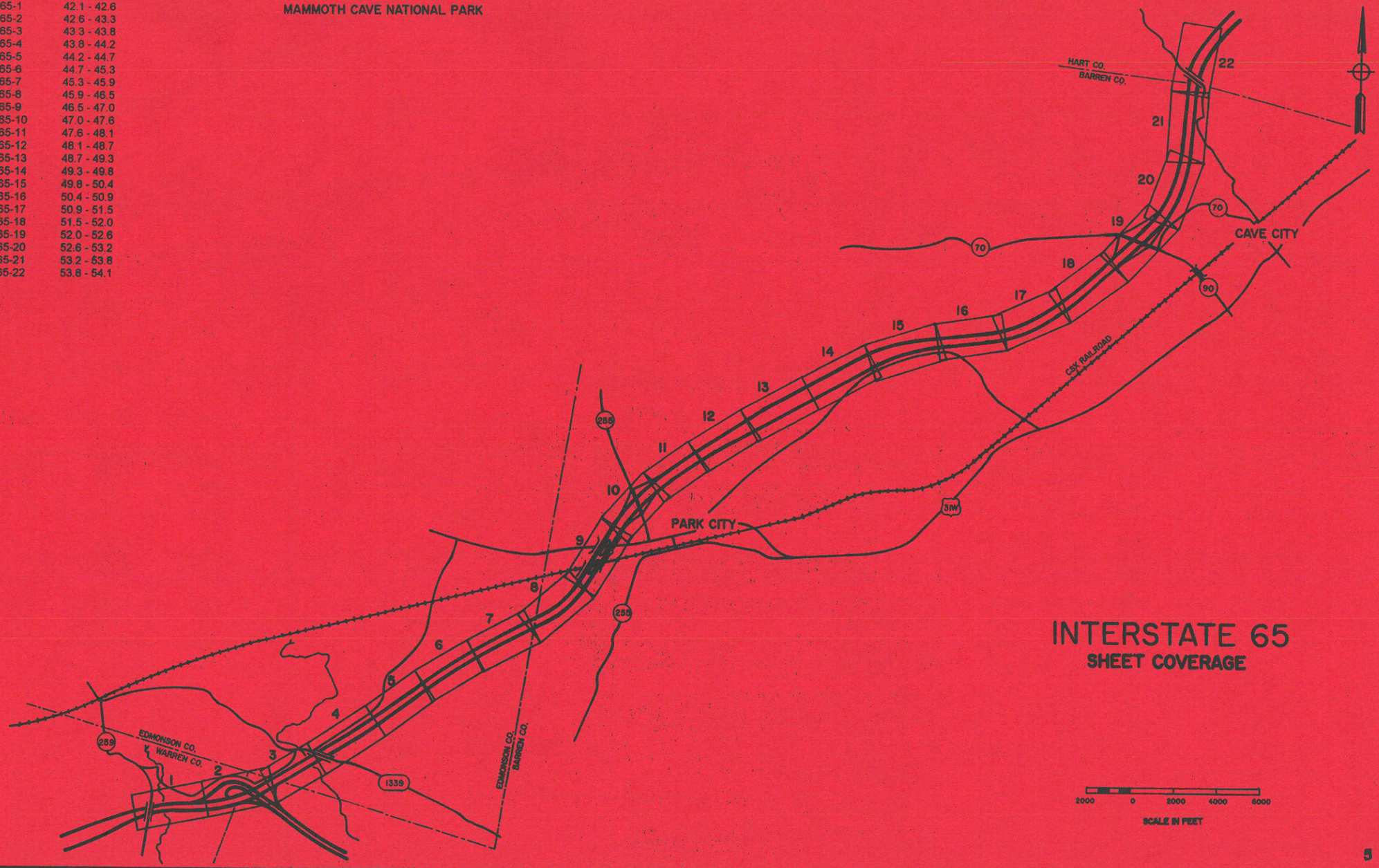
FOOTNOTE

THESE MAPS WERE COMPILED BETWEEN JANUARY 1994 AND SEPTEMBER 1995. USING THE ORIGINAL GRADE AND DRAIN PLANS, AND AERIAL PHOTOGRAPHS, BASE MAPS WERE DRAFTED. A GLOBAL POSITIONING SYSTEM WAS USED TO LOCATE ALL SURFACE FEATURES, AND EACH FEATURE WAS FIELD CHECKED FOR ACCURACY BEFORE BEING ANNOTATED TO THE BASE MAP. THE CORRESPONDING TEXT ON EACH MAP SHEET PROVIDES A DETAILED DESCRIPTION OF EACH RECHARGE FEATURE AND POTENTIAL HAZARD.

THESE MAPS ARE A PRODUCT OF THE MAMMOTH CAVE AREA INTERNATIONAL BIOSPHERE RESERVE. COOPERATORS ON THIS PROJECT INCLUDED THE NATIONAL PARK SERVICE, THE KENTUCKY DIVISION OF WATER, THE BARREN RIVER AREA DEVELOPMENT DISTRICT, AND THE U.S. ENVIRONMENTAL PROTECTION AGENCY. THESE MAPS WERE CREATED BY BRICE T. LEECH JR.,AND JOHN F. FRY (NATIONAL PARK SERVICE) AND JOSEPH A. RAY (KENTUCKY DIVISION OF WATER), UNDER THE DIRECTION OF JOE MEIMAN (NATIONAL PARK SERVICE).

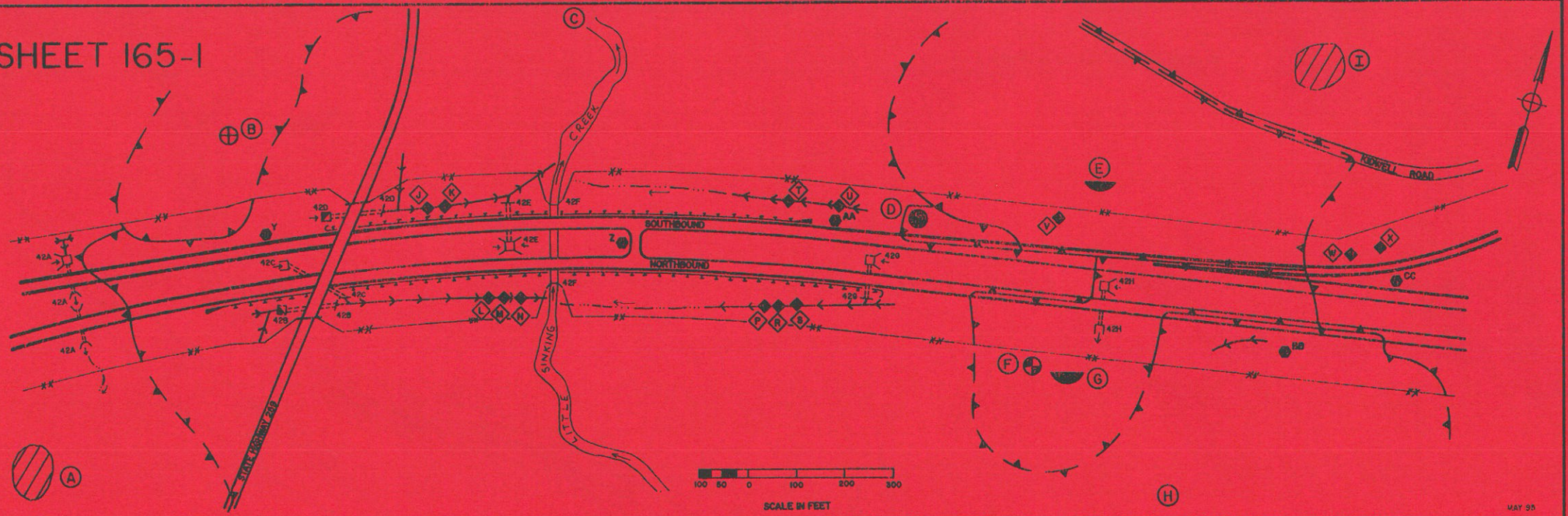
SHEET	RANGE
I65-1	42.1 - 42.6
I65-2	42.6 - 43.3
I65-3	43.3 - 43.8
I65-4	43.8 - 44.2
I65-5	44.2 - 44.7
I65-6	44.7 - 45.3
I65-7	45.3 - 45.9
I65-8	45.9 - 46.5
I65-9	46.5 - 47.0
I65-10	47.0 - 47.6
I65-11	47.6 - 48.1
I65-12	48.1 - 48.7
I65-13	48.7 - 49.3
I65-14	49.3 - 49.8
I65-15	49.8 - 50.4
I65-16	50.4 - 50.9
I65-17	50.9 - 51.5
I65-18	51.5 - 52.0
I65-19	52.0 - 52.6
I65-20	52.6 - 53.2
I65-21	53.2 - 53.8
I65-22	53.8 - 54.1

MAMMOTH CAVE NATIONAL PARK



INTERSTATE 65
SHEET COVERAGE

SHEET 165-1



MAY 95

- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
- TYPE II SINKHOLE
- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: SMITHS GROVE 7.5 ' TOPO , PARK CITY 7.5' TOPO

- ***LAST SURFACE POINT TO INTERCEPT FLOW IS LITTLE SINKING CREEK, OWNED BY EARL LLOYD ESTES, 2783 HAYS LODGE ROAD FOR SINKS "C" AND "H"***
- ***NO SURFACE INTERCEPTS FOR SINKS "A" "B" "D" "E" "F" "G" AND "I".***
- ***NEXT GROUNDWATER INTERCEPT FOR ALL SINKS: MILL HOLE, OWNED BY PERRY SEBAUGH, 3221 CHAUMONT RD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 2-42 HRS.***

(A) PERENNIAL POND IN OPEN FIELD 100 YD. SOUTH OF I65 R.O.W. POND RECEIVES FLOW FROM BOTH SIDES OF I65 INCLUDING MEDIAN VIA DRAINS 42A.

(B) TYPE IV SINK IN OPEN FIELD 100 YD. NORTH OF I65 R.O.W. SINK IS 15 FT. WIDE AND FILLED WITH WOOD PLANKS AND ROCKS. SINK RECEIVES FLOW FROM SURROUNDING AREA INCLUDING PORTION OF R.O.W., BUT NOT I65 ITSELF.

(C) TYPE I SINK, LITTLE SINKING CREEK WHICH FLOWS 3/4 MI. NORTH OF I65 R.O.W. UNDER HIGH FLOW CONDITIONS WATER BYPASSES THIS SINK TO A LARGER TYPE I SINKHOLE FURTHER DOWN CREEK BED ABOUT 200 YD. SINK RECEIVES LARGE QUANTITIES OF WATER AND MAY POOL FOLLOWING LARGE RAINS.

(D) TYPE I SINK AT FOOT OF CUT SLOPE. SINK IS 5 FT. WIDE AND 3 FT. DEEP WITH A 4 IN. DRAIN. SINK RECEIVES FLOW FROM SOUTHBOUND LANE ONLY.

(E) SWALE, DIRECTLY BEYOND I65 R.O.W. SWALE RECEIVES WATER FROM SOUTHBOUND LANE ONLY.

(F) TYPE II SINK IN OPEN FIELD 30 FT. SOUTH OF I65 R.O.W. SINK IS 3 FT. WIDE AND 6 / FT. IN DEPTH. SINK DRAINS MEDIAN VIA DRAIN 42H, NORTHBOUND LANE AND FROM AREA SURROUNDING SINK.

(G) SWALE IN OPEN FIELD DIRECTLY ADJACENT TO SOUTH I65 R.O.W. ALTHOUGH WATER POOLS IN THIS AREA THE GENERAL FLOW IS GRADUALLY TOWARD SINK "F".

(H) INTERMITTENT POND AND STREAM, IN WOODED AREA 150 YD. SOUTH OF I65 R.O.W. STREAM FLOWS FROM POND TO LITTLE SINKING CREEK.

(I) PERENNIAL POND BEYOND KIDWELL ROAD 150 YD NORTH OF I65 R.O.W. THIS POND IS NOT EFFECTED BY I65.

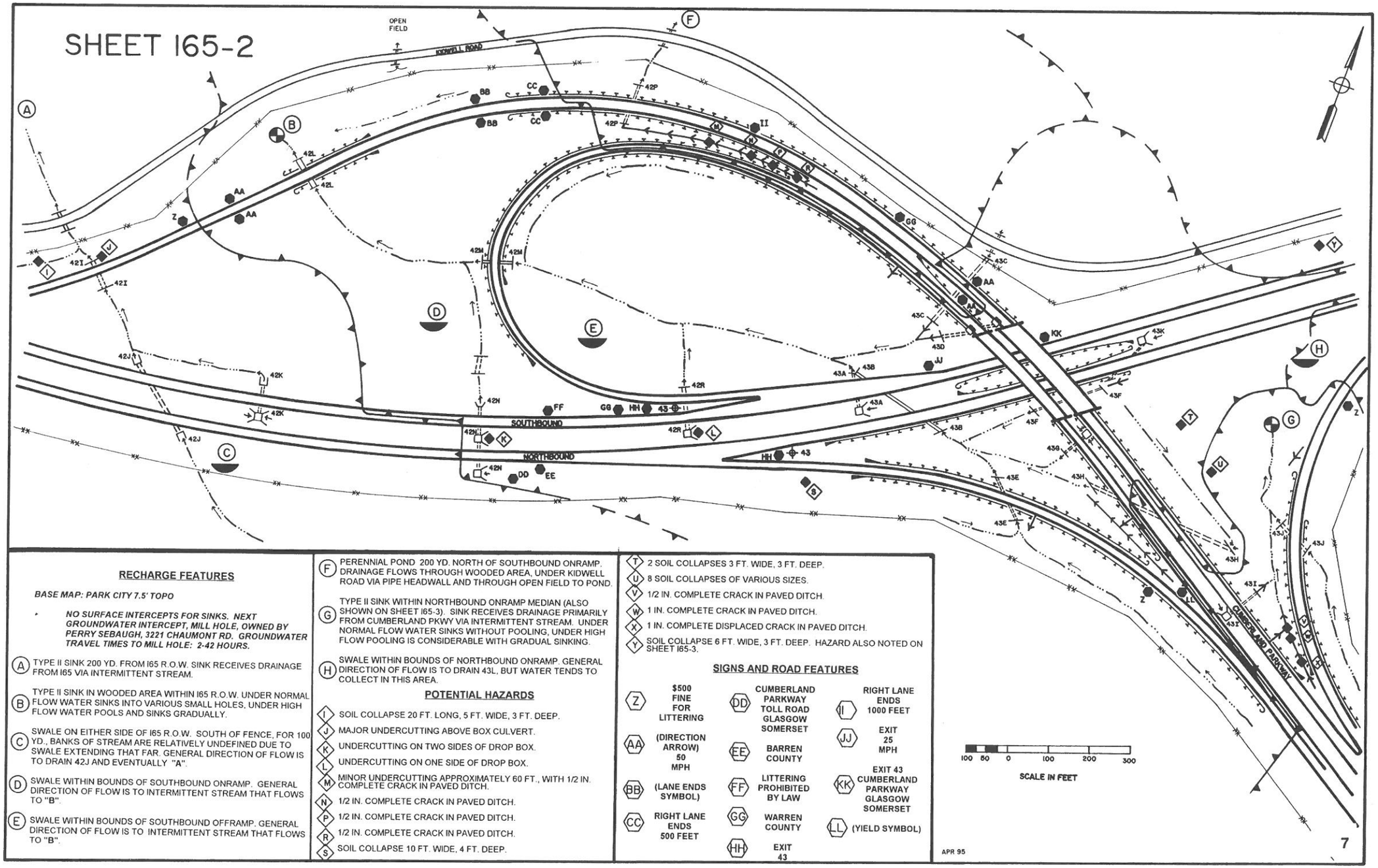
POTENTIAL HAZARDS

- (J) 1 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (K) 1/2 IN. COMPLETE CRACK IN PAVED DITCH.
- (L) 1IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (M) 4 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (N) 1 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (P) 1 IN. COMPLETE CRACK IN PAVED DITCH.
- (R) 2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (S) MINOR UNDERCUTTING 30 FT. LONG IN PAVED DITCH.
- (T) MAJOR UNDERCUTTING 40 FT. LONG IN PAVED DITCH.
- (U) 1/2 IN. COMPLETE CRACK IN PAVED DITCH.
- (V) 10 SOIL COLLAPSES IN AN AREA OF 40 FT. COLLAPSES VARY IN SIZE FROM 2 FT. WIDE AND 1 FT. DEEP TO 6 FT. WIDE AND 3 FT. DEEP, WITH SOME HAVING BEDROCK EXPOSED.
- (W) SOIL COLLAPSE 6 FT. WIDE AND TWO FT. DEEP.
- (X) SOIL COLLAPSE 3 FT. WIDE AND 2 FT. DEEP, 3 FT. UP SLOPE FROM BOTTOM OF CUT SLOPE.

SIGNS AND ROAD FEATURES

- (Y) SPEED LIMIT 65
- (Z) (NO U-TURN SYMBOL)
- (AA) BRIDGES FREEZE BEFORE ROADWAY
- (BB) EXIT 43 BARREN RIVER LAKE STATE RESORT PARK NEXT RIGHT
- (CC) (YIELD SYMBOL)

SHEET I65-2



RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO

- *NO SURFACE INTERCEPTS FOR SINKS. NEXT GROUNDWATER INTERCEPT, MILL HOLE, OWNED BY PERRY SEBAUGH, 3221 CHAUMONT RD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 2-42 HOURS.*

(A) TYPE II SINK 200 YD. FROM I65 R.O.W. SINK RECEIVES DRAINAGE FROM I65 VIA INTERMITTENT STREAM.

(B) TYPE II SINK IN WOODED AREA WITHIN I65 R.O.W. UNDER NORMAL FLOW WATER SINKS INTO VARIOUS SMALL HOLES, UNDER HIGH FLOW WATER POOLS AND SINKS GRADUALLY.

(C) SWALE ON EITHER SIDE OF I65 R.O.W. SOUTH OF FENCE, FOR 100 YD., BANKS OF STREAM ARE RELATIVELY UNDEFINED DUE TO SWALE EXTENDING THAT FAR. GENERAL DIRECTION OF FLOW IS TO DRAIN 42J AND EVENTUALLY "A".

(D) SWALE WITHIN BOUNDS OF SOUTHBOUND ONRAMP. GENERAL DIRECTION OF FLOW IS TO INTERMITTENT STREAM THAT FLOWS TO "B".

(E) SWALE WITHIN BOUNDS OF SOUTHBOUND OFFRAMP. GENERAL DIRECTION OF FLOW IS TO INTERMITTENT STREAM THAT FLOWS TO "B".

(F) PERENNIAL POND 200 YD. NORTH OF SOUTHBOUND ONRAMP. DRAINAGE FLOWS THROUGH WOODED AREA, UNDER KIDWELL ROAD VIA PIPE HEADWALL AND THROUGH OPEN FIELD TO POND.

(G) TYPE II SINK WITHIN NORTHBOUND ONRAMP MEDIAN (ALSO SHOWN ON SHEET I65-3). SINK RECEIVES DRAINAGE PRIMARILY FROM CUMBERLAND PKWY VIA INTERMITTENT STREAM. UNDER NORMAL FLOW WATER SINKS WITHOUT POOLING, UNDER HIGH FLOW POOLING IS CONSIDERABLE WITH GRADUAL SINKING.

(H) SWALE WITHIN BOUNDS OF NORTHBOUND ONRAMP. GENERAL DIRECTION OF FLOW IS TO DRAIN 43L, BUT WATER TENDS TO COLLECT IN THIS AREA.

POTENTIAL HAZARDS

(I) SOIL COLLAPSE 20 FT. LONG, 5 FT. WIDE, 3 FT. DEEP.

(J) MAJOR UNDERCUTTING ABOVE BOX CULVERT.

(K) UNDERCUTTING ON TWO SIDES OF DROP BOX.

(L) UNDERCUTTING ON ONE SIDE OF DROP BOX.

(M) MINOR UNDERCUTTING APPROXIMATELY 60 FT., WITH 1/2 IN. COMPLETE CRACK IN PAVED DITCH.

(N) 1/2 IN. COMPLETE CRACK IN PAVED DITCH.

(P) 1/2 IN. COMPLETE CRACK IN PAVED DITCH.

(R) 1/2 IN. COMPLETE CRACK IN PAVED DITCH.

(S) SOIL COLLAPSE 10 FT. WIDE, 4 FT. DEEP.

(T) 2 SOIL COLLAPSES 3 FT. WIDE, 3 FT. DEEP.

(U) 8 SOIL COLLAPSES OF VARIOUS SIZES.

(V) 1/2 IN. COMPLETE CRACK IN PAVED DITCH.

(W) 1 IN. COMPLETE CRACK IN PAVED DITCH.

(X) 1 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.

(Y) SOIL COLLAPSE 6 FT. WIDE, 3 FT. DEEP. HAZARD ALSO NOTED ON SHEET I65-3.

SIGNS AND ROAD FEATURES

(Z) $500 FINE FOR LITTERING

(AA) (DIRECTION ARROW) 50 MPH

(BB) (LANE ENDS SYMBOL)

(CC) RIGHT LANE ENDS 500 FEET

(DD) CUMBERLAND PARKWAY TOLL ROAD GLASGOW SOMERSET

(EE) BARREN COUNTY

(FF) LITTERING PROHIBITED BY LAW

(GG) WARREN COUNTY

(HH) EXIT 43

(II) RIGHT LANE ENDS 1000 FEET

(JJ) EXIT 25 MPH

(KK) EXIT 43 CUMBERLAND PARKWAY GLASGOW SOMERSET

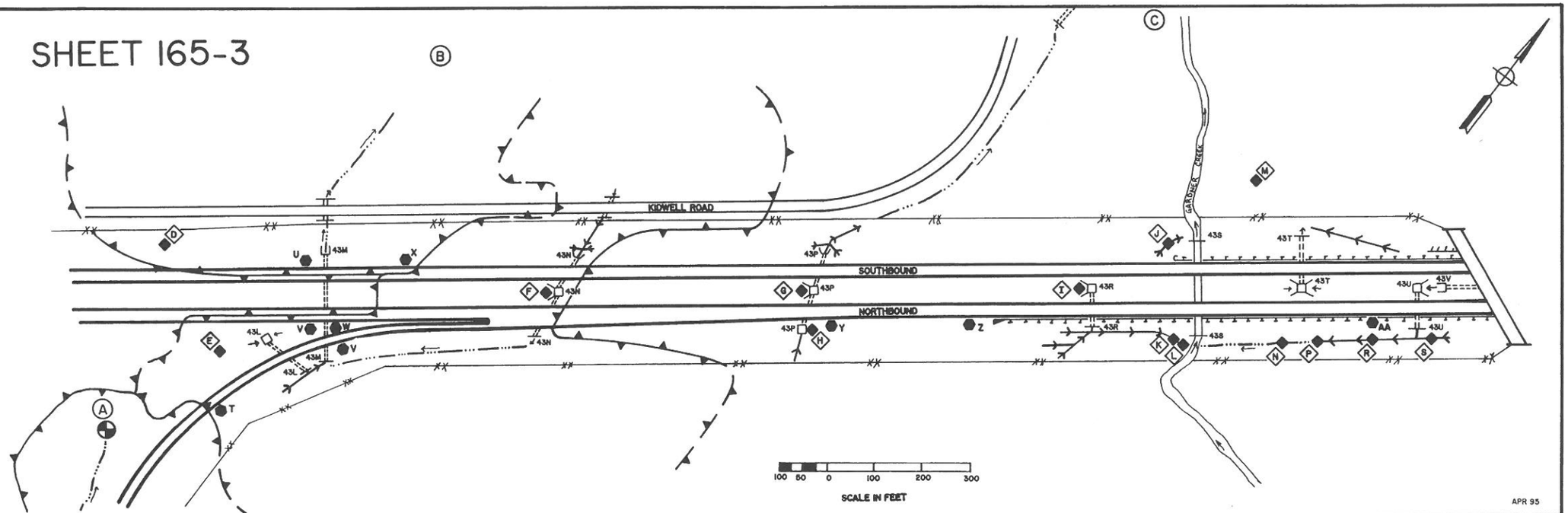
(LL) (YIELD SYMBOL)

100 50 0 100 200 300

SCALE IN FEET

APR 95

SHEET 165-3



- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- 8 SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
- TYPE II SINKHOLE
- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO

- ***LAST SURFACE POINT TO INTERCEPT FLOW IS GARDNER CREEK AT ROUTE 1339 BRIDGE FOR SINK "C".***
- ***NO SURFACE INTERCEPTS FOR SINKS "A" AND "B".***
- ***NEXT GROUNDWATER INTERCEPT FOR ALL SINKS: MILL HOLE, OWNED BY PERRY SEBAUGH, 3221 CHAUMONT RD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 2-42 HRS.***

(A) TYPE II SINK WITHIN NORTHBOUND ONRAMP MEDIAN (FEATURE IS ALSO SHOWN ON SHEET I65-2). SINK RECEIVES DRAINAGE PRIMARILY FROM THE CUMBERLAND PKWY VIA INTERMITTENT STREAM. UNDER NORMAL FLOW WATER SINKS WITHOUT POOLING, UNDER HIGH FLOW POOLING IS CONSIDERABLE WITH GRADUAL SINKING.

(B) PERENNIAL POND APPROXIMATELY 250 YD. FROM I65 R.O.W. DRAINAGE FLOWS THROUGH BOX CULVERT UNDER KIDWELL RD. AND THROUGH OPEN FIELD TO POND WHICH RECEIVES FLOW FROM BOTH SIDES OF I65, INCLUDING A PORTION OF MEDIAN, VIA DRAINS 43L AND 43M.

(C) TYPE I SINK, GARDNER CREEK, WHICH FLOWS NORTHWEST AND SINKS 700 YD. FROM I65 R.O.W. UNDER HIGH FLOW WATER BYPASSES PRIMARY SINKING POINT AND CONTINUES DOWN STREAM BED WHICH ULTIMATELY ENDS 2 MI. FURTHER TO FIELD AND A TYPE I SINK. WATER MAY SINK AT OTHER LOCATIONS ALONG REMAINING 2 MI.

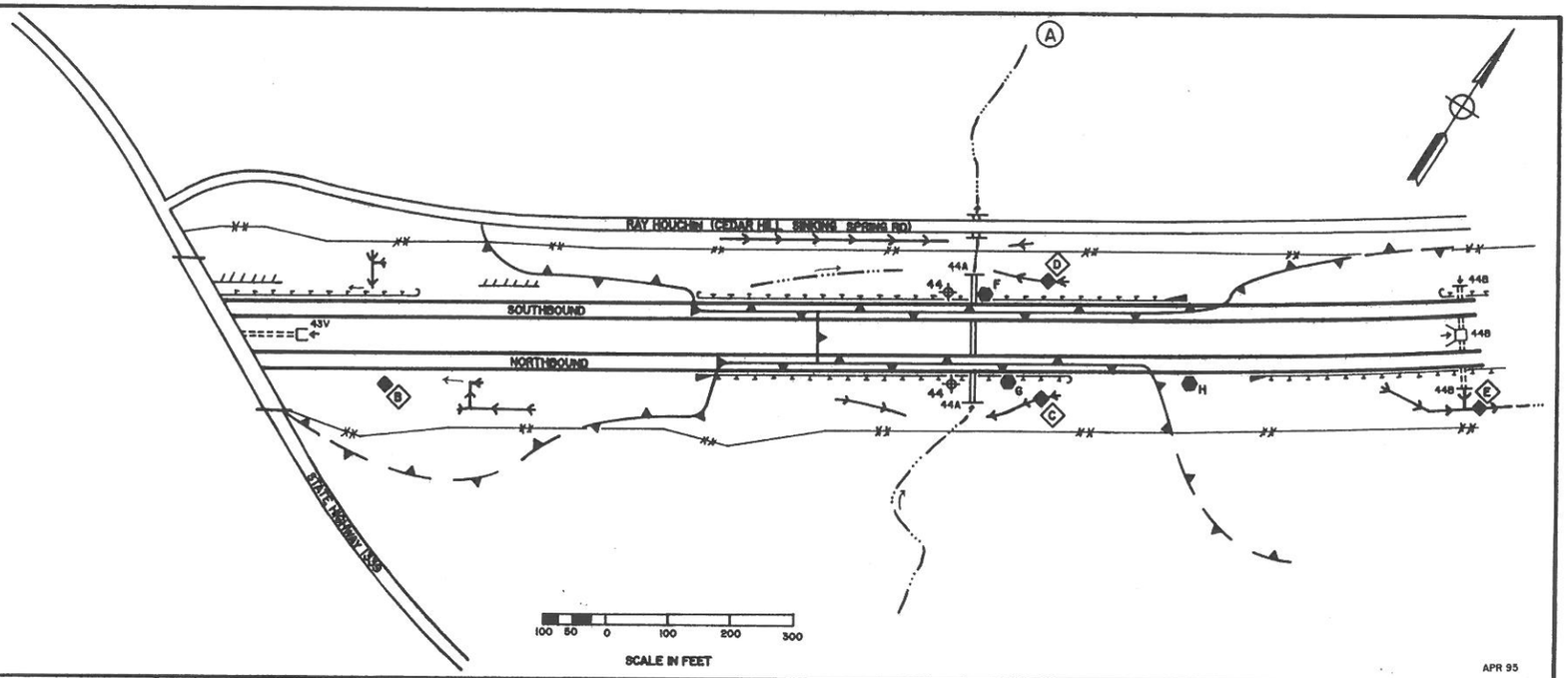
POTENTIAL HAZARDS

- (D) SOIL COLLAPSE 6 FT. WIDE AND 3 FT. DEEP.
- (E) SOIL COLLAPSE 5 FT. WIDE AND 2 FT. DEEP.
- (F) DROP BOX UNDERCUT ON 3 SIDES WITH 1 SIDE FILLED IN.
- (G) DROP BOX UNDERCUT ON 2 SIDES WITH 1 SIDE FILLED IN.
- (H) DROP BOX UNDERCUT ON 2 SIDES.
- (I) UNDERCUT HOLE NEXT TO DROP BOX 1 FT. WIDE AND 1/2 FT. DEEP.
- (J) MAJOR UNDERCUTTING 30 FT. LONG WITH A 1 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (K) MAJOR UNDERCUTTING WITH A 2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (L) PAVED DITCH HAS BEEN COMPLETELY UNDERCUT. THE LAST 6 FT. WITH A 3 IN. COMPLETE DISPLACED CRACK AT HEAD OF UNDERCUTTING DUE TO DROPPING OF PAVED DITCH.
- (M) SOIL COLLAPSE 3 FT. WIDE AND 2 FT. DEEP UNDER A TREE AND BEYOND I65 R.O.W.
- (N) SOIL COLLAPSE 3 FT. WIDE AND 3 FT. DEEP.
- (P) SOIL COLLAPSE AT END OF PAVED DITCH 10 FT. LONG, 6 FT. WIDE AND 3 FT DEEP.
- (R) UNDERCUT HOLE IN PAVE DITCH 1 FT. WIDE AND 1 FT. DEEP.
- (S) 1/2 IN. COMPLETE CRACK IN PAVED DITCH.

SIGNS AND ROAD FEATURES

- (T) $500 FINE FOR LITTERING
- (U) BARREN COUNTY
- (V) EDMONSON COUNTY
- (W) YIELD
- (X) EXIT 43 BARREN RIVER LAKE STATE RESORT PARK NEXT RIGHT
- (Y) BRIDGES FREEZE BEFORE ROADWAY
- (Z) NORTH I65
- (AA) SPEED LIMIT 65

SHEET 165-4



- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
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- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
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- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

- *BASE MAP: PARK CITY 7.5' TOPO*
- *NO SURFACE INTERCEPTS FOR SINKS. NEXT GROUNDWATER INTERCEPT, MILL HOLE, OWNED BY PERRY SEBAUGH, 3221 CHAUMONT RD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 2-42 HRS.*

(A) TYPE IV SINK IN SMALL WOODED AREA 600 YD. FROM I65 R.O.W. SINK RECEIVES DRAINAGE FROM BOTH SIDES OF I65, NOT INCLUDING MEDIAN, VIA BOX CULVERT 44A. AN INTERMITTENT STREAM LEADS FROM BOX CULVERT, THROUGH AN OPEN FIELD TO SINK. THERE IS A BREAK IN PATH OF STREAM WHERE FLOW SPREADS DIFFUSELY UNTIL STREAM BED BEGINS AGAIN.

POTENTIAL HAZARDS

- (B) SOIL COLLAPSE 1 FT. WIDE AND 1 FT. DEEP AT BASE OF CUT SLOPE.
- (C) 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (D) 1/2 IN. COMPLETE CRACK IN PAVED DITCH.
- (E) 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH (ALSO NOTED ON SHEET I65-5).

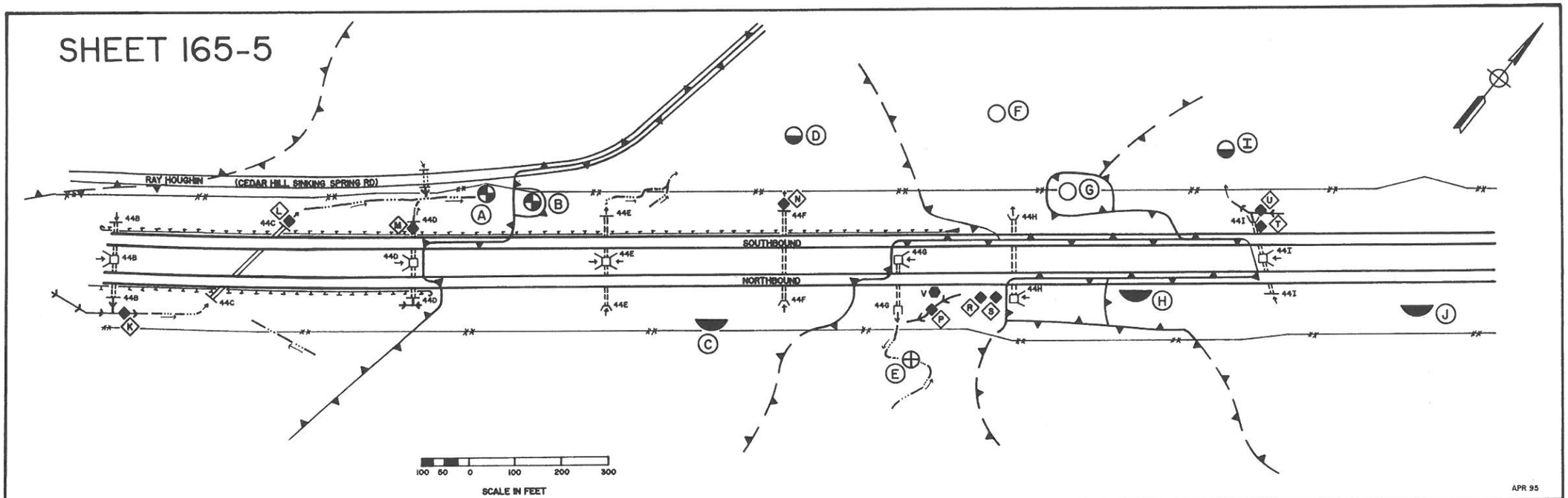
SIGNS AND ROAD FEATURES

EXIT 43
CUMBERLAND PARKWAY
(F) TOLL ROAD
GLASGOW
SOMERSET

(G) PARK CITY 4
LOUISVILLE 94

(H) KEEP
RIGHT
EXCEPT
TO PASS

SHEET I65-5



APR 95

- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
- TYPE II SINKHOLE
- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO

* ***NO SURFACE INTERCEPTS FOR SINKS. NEXT GROUNDWATER INTERCEPT, MILL HOLE, OWNED BY PERRY SEBAUGH, 3221 CHAUMONT RD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 2-42 HRS.***

(A) TYPE II SINK IN WOODED AREA WITHIN I65 R.O.W. RECEIVES FLOW FROM BOTH SIDES OF I65 INCLUDING MEDIAN VIA DRAINS 44B, C AND D, THEN TO INTERMITTENT STREAM LEADING DIRECTLY INTO SINK.

(B) TYPE II SINK IN WOODED AREA ON TOP OF CUT SLOPE WITHIN I65 R.O.W. SINK IS 6 FT. WIDE, 2 FT. DEEP WITH AN 8 IN. DRAIN WHICH WIDENS 6 FT. BENEATH THE SURFACE. THIS SINK IS NOT AFFECTED BY I65 .

(C) SWALE IN OPEN AREA WITHIN I65 R.O.W. DRAINAGE FROM I65 DOES NOT FLOW INTO SWALE, BUT TRAFFIC COULD REACH THIS POINT.

(D) TYPE III SINK IN OPEN FIELD ADJACENT TO I65 R.O.W. SINK RECEIVES DRAINAGE FROM BOTH SIDES OF I65, INCLUDING MEDIAN, VIA DRAINS 44E AND 44F. 30 FT. WIDE AND 15 FT. DEEP. FLOW TOWARD SINK IS DIFFUSE OVER A GENTLE SLOPE.

(E) TYPE IV SINK IN WOODED AREA ADJACENT TO I65 R.O.W. SINK RECEIVES FLOW FROM NORTHBOUND LANE AND MEDIAN VIA DRAIN 44G. AN INTERMITTENT STREAM ALSO LEADS DIRECTLY INTO SINK.

(F) TYPE V SINK ON EDGE OF WOODED AREA AND AN OPEN FIELD. THERE IS DIFFUSE DRAINAGE AND NO OBVIOUS SINK POINT.

(G) TYPE V SINK LOCATED ON I65 R.O.W. DRAINAGE IS CONFINED TO IMMEDIATE AREA AND IS NOT DRAINED BY I65.

(H) SWALE AT BASE OF CUT SLOPE. SWALE RECEIVES DRAINAGE FROM NORTHBOUND LANE AND CUT SLOPE.

(I) TYPE III SINK IN OPEN FIELD DIRECTLY ADJACENT TO I65 R.O.W. SINK RECEIVES DRAINAGE FROM BOTH SIDES OF I65 AND MEDIAN VIA DRAIN 44I. SINK IS 20 FT. WIDE, 10 FT. DEEP AND BRIAR FILLED.

(J) SWALE IN OPEN FIELD WITHIN I65 R.O.W. GENERAL DIRECTION OF FLOW IS TOWARD DRAIN 44I.

POTENTIAL HAZARDS

(K) 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.

(L) WATER POOLS 15 FT. WIDE AND 3 FT. DEEP JUST BEYOND BOX CULVERT.

(M) MAJOR UNDERCUTTING ABOVE PIPE HEADWALL 44D.

(N) PIPE HEADWALL 44F HALF FULL OF SEDIMENT.

(P) MAJOR UNDERCUTTING 10 FT. LONG, WITH 1/2 IN. COMPLETE CRACK IN PAVED DITCH. UNDERCUTTING HAS CAUSED DRAINAGE TO FLOW UNDER PAVED DITCH.

(R) SOIL COLLAPSE 3 FT. WIDE AND 2 FT. DEEP IN BASE OF CUT SLOPE.

(S) PROBABLE SINK FILL IN BASE OF CUT SLOPE, 5 FT. WIDE AND FILLED WITH ASPHALT.

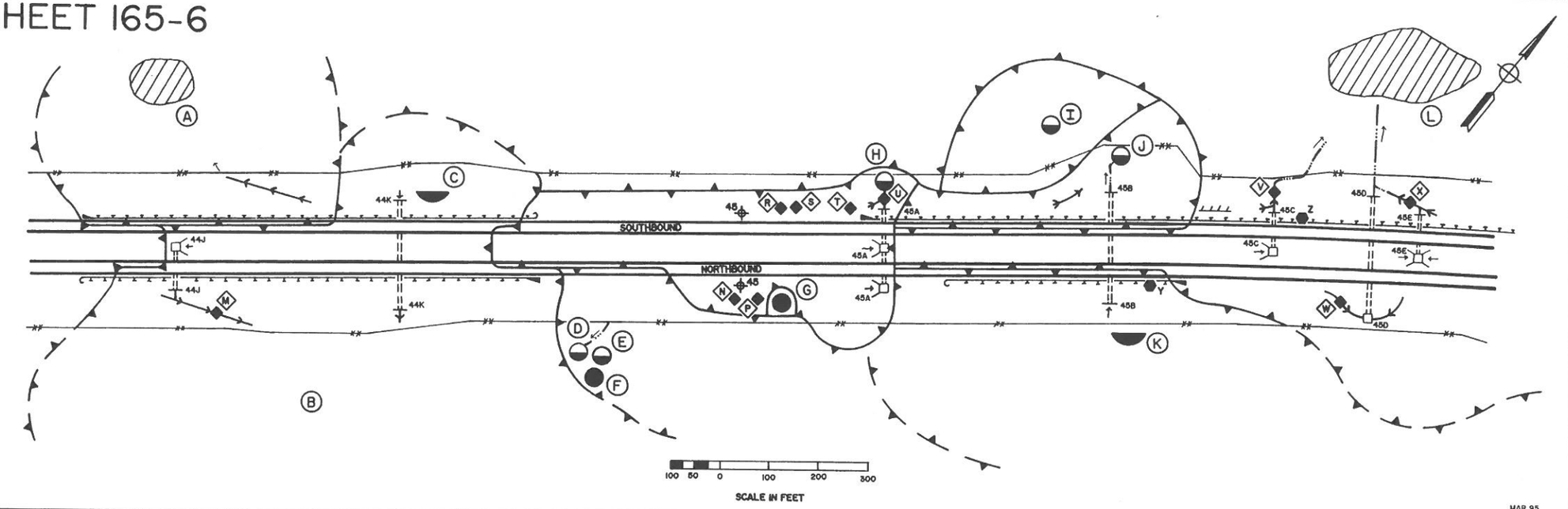
(T) SOIL COLLAPSE 3 FT. WIDE AND 2 FT. DEEP IN PAVED DITCH.

(U) 1/2 IN. COMPLETE CRACK IN PAVED DITCH.

SIGNS AND ROAD FEATURES

(V) VISITOR INFORMATION
TUNE AM RADIO
TO 530

SHEET I65-6



MAR 95

- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
- TYPE II SINKHOLE
- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO

NO SURFACE INTERCEPTS FOR SINKS. NEXT GROUNDWATER INTERCEPT, MILL HOLE, OWNED BY PERRY SEBAUGH, 3221 CHAUMONT RD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 2-42 HRS.

(A) POND IN OPEN FIELD 200 YD. FROM I65 R.O.W. FLOW TO POND IS GRADUAL. DRAINAGE FROM SOUTHBOUND I65 ONLY.

(B) LARGE OPEN FIELD ADJACENT TO I65 R.O.W. RECEIVES FLOW FROM BOTH SIDES OF I65 INCLUDING MEDIAN VIA DRAINS 44J & 44K. FIELD DRAINS DIFFUSELY WITH NO OBVIOUS SINK POINT.

(C) SWALE WITHIN I65 R.O.W. ALTHOUGH WATER DOES POOL HERE, THERE IS A SLOW GENERAL FLOW IN A SOUTHERLY DIRECTION TOWARD DRAIN 44K.

(D) TYPE III SINK IN WOODED AREA ADJACENT TO I65 R.O.W. SINK IS 40 FT. WIDE AND 15 FT. DEEP WITH VERTICAL SOIL WALLS AND BEDROCK IN LOWEST POINT. SINK RECEIVES FLOW FROM NORTH BOUND I65 ONLY.

(E) TYPE III SINK IN WOODED AREA ADJACENT TO I65 R.O.W. DRAINAGE IS PRIMARILY CONFINED TO WALLS OF SINK, WHICH IS 20 FT. WIDE, 10 FT. DEEP AND VERTICAL.

(F) TYPE I SINK IN WOODED AREA DIRECTLY ADJACENT TO I65 R.O.W. DRAINAGE IS PRIMARILY CONFINED TO WALLS OF SINK, WHICH IS 20 FT. WIDE, 10 FT. DEEP AND VERTICAL. SINK HAS DRAIN 1 FT. WIDE.

(G) TYPE I SINK 6 FT. UP FROM BASE OF CUT SLOPE. SINK HAS 3 FT. WIDE DRAIN THAT SLANTS UNDERGROUND TOWARD I65.

(H) TYPE III SINK AT END OF AND BENEATH PAVED DITCH AT DRAIN 45A. SINK RECEIVES FLOW FROM BOTH SIDES OF I65 AND MEDIAN VIA DRAINS 45A.

(I) TYPE III SINK IN WOODED AREA ADJACENT TO I65 R.O.W. SINK RECEIVES FLOW PRIMARILY FROM OUTSIDE R.O.W. AND NOT I65.

(J) TYPE III SINK IN WOODED AREA WITHIN I65 R.O.W. SINK RECEIVES FLOW FROM BOTH SIDES OF I65, BUT NOT MEDIAN, VIA DRAINS 45B.

(K) SWALE IN A PARTIALLY WOODED AREA ADJACENT TO I65 R.O.W. AREA DRAINS DIFFUSELY WHILE THERE IS A SLOW GENERAL FLOW TOWARD DRAIN 45B.

(L) POND IN OPEN FIELD ADJACENT TO I65 R.O.W. POND RECEIVES DRAINAGE FROM BOTH SIDES OF I65, INCLUDING MEDIAN, VIA DRAINS 45C,D AND E.

POTENTIAL HAZARDS

(M) 1/2 INCH COMPLETE DISPLACED CRACK IN PAVED DITCH.

(N) SOIL COLLAPSE, 3 FT. WIDE, IN BASE OF CUT SLOPE.

(P) SOIL COLLAPSE, 3 FT. WIDE, IN BASE OF CUT SLOPE.

(R) SOIL COLLAPSE, 3 FT. WIDE, 3 FT. UP SLOPE FROM BASE OF CUT SLOPE.

(S) SOIL COLLAPSE, 2 FT. WIDE AND 2 FT. DEEP, IN BASE OF CUT SLOPE.

(T) SOIL COLLAPSE, 4 FT. WIDE AND 3 FT. UP FROM BASE OF CUT.

(U) PAVED DITCH COMPLETELY UNDERCUT DUE TO SINKHOLE "H" AT END OF DITCH. END OF PAVED DITCH HAS DROPPED AND A 6 IN. COMPLETE DISPLACED CRACK HAS FORMED.

(V) PAVED DITCH COMPLETELY UNDERCUT 3 FT. UNDERCUTTING IS HEAD OF INTERMITTENT STREAM.

(W) MINOR UNDERCUTTING 20 FT. LONG IN PAVED DITCH.

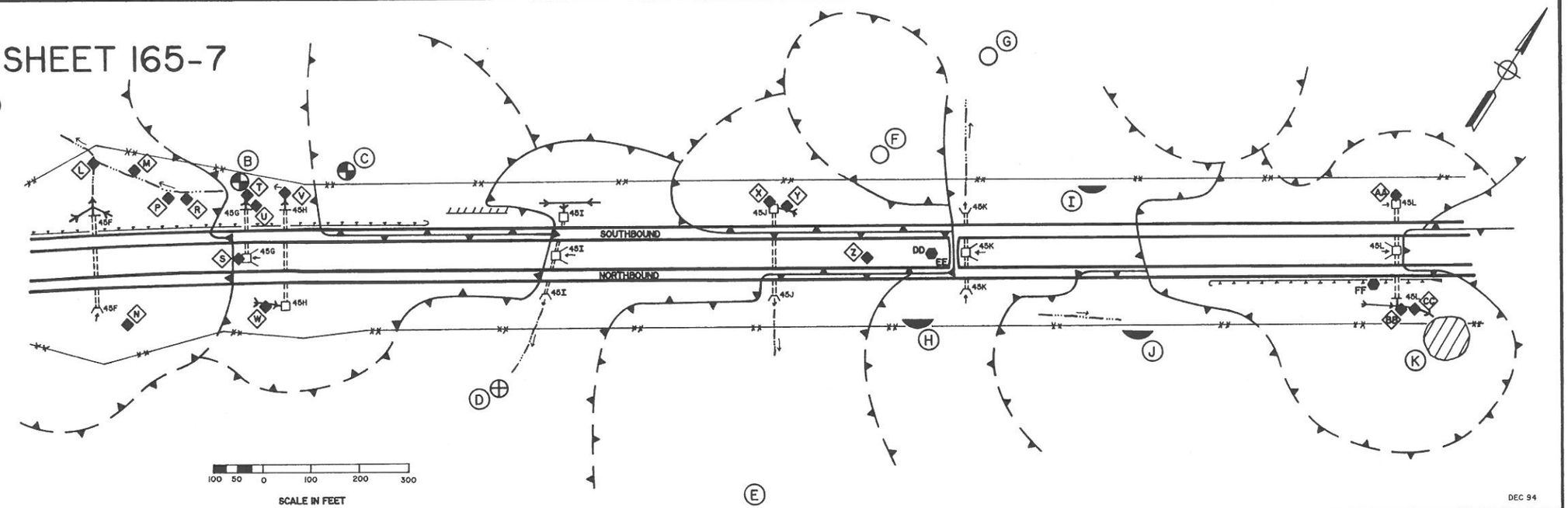
(X) MAJOR UNDERCUT HOLES UNEVENLY SPACED ALONG LENGTH OF PAVED DITCH BELOW DRAIN 45E. UNDERCUTTING HAS CAUSED FLOW TO OCCUR BENEATH PAVED DITCH.

SIGNS AND ROAD FEATURES

(Y) EXIT 48
255
BROWNSVILLE
PARK CITY
2 MILES

(Z) CUMBERLAND PARKWAY
TOLL ROAD
GLASGOW
SOMERSET
2 MILES

SHEET I65-7



DEC 94

INTERSTATE 65
U.S. ROUTE
STATE ROUTE
LOCAL ROUTE
RAILROAD
ACCESS CONTROL FENCE
SIGN
MILE MARKER
GUARDRAIL
ROCK OUTCROP
PAVED DITCH
AGGREGATE LINED CHANNEL
PIPE HEADWALL
BOX CULVERT HEADWALL
DROP BOX INLET
DOUBLE DROP BOX INLET
SLOPED BOX INLET
SLOPED & FLARED BOX INLET
12 SIDE TAPERED INLET

SLOPED BOX OUTLET
SLOPED & FLARED BOX OUTLET
DRAINAGE BASIN BOUNDARY
INFERRED DRAINAGE BASIN BOUNDARY
CLASS V INJECTION WELL
TYPE I SINKHOLE
TYPE II SINKHOLE
TYPE III SINKHOLE
TYPE IV SINKHOLE
TYPE V SINKHOLE
POTENTIAL HAZARD
SWALE
INTERMITTENT STREAM
PERENNIAL STREAM
EPHEMERAL POND
PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO

- ***NO SURFACE INTERCEPTS FOR SINKS. NEXT GROUNDWATER INTERCEPT, MILL HOLE, OWNED BY PERRY SEBAUGH, 3221 CHAUMONT RD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 2-42 HRS.***

(A) LARGE POND IN FIELD ADJACENT TO I65 R.O.W. DRAINAGE FROM BOTH SIDES OF I65, INCLUDING MEDIAN, FLOWS TO THIS POND VIA DRAIN 45F, CUT CHANNEL AND INTERMITTENT STREAM. FEATURE IS SHOWN ON SHEET I65-6.

(B) TYPE II SINK WITHIN I65 R.O.W. SINK IS 30 FT. WIDE, 10 FT. DEEP WITH 1 FT. BEDROCK DRAIN AND VERTICAL SOIL SIDES. SINK TAKES DRAINAGE FROM BOTH SIDES OF I65 AND MEDIAN VIA DRAINS 45G AND 45H.

(C) TYPE II SINK IN SMALL WOODED AREA DIRECTLY ADJACENT TO I65 R.O.W. SINK IS 30 FT. WIDE, 10 FT. DEEP WITH 1 FT. SOIL DRAIN AND VERTICAL SOIL SIDES. SINK TAKES RUNOFF FROM SOUTHBOUND LANE ONLY.

(D) TYPE IV SINK IN WOODED AREA DIRECTLY ADJACENT TO I65 R.O.W. SINK TAKES DRAINAGE FROM BOTH SIDES OF I65 AND MEDIAN VIA DRAIN 45I. CUT CHANNEL DIRECTS FLOW BEYOND I65 R.O.W.

(E) DRAINAGE FROM BOTH SIDES OF I65 (NOT INCLUDING MEDIAN) IS DIRECTED BEYOND I65 R.O.W. VIA DRAIN 45J, AND CUT CHANNEL, THROUGH WIDE WOODED AREA TO OPEN FIELD. DRAINAGE SINKS DIFFUSELY AS IT FLOWS TO OPEN FIELD.

(F) TYPE V SINK IN OPEN FIELD DIRECTLY ADJACENT TO I65 R.O.W. ONLY A SMALL PORTION OF R.O.W. FLOWS TO SINK DUE TO GRASS BANK.

(G) TYPE V SINK IN OPEN FIELD DIRECTLY ADJACENT TO I65 R.O.W. SINK TAKES DRAINAGE FROM BOTH SIDES OF I65, INCLUDING MEDIAN VIA DRAIN 45K. A CUT CHANNEL DIRECTS FLOW TO SINK.

(H) SWALE, GENERAL DIRECTION OF FLOW IS TO DRAIN 45K, AND TO "G". THIS FEATURE WILL RETARD FLOW TOWARD DRAIN 45K.

(I) SWALE WITHIN I65 R.O.W. GENERAL DIRECTION OF FLOW IS TO SOUTHWEST. SWALE TENDS TO COLLECT WATER AND RETARDS FLOW TOWARD CUT DRAINAGE AND "G".

(J) SWALE IN BRUSHY AREA DIRECTLY ADJACENT TO THE I65 R.O.W. SWALE TAKES DRAINAGE FROM NORTHBOUND LANE ONLY.

(K) POND DIRECTLY ADJACENT TO I65 R.O.W. POND TAKES DRAINAGE FROM BOTH SIDES OF I65 AND MEDIAN VIA DRAIN 45L.

POTENTIAL HAZARDS

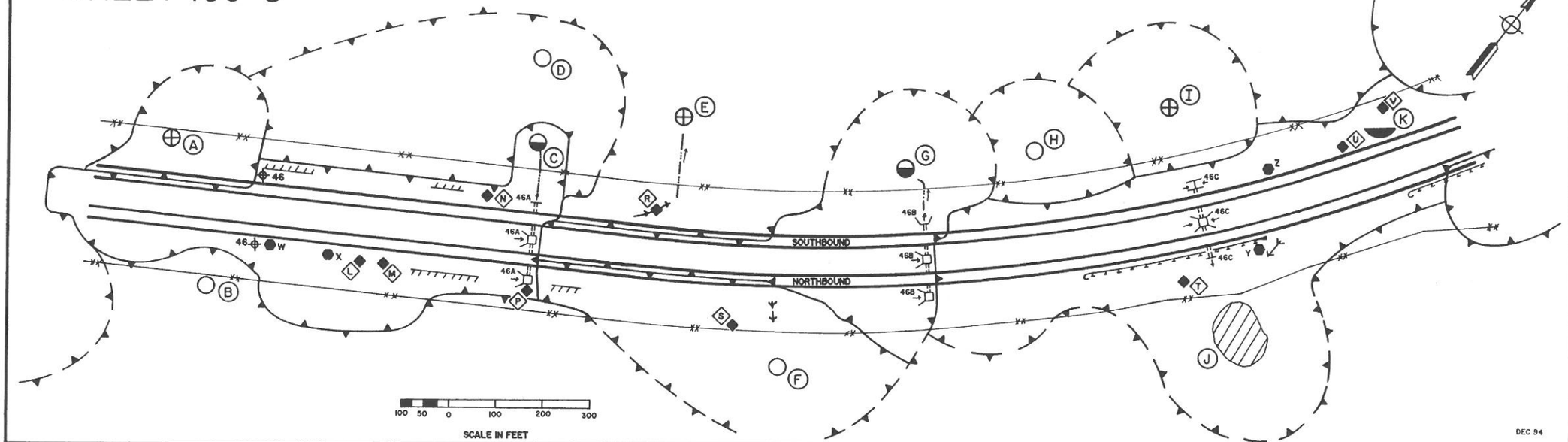
- (L) SOIL COLLAPSE AT JUNCTION OF 2 INTERMITTENT STREAMS, 3 FT. WIDE AND 2 FT. DEEP.
- (M) SOIL COLLAPSE AT FOOT OF BANK OF INTERMITTENT STREAM, 4 FT. LONG, 2 FT. WIDE AND 2 FT. DEEP.
- (N) SOIL COLLAPSE 10 FT. LONG, 2 FT. WIDE AND 1 FT. DEEP.
- (P) SOIL COLLAPSE 10 FT. UP BANK OF INTERMITTENT STREAM, 1 FT. WIDE AND 6+ FT. DEEP WITH BEDROCK EXPOSED.
- (R) SOIL COLLAPSE 10 FT. UP BANK OF INTERMITTENT STREAM, 2 FT. WIDE, 2 FT. DEEP AND 6 IN. DRAIN WITH BEDROCK EXPOSED.
- (S) UNDERCUT HOLE IN CORNER OF DROP BOX.
- (T) MAJOR UNDERCUTTING AT END OF PAVED DITCH.
- (U) MAJOR UNDERCUT HOLE IN PAVED DITCH AT FOOT OF PIPE HEADWALL.
- (V) MAJOR UNDERCUTTING AT END OF PAVED DITCH.
- (W) MAJOR UNDERCUTTING IN PAVED DITCH 20 FT. LONG.
- (X) MINOR UNDERCUTTING ON 2 SIDES OF DROP BOX.
- (Y) 1/2 IN. COMPLETE CRACK IN PAVED DITCH.
- (Z) SOIL COLLAPSE DIRECTLY ADJACENT TO UNDERBED DRAIN 2 FT. WIDE AND 2 FT. DEEP.
- (AA) MINOR UNDERCUTTING IN 3 SIDES OF DROP BOX.

- (BB) 1 IN. COMPLETE CRACK IN PAVED DITCH.
- (CC) 1 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.

SIGNS AND ROAD FEATURES

- (DD) NO U-TURN
- (EE) MEDIAN CROSSOVER (GRAVEL)
- (FF) CAVE AREA NEXT 3 EXITS

SHEET 165-8



- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
- TYPE II SINKHOLE
- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO

- ***NO SURFACE INTERCEPTS FOR SINKS. NEXT GROUNDWATER INTERCEPT, MILL HOLE, OWNED BY PERRY SEBAUGH, 3221 CHAUMONT RD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 2-42 HRS.***

(A) TYPE IV SINK WITHIN I65 R.O.W. 30 FT. FROM SOUTHBOUND LANE. SINK FILLED IN TO A LEVEL 4 FT. FROM SURFACE WITH CONSTRUCTION DEBRIS. DRAINAGE FROM I65 CONFINED TO SOUTHBOUND LANE.

(B) TYPE V SINK LOCATED IN OPEN FIELD DIRECTLY ADJACENT TO I65 R.O.W. DRAINAGE FROM I65 IS CONFINED TO ALONG R.O.W. FENCE.

(C) TYPE III SINK AT END OF CUT DRAINAGE IN OPEN FIELD DIRECTLY ADJACENT TO I65 R.O.W. SINK DRAINS BOTH SIDES OF I65, INCLUDING MEDIAN, VIA DRAIN 46A. SINK IS 20 FT. WIDE, 5 FT. DEEP AND ROCK FILLED.

(D) TYPE V SINK IN OPEN FIELD DIRECTLY ADJACENT TO I65 R.O.W. AND "C". SINK APPEARS TO HAVE BEEN OLD POND IN THE PAST. TYPE IV SINK AT THE END OF A CUT DRAINAGE IN OPEN FIELD ADJACENT TO I65 R.O.W. DRAINAGE FROM I65 IS CONFINED TO ALONG SOUTHBOUND LANE. SINK IS 30 FT. WIDE, 5 FT. DEEP AND FILLED WITH TRASH, WIRE AND ROCKS.

(E) TYPE V SINK IN OPEN FIELD ADJACENT TO I65 R.O.W. A PARTIALLY FILLED AGGREGATE CHANNEL DIRECTS FLOW FROM NORTHBOUND LANE TO SINK.

(F) TYPE III SINK IN OPEN FIELD ADJACENT TO I65 R.O.W. DRAINAGE INTO SINK ORIGINATES FROM BOTH LANES OF I65 , INCLUDING MEDIAN VIA DRAIN 46B. SINK IS 20 FT. WIDE, 10 FT. DEEP AND BOULDER FILLED.

(G) TYPE III SINK IN OPEN FIELD ADJACENT TO I65 R.O.W. DRAINAGE INTO SINK ORIGINATES FROM BOTH LANES OF I65 , INCLUDING MEDIAN VIA DRAIN 46B. SINK IS 20 FT. WIDE, 10 FT. DEEP AND BOULDER FILLED.

(H) TYPE V SINK IN OPEN FIELD ADJACENT TO I65 R.O.W. DRAINAGE FROM I65 IS PRIMARILY CONFINED TO ALONG R.O.W. FENCE.

(I) TYPE IV SINK IN OPEN FIELD ADJACENT TO I65 R.O.W. SINK IS 40 FT. WIDE, 15 FT. DEEP WITH STEEP SOIL SIDES. DRAINAGE FROM I65 IS PRIMARILY CONFINED TO ALONG R.O.W. FENCE.

(J) POND DIRECTLY ADJACENT TO I65 R.O.W. POND TAKES FLOW FROM BOTH SIDES OF I65 FROM DRAINS 46C, INCLUDING MEDIAN.

(K) SWALE, WATER TENDS TO COLLECT HERE AND FLOWS SLOWLY TO DRAIN 46C, AND "J".

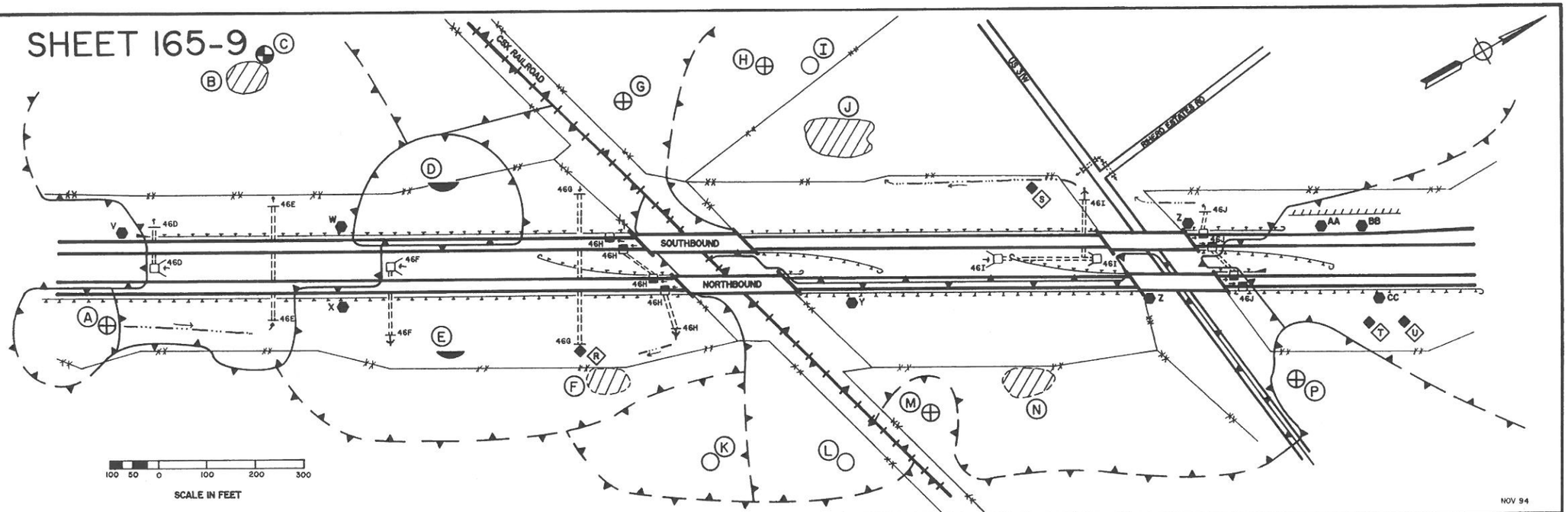
POTENTIAL HAZARDS

- (L) SOIL COLLAPSE 4 FT. LONG, 2 FT. WIDE AND 1 FT. DEEP.
- (M) SOIL COLLAPSE 3 FT. WIDE, 4 FT. DEEP WITH BEDROCK EXPOSED IN COLLAPSE.
- (N) SOIL COLLAPSE 3 FT. WIDE AND 2 FT. DEEP.
- (P) MAJOR UNDERCUTTING ON 1 SIDE OF DROPBOX.
- (R) 1/2 IN. COMPLETE CRACK IN PAVED DITCH.
- (S) SOIL COLLAPSE 1 FT. WIDE AND 1 FT. DEEP.
- (T) SOIL COLLAPSE 10 FT. WIDE AND 4 FT. DEEP.
- (U) SOIL COLLAPSE THAT OCCURRED DURING ROAD CONSTRUCTION IN FALL OF 1994 THAT WAS FILLED IN BY THE KYDOT. THERE ARE 2 FILLED COLLAPSES 5 FT. WIDE 15 FT. APART. THIS WAS A SINK THAT WAS ALSO FILLED DURING CONSTRUCTION OF I65.
- (V) SOIL COLLAPSE 3 FT. WIDE AND 3 FT. DEEP WITH BEDROCK EXPOSED IN COLLAPSE.

SIGNS AND ROAD FEATURES

- (W) BARREN COUNTY
- (X) LODGING-EXIT 48
- (Y) EXIT 48 255 BROWNSVILLE PARK CITY 1 MILE
- (Z) EMERGENCY STOPPING ONLY

SHEET I65-9



- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
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- INFERRED DRAINAGE BASIN BOUNDARY
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- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO

- ***NO SURFACE INTERCEPTS FOR SINKS. NEXT GROUNDWATER INTERCEPT, RIGHT FORK OF HAWKINS RIVER IN MCNP. GROUNDWATER TRAVEL TIMES TO RIGHT FORK OF HAWKINS RIVER: 4-150 HRS.***

(A) TYPE IV SINK WITHIN I65 R.O.W. SINK IS 30 FT. WIDE, 10 FT. DEEP WITH STEEP WALLS, BRIAR FILLED. INTERMITTENT STREAM FLOWS FROM THIS SINK TO DRAIN 46E PIPE HEADWALL INLET.

(B) PERENNIAL POND IN FIELD ADJACENT TO I65 R.O.W. FLOW FROM I65 TO POND IS GRADUAL.

(C) TYPE II SINK DIRECTLY ADJACENT TO "B". SINK IS 4 FT. WIDE AND 5 FT. DEEP WITH A HORIZONTAL CRAWLWAY TO NORTH.

(D) SWALE, NO OBVIOUS SINK POINT.

(E) SWALE, GENERAL DIRECTION OF FLOW IS TOWARD "F", BUT WATER POOLS UP IN THIS AREA BEFORE CONTINUING TO "F".

(F) EPHEMERAL POND DIRECTLY ADJACENT TO I65 R.O.W. FENCE. DRAINS BOTH SIDES OF I65, INCLUDING MEDIAN VIA 46F, 46G, AND 46H.

(G) TYPE IV SINK IN OPEN FIELD ADJACENT TO I65 AND RAILROAD R.O.W's. SINK HAS 2 COLLAPSES 25 FT. WIDE AND 5 FT. DEEP, AND ARE BOULDER FILLED.

(H) TYPE IV SINK IN OPEN FIELD ADJACENT I65 R.O.W. SINK IS 6 FT. WIDE, 4 FT. DEEP AND 20 FT. LONG, AND IS FULL OF ROCKS AND BARBED WIRE.

(I) TYPE V SINK IN OPEN FIELD ADJACENT TO I65 R.O.W. WATER COLLECTS WITH RAINFALL AND SINKS DIFFUSELY WITH NO OBVIOUS SINKPOINT.

(J) PERENNIAL POND IN OPEN FIELD ADJACENT TO I65 R.O.W. POND TAKES FLOW FROM MEDIAN BETWEEN RAILROAD AND 31W THROUGH DRAINS 46I, AND FROM I65 SOUTHBOUND LANE BETWEEN RAILROAD AND 31W.

(K) TYPE V SINK IN OPEN FIELD ADJACENT TO I65 R.O.W.

(L) TYPE V SINK IN OPEN FIELD ADJACENT TO I65 AND RAILROAD R.O.W's.

(M) TYPE IV SINK IN OPEN FIELD ADJACENT TO I65 AND RAILROAD R.O.W's.

(N) EPHEMERAL POND ADJACENT TO I65 R.O.W. FENCE.

(P) TYPE IV SINK IN WOODED AREA ADJACENT TO I65 AND 31W R.O.W's. SINK TAKES A SMALL AMOUNT OF FLOW FROM I65 R.O.W.

POTENTIAL HAZARDS

(R) PIPE HEADWALL 46G 3/4 FILLED AT OUTLET. SOIL MOUNDED UP 10 FT. IN FRONT OF OUTLET WHICH CAUSES WATER TO POOL BEFORE CONTINUING TOWARD "F".

(S) SOIL COLLAPSE 1 FT. WIDE AND 2 FT. DEEP.

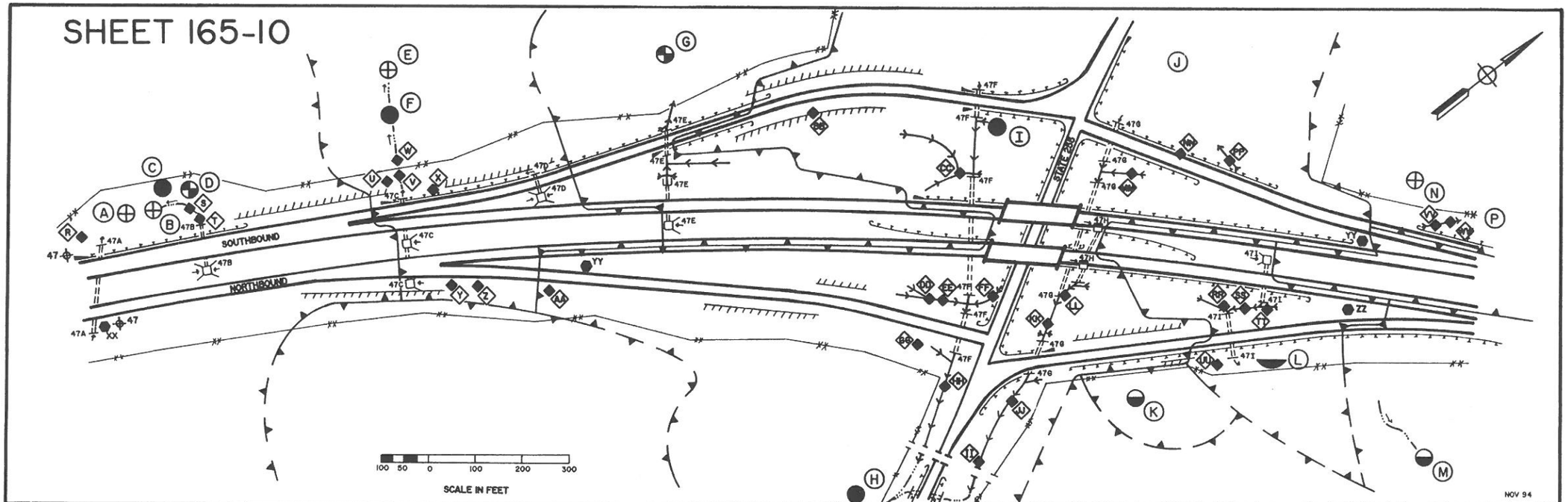
(T) SOIL COLLAPSE 3 FT. WIDE AND 1 FT. DEEP.

(U) SOIL COLLAPSE 2 FT. DEEP.

SIGNS AND ROAD FEATURES

- (V) KEEP RIGHT EXCEPT TO PASS
- (W) SMITH GROVE 10 NASHVILLE 85
- (X) GAS EXIT 48
- (Y) MAMMOTH CAVE NATIONAL PARK NEXT RIGHT
- (Z) US31W
- (AA) SOUTH I-65
- (BB) BRIDGES FREEZE BEFORE ROADWAY
- (CC) FALLEN ROCK ZONE

SHEET I65-10



- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
- TYPE II SINKHOLE
- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO

NO SURFACE INTERCEPTS FOR SINKS. NEXT GROUNDWATER INTERCEPT, RIGHT FORK OF HAWKINS RIVER, MCNP. GROUNDWATER TRAVEL TIMES TO RIGHT FORK OF HAWKINS RIVER: 4-150 HRS.

(A) TYPE IV SINK 40 FT. WIDE AND 10 FT. DEEP WITHIN I65 R.O.W. SINK TAKES WATER FROM DRAIN 47A.

(B) TYPE IV SINK WITHIN I65 R.O.W. SINK IS 30 FT. WIDE, 10 FT. DEEP AND IS SOIL FILLED.

(C) TYPE I SINK WITHIN I65 R.O.W. SINK IS 25 FT. LONG, 6 FT. WIDE, 15 FT. DEEP WITH A 2 FT. HORIZONTAL DRAIN.

(D) TYPE II SINK WITHIN I65 R.O.W. SINK IS 15 FT. WIDE, 10 FT. DEEP WITH A 1 FT. DRAIN. DRAINAGE IS PRIMARILY CONFINED TO WALLS OF SINK.

(E) LARGE TYPE IV SINK IN WOODED AREA AT END OF CUT DRAINAGE ADJACENT TO I65 R.O.W.

(F) TYPE I SINK ALONG CUT IN DIRECTION OF "E". MOST WATER FLOWING DOWN THIS DRAINAGE DOES NOT MAKE IT BEYOND THIS POINT.

(G) TYPE II SINK IN WOODED AREA ADJACENT TO I65 R.O.W. SINK IS 40 FT. WIDE, 10 FT. DEEP WITH A 6 IN. DRAIN.

(H) TYPE I SINK ADJACENT TO I65 AND KY 255 R.O.W's. MAJORITY OF INTERCHANGE DRAINS INTO THIS SINK. AN INTERMITTENT STREAM ALSO FLOWS FROM A PIPE HEADWALL AND END OF A PAVED DITCH INTO A 2 FT. WIDE AND 2 FT. HIGH CAVE AT BASE OF SINK.

(I) TYPE I SINK IN MEDIAN OF SOUTHBOUND I65 ONRAMP. THIS SINK HAS CAUSED MAJOR UNDERCUTTING AT HEAD OF PAVED DITCH. SINK IS 6 FT. WIDE, 5 FT. DEEP WITH A 6 IN. DRAIN.

(J) SWALE, WATER POOLS PRIOR TO REACHING 47G HEADWALL.

(K) TYPE III SINK ADJACENT TO I65 NORTHBOUND ONRAMP R.O.W. BOTTOM IS MADE OF ROCK AND SOIL, AND IS FILLED WITH TIRES, METAL AND OTHER REFUSE. A HOUSE SITS 50 FT. NORTH OF SINK. DRAINAGE IS PRIMARILY CONFINED TO WALLS OF SINK.

(L) SWALE, WATER POOLS AND SLOWLY ENTERS GROUND. NO OBVIOUS SINK POINT.

(M) TYPE III SINK IN WOODED AREA ADJACENT TO I65 R.O.W. SINK IS 20 FT. WIDE AND 8 FT. DEEP.

(N) TYPE IV SINK ADJACENT TO I65 R.O.W. DRAINAGE IS PRIMARILY CONFINED TO WALLS OF SINK, WHICH IS 60 FT. WIDE.

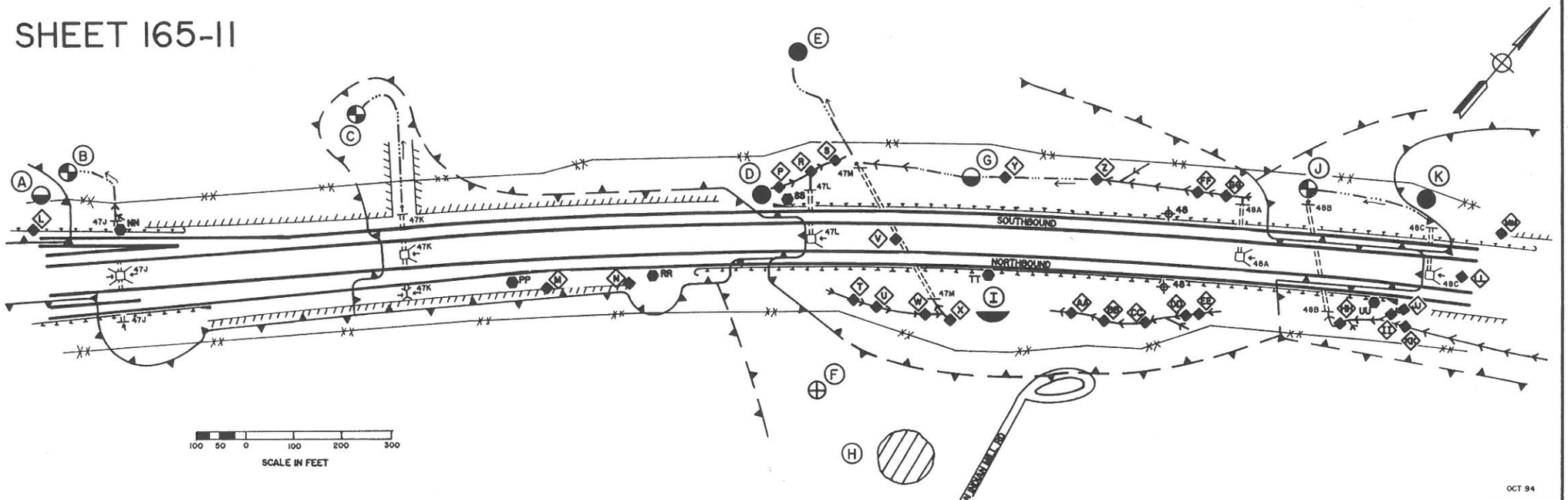
POTENTIAL HAZARDS

- R — SOIL COLLAPSE 2 FT. WIDE, 1 FT. DEEP, 8 IN. DRAIN.
- S — SOIL COLLAPSE IN STREAM BED 5 FT. WIDE AND 3 FT. DEEP.
- T — SOIL COLLAPSE, FOOT OF HEADWALL 47B 4 FT. WIDE, 1 FT. DEEP.
- U — SOIL COLLAPSE 4 FT. WIDE, 2 FT. DEEP WITH ROCK BOTTOM.
- V — SOIL COLLAPSE 3 FT. WIDE, 2 FT. DEEP WITH SOIL BOTTOM.
- W — SOIL COLLAPSE 3 FT. WIDE, 3 FT. DEEP WITH SOIL BOTTOM.
- X — SOIL COLLAPSE 10 FT. LONG, 3 FT. WIDE AND 3 FT. DEEP.
- Y — SOIL COLLAPSE 1 FT. WIDE, 5 FT. DEEP, WITH ROCK BOTTOM.
- Z — SOIL COLLAPSE 2 FT. WIDE AND 1 FT. DEEP.
- AA — SOIL COLLAPSE 1 FT. WIDE AND 3 FT. DEEP.
- BB — HOLE IN BASE OF ROCK OUTCROP 2 FT. WIDE, 3 FT. HIGH.
- CC — MAJOR UNDERCUTTING AT JUNCTION OF 2 PAVED DITCHES.
- DD — 1/2 IN. COMPLETE DISPLACED CRACK AT JUNCT. 2 PAVED DITCH.
- EE — 2, 1/2 IN. COMPLETE DISPLACED CRACKS IN PAVED DITCHES.
- FF — 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCHES.
- GG — SOIL COLLAPSE 6 IN. WIDE 2 FT. DEEP WITH ROCK BOTTOM.
- HH — 2, 1/2 IN. COMPLETE CRACKS 40 FT. APART IN PAVED DITCH.
- II — 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- JJ — 2, 1/2 IN. COMPLETE CRACKS 60 FT. APART IN PAVED DITCH.
- KK — PAVED DITCH BROKEN, 5 FT. LONG.
- LL — MAJOR UNDERCUTTING WITH 2 COMPLETE CRACKS AT JUNCTION OF PAVED DITCHES AND PIPE HEADWALL 47G.
- MM — 1/2 IN. COMPLETE CRACK IN PAVED DITCH.
- NN — MAJOR UNDERCUTTING IN EDGE OF OFFRAMP.
- PP — 1 IN. COMPLETE CRACK IN PAVED DITCH.
- RR — MINOR UNDERCUTTING 15 FT. IN PAVED DITCH.
- SS — 2, 1/2 IN. COMPLETE CRACKS IN PAVED DITCH.
- TT — 1/2 IN. COMPLETE CRACK IN PAVED DITCH.
- UU — SOIL COLLAPSE 2 FT. WIDE, 6 FT. LONG AND 1 FT, DEEP.
- VV — 1 IN. COMPLETE CRACK AND 2 IN. COMPLETE DISPLACED CRACK.
- WW — MAJOR UNDERCUT HOLE 3 FT. LONG IN PAVED DITCH.

SIGNS AND ROAD FEATURES

- XX — EXIT 48 255 BROWNSVILLE PARK CITY
- YY — EXIT 48
- ZZ — YIELD
- YY — EXIT 48
- 47H — CURB DROP BOXES

SHEET I65-II



- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
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- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO

* ***NO SURFACE INTERCEPTS FOR SINKS. NEXT GROUNDWATER INTERCEPT, RIGHT FORK OF HAWKINS RIVER, MCNP. GROUNDWATER TRAVEL TIMES TO RIGHT FORK OF HAWKINS RIVER: 4-150 HRS.***

(A) TYPE III SINK UNDER I65 R.O.W. FENCE. SINK IS 6 FT. WIDE AND 4 FT. DEEP WITH BEDROCK AND BOULDERS IN BOTTOM.

(B) TYPE II SINK IN WOODED AREA DIRECTLY ADJACENT TO I65 R.O.W. SINK IS 25 FT. WIDE AND 15 FT. DEEP WITH A 6 IN. DRAIN. BOTTOM IS FLAT AND SOIL COVERED.

(C) FLOW THROUGH A ROCK OUTCROP TO A TYPE II SINK IN WOODED AREA ADJACENT TO I65 R.O.W. SINK IS 30 FT. WIDE 15 FT. DEEP WITH 1 FT. DRAIN.

(D) TYPE I SINK DIRECTLY ADJACENT TO I65 SOUTHBOUND LANE. SINK IS 6 FT. WIDE WITH UNKNOWN DEPTH.

(E) FLOW DIRECTED THROUGH A ROCK OUTCROP TOWARD A TYPE I SINK A FLAT WOODED AREA ADJACENT TO I65 R.O.W. SINK IS 30 FT. WIDE, 6 FT. DEEP WITH A 3 FT. HORIZONTAL CRAWLWAY (OF UNKNOWN LENGTH) LEADING FROM BOTTOM OF SINK.

(F) TYPE IV SINK IN WOODED AREA ADJACENT TO I65 R.O.W.

(G) TYPE III SINK WITHIN I65 R.O.W. IN INTERMITTED STREAM. SINK AREA HAS EXPOSED BEDROCK 20 FT. WIDE AND 6 FT. DEEP WITH NO OBVIOUS SINKING POINT.

(H) PERENNIAL POND 150 FT. FROM I65 R.O.W. DRAINAGE FROM I65 DOES NOT REACH THE POND.

(I) SWALE IN WOODED AREA WITHINI65 R.O.W. GENERAL DIRECTION OF FLOW IS TOWARD DRAIN 47M AND EVENTUALLY TO SINK "E".

(J) TYPE IV SINK WITHIN I65 R.O.W. DRAIN 48A EMPTIES INTO BOTTOM OF SINK. SINK IS 30 FT. WIDE AND 10 FT. DEEP.

(K) TYPE I SINK WITHIN I65 R.O.W. SINK HAS TWO COLLAPSES, ONE 10 FT. WIDE, 5 FEET DEEP, AND 1 IN. DRAIN. THE OTHER 5 FT. WIDE, 4 FT. DEEP AND 1 FT. DRAIN.

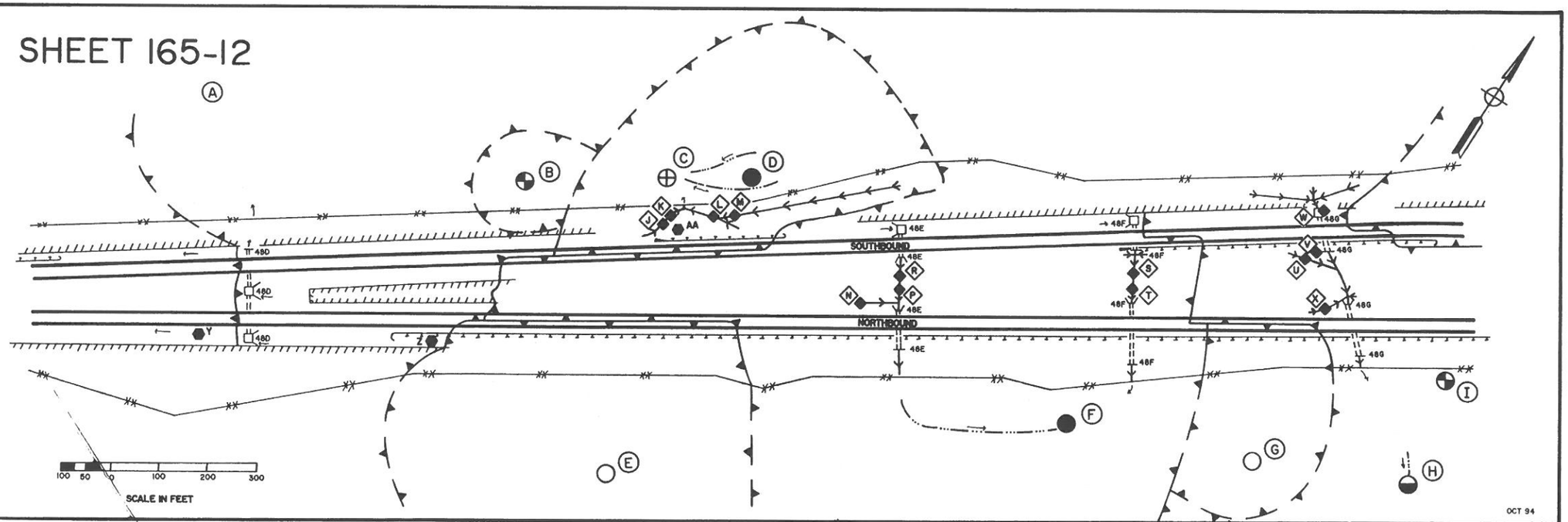
POTENTIAL HAZARDS

- (L) 3 MINOR UNDERCUTTINGS ALONG EDGE OF OFFRAMP UNDER GUARD RAIL.
- (M) 3 FT. WIDE HORIZONTAL HOLE AT BASE OF ROCK OUTCROP.
- (N) 6 IN. WIDE HORIZONTAL HOLE AT NORTH END OF ROCK OUTCROP.
- (P) 2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (R) 40 FT. MAJOR UNDERCUTTING ALONG PAVED DITCH.
- (S) 20 FT. MINOR UNDERCUTTING ALONG PAVED DITCH.
- (T) 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (U) 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (V) 30 FT. SOIL COLLAPSE 1 FT. WIDE AND 1 FT. DEEP IN MEDIAN.
- (W) 1/2 IN. COMPLETE CRACK WITH 2 IN. DISPLACEMENT AND 30 FT. MINOR UNDERCUTTING ALONG PAVED DITCH.
- (X) 2 FT. DEEP UNDERCUTTING AT END OF PAVED DITCH.
- (Y) SOIL COLLAPSE 3 FT. WIDE AND 3 FT. DEEP ALONG INTERMITTENT STREAM BED.
- (Z) MAJOR UNDERCUTTING AT END OF PAVED DITCH.
- (AA) 20 FT. MINOR UNDERCUTTING ALONG PAVED DITCH.
- (BB) 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (CC) 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (DD) 1 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (EE) 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (FF) 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (GG) 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (HH) 1/2 IN. COMPLETE DISPLACED CRACK AT JUNCTION OF PAVED DITCHES.
- (II) 1 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (JJ) MINOR UNDERCUTTING AT HEAD OF PAVED DITCH.
- (KK) 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (LL) 2 SOIL COLLAPSES IN MEDIAN, 8 FT. LONG, 1 FT. WIDE AND 1 FT. DEEP.
- (MM) SOIL COLLAPSE 20 FT. LONG, 4 FT. WIDE AND 3 FT. DEEP BEYOND ROCK OUTCROP.

SIGNS AND ROAD FEATURES

- (NN) EXIT 48 255 PARK CITY BROWNSVILLE
- (SS) EXIT 48 255 PARK CITY BROWNSVILLE NEXT RIGHT
- (PP) BRIDGES FREEZE BEFORE ROADWAY
- (TT) SPEED LIMIT 65
- (RR) NORTH I-65
- (UU) CAVE CITY 6 LOUISVILLE 86

SHEET 165-12



- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
- TYPE II SINKHOLE
- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5TOPO

NO SURFACE INTERCEPT FOR SINKS. NEXT GROUNDWATER INTERCEPT, RIGHT FORK OF HAWKINS RIVER, MCNP. GROUNDWATER TRAVEL TIMES TO RIGHT FORK OF HAWKINS RIVER: 4-150HRS.

(A) LARGE OPEN FIELD WHICH APPEARS TO HAVE DIFFUSE DRAINAGE PATTERNS WITH NO OBVIOUS SINK POINTS.

(B) TYPE II SINK IN WOODED AREA ADJACENT TO I65 R.O.W. DRAINAGE IS CONFINED TO WALLS OF SINK WHICH HAS 2 DRAINS, ONE IS 2 FT. WIDE AND THE OTHER 1 FT. WIDE.

(C) TYPE IV SINK IN WOODED AREA ADJACENT TO I65 R.O.W. SINK HAS FLAT SOIL BOTTOM AND SOMEWHAT STEEP WALLS.

(D) TYPE I SINK NORTH OF R.O.W. FENCE. MOST RUNOFF IS ROUTED AROUND TO SINK "C".

(E) TYPE V SINK IN WOODED AREA DIRECTLY ADJACENT TO I65 R.O.W. SINK APPEARS TO HAVE BEEN A POND IN PAST, AND IS PRESENTLY CAPABLE OF PONDING WATER. DRAINAGE IS DIFFUSE DRAINAGE WITH NO OBVIOUS SINK POINT.

(F) TYPE I SINK IN WOODS DIRECTLY ADJACENT TO I65 R.O.W. SINK IS 30 FT. WIDE, 10 FT. DEEP, 2 FT. DRAIN WITH SOIL AND BEDROCK WALLS. THERE ARE 2 INTERMITTENT STREAMS THAT FLOW INTO SINK.

(G) TYPE V SINK IN OPEN FIELD ADJACENT TO I65 R.O.W. DRAINAGE IS DIFFUSE WITH NO OBVIOUS SINK POINT.

(H) TYPE III SINK IN WOODED AREA ADJACENT TO I65 R.O.W. SINK IS SURROUNDED BY BRIARS AND HAS 2 OR 3 CARS IN CENTER MAKING THE BOTTOM NOT VISIBLE.

(I) TYPE II SINK 30 FT. FROM I65 R.O.W. FENCE. SINK IS 6 FT. WIDE, 4 FT. DEEP AND HAS 3 IN. DRAIN.

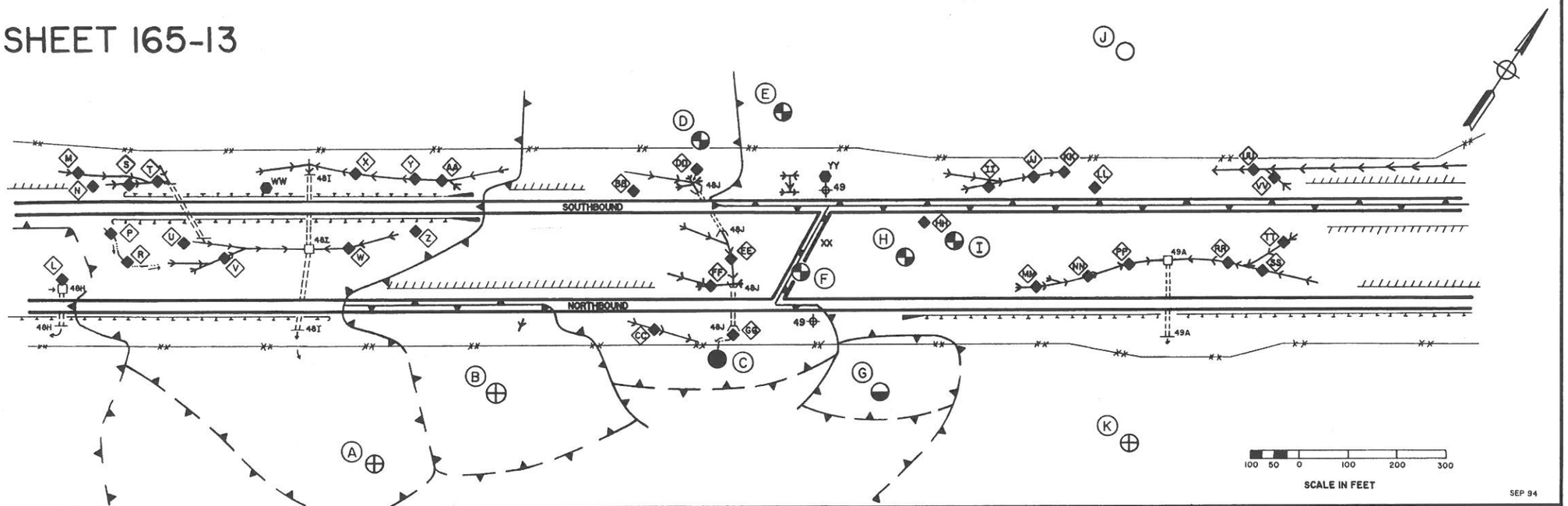
POTENTIAL HAZARDS

- (J) MINOR UNDERCUT HOLE IN PAVED DITCH.
- (K) 1 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (L) 1/2 IN. COMPLETE CRACK IN PAVED DITCH.
- (M) 1 IN. COMPLETE CRACK WITH 2 IN. DISPLACEMENT IN PAVED DITCH.
- (N) SOIL COLLAPSE 6 FT. LONG, 2 FT. WIDE AT HEAD OF PAVED DITCH.
- (P) 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (R) 2, 1/2 IN. COMPLETE DISPLACED CRACKS IN PAVED DITCH.
- (S) 2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (T) 1 IN. COMPLETE CRACK IN PAVED DITCH.
- (U) 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (V) SOIL COLLAPSE 6 FT. LONG, 3 FT. WIDE AND 2 FT. DEEP.
- (W) 2 MAJOR UNDERCUT HOLES ON 2 SIDES OF DROP BOX.
- (X) 1/2 IN. COMPLETE CRACK IN PAVED DITCH.

SIGNS AND ROAD FEATURES

- (Y) KEEP RIGHT EXCEPT TO PASS
- (Z) EMERGENCY STOPPING ONLY
- (AA) MAMMOTH CAVE NATIONAL PARK NEXT EXIT

SHEET I65-13



INTERSTATE 65
U.S. ROUTE
STATE ROUTE
LOCAL ROUTE
RAILROAD
ACCESS CONTROL FENCE
SIGN
MILE MARKER
GUARDRAIL
ROCK OUTCROP
PAVED DITCH
AGGREGATE LINED CHANNEL
PIPE HEADWALL
BOX CULVERT HEADWALL
DROP BOX INLET
DOUBLE DROP BOX INLET
SLOPED BOX INLET
SLOPED & FLARED BOX INLET
18 SIDE TAPERED INLET

SLOPED BOX OUTLET
SLOPED & FLARED BOX OUTLET
DRAINAGE BASIN BOUNDARY
INFERRED DRAINAGE BASIN BOUNDARY
CLASS V INJECTION WELL
TYPE I SINKHOLE
TYPE II SINKHOLE
TYPE III SINKHOLE
TYPE IV SINKHOLE
TYPE V SINKHOLE
POTENTIAL HAZARD
SWALE
INTERMITTENT STREAM
PERENNIAL STREAM
EPHEMERAL POND
PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO

NO SURFACE INTERCEPTS FOR SINKS. NEXT GROUNDWATER INTERCEPT, RIGHT FORK OF HAWKINS RIVER, MCNP. GROUNDWATER TRAVEL TIMES TO RIGHT FORK OF HAWKINS RIVER: 4-150 HRS.

(A) TYPE IV SINK IN FIELD ADJACENT TO I65 R.O.W. SINK HAS SOIL COLLAPSE 60 FT. WIDE, 10+ FT. DEEP AND FILLED WITH SHEET METAL, LOGS AND LIMBS, AND FULL OF BRIARS. THE BOTTOM OF SINK IS NOT VISIBLE DUE TO RUBBLE. DRAINAGE INTO SINK IS CONFINED TO EDGE OF SINK AND FROM DRAINS 48J AND 48K.

(B) TYPE IV SINK IN FIELD ADJACENT TO I65 R.O.W. SINK APPEARS TO BE AN OLD POND. DRAINAGE INTO SINK IS CONFINED TO EDGE OF SINK AND RUNOFF FROM NORTHBOUND LANE OF I65.

(C) TYPE I SINK IN A BRIAR PATCH IMMEDIATELY ADJACENT TO I65 R.O.W. FENCE. SINK IS 60 FT. WIDE AND 10+ FT. DEEP. CENTER OF COLLAPSE IS BEDROCK WITH OPENING OF UNKNOWN SIZE. A LARGE METAL PLATE COVERING OPENING. DRAINAGE INTO SINK IS CONFINED TO EDGE OF SINK AND FROM DRAIN 48.

(D) TYPE II SINK IN WOODED AREA BEYOND, AND IMMEDIATELY ADJACENT TO I65 R.O.W. FENCE. SINK IS 20 FT. WIDE AND 6 FT. DEEP WITH 2 FT. DRAIN. WALLS OF SINK ARE FAIRLY STEEP, AND RECHARGE AREA IS MOSTLY CONFINED WITHIN WALLS OF SINK.

(E) TYPE II SINK IN WOODED AREA BEYOND I65 R.O.W. SINK IS 40 FT. WIDE AND 10 FT. DEEP WITH BEDROCK AND LOOSE ROCKS IN BOTTOM. DRAIN APPEARS TO BE UNDER BOULDERS. DRAINAGE IS MOSTLY WITHIN THE CONFINES OF SINK WALLS.

(F) TYPE II SINK IN OPEN AREA ADJACENT TO MEDIAN CROSS-OVER. AREA HAS 3 SOIL COLLAPSES OF VARIOUS SIZES AND 1 SWALLET. SWALLET HAS AN OPENING 1 1/2 FT. WIDE.

(G) TYPE III SINK IN FIELD ADJACENT TO I65 R.O.W. SINK IS 30 FT. WIDE, 6 FT. DEEP AND IS FILLED WITH WIRE AND BRUSH. DRAINAGE IS CONFINED TO EDGE OF SINK.

(H) TYPE II SINK IN BRUSHY AREA WITHIN MEDIAN. SWALLET FOR SINK IS 10 FT. LONG, 4 FT. WIDE, 5 FT. DEEP, WITH 1 FT. DRAIN.

(I) TYPE II SINK WITHIN MEDIAN IN BRUSHY AREA SURROUNDED BY A FEW SMALL TREES. SINK IS 15 FT. WIDE, 10 FT. DEEP WITH A 2 FT. X 5 IN. DRAIN. RECHARGE OF SINK IS PRIMARILY CONFINED TO WALLS OF SINK, AND RUNOFF FROM SOUTHBOUND LANE.

(J) TYPE V SINK ADJACENT TO I65 R.O.W. DENSE BRUSH SURROUNDS SINK. NO OBVIOUS SINK POINT. THIS SINK TAKES RUNOFF FROM SOUTHBOUND LANE.

(K) TYPE IV SINK IN FIELD ADJACENT TO I65 R.O.W. SINK HAS COLLAPSE 20 FT. WIDE, 6 FT. DEEP AND FILLED WITH DEBRIS. BOTTOM IS NOT VISIBLE. DRAINAGE IS CONFINED TO EDGE OF SINK AND FROM DRAIN 49A.

POTENTIAL HAZARDS

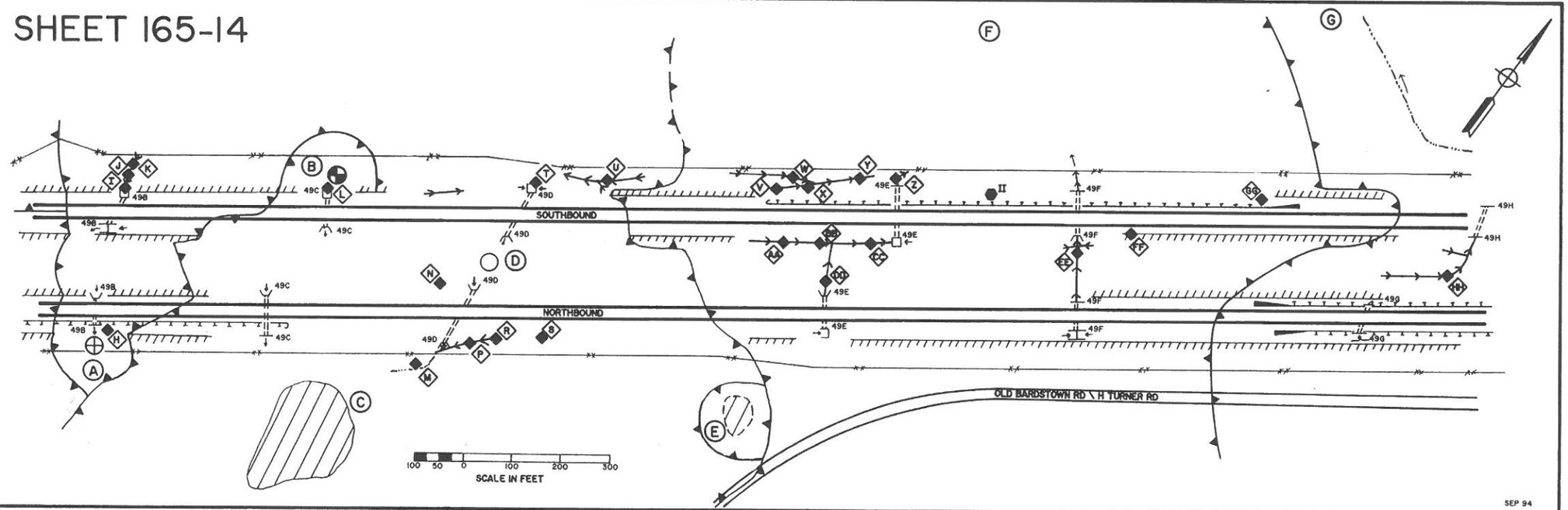
L MAJOR UNDERCUT HOLES ON 3 SIDES OF DROP BOX.
M 1/2 IN. COMPLETE CRACK IN PAVED DITCH.
N SOIL COLLAPSE 2 FT. WIDE, 1 FT. DEEP.
P SOIL COLLAPSE 2 FT. WIDE, 2 FT. DEEP, 4 FT. LONG.
R SOIL COLLAPSE 6 FT. WIDE, 2 1/2 FT. DEEP, 8 FT. LONG.
S 1/2 IN. COMPLETE CRACK IN PAVED DITCH.
T 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
U SOIL COLLAPSE 6 FT. LONG, 2 FT. WIDE, 2FT. DEEP, 1 FT. DRAIN.
V MINOR UNDERCUTTING ALONG 70 FT. OF PAVED DITCH.
W 1 IN. COMPLETE CRACK IN PAVED DITCH.
X MINOR UNDERCUTTING ALONG 40 FT. OF PAVED DITCH.
Y 1/2 IN. COMPLETE CRACK IN PAVED DITCH.
Z SOIL COLLAPSE 2 FT. LONG, 1 FT. WIDE, 1 FT. DEEP.
AA 1/2 IN. COMPLETE CRACK AND 10 FT. MINOR UNDERCUTTING ALONG PAVED DITCH.
BB SOIL COLLAPSE 6 FT. LONG, 3 FT. WIDE, 2 FT. DEEP.
CC 1/2 IN. COMPLETE CRACK IN PAVED DITCH.
DD 1 IN. COMPLETE CRACK AT JUNCTION OF PAVED DITCHES.
EE 2, 1/2 IN. COMPLETE CRACKS, ONE DISPLACED, WITH MINOR UNDERCUT HOLES FOR 20 FT. IN PAVED DITCH.
FF 1 IN. COMPLETE CRACK AT JUNCTION OF 2 PAVED DITCHES.
GG MAJOR UNDERCUT 5 FT. FROM END OF SLOPED AND FLARED OUTLET DRAIN 48L, AT END OF CONCRETE.
HH SOIL COLLAPSE 10 FT. LONG, 2 FT. WIDE, 2 FT. DEEP.
II 1 IN. COMPLETE CRACK IN PAVED DITCH.
JJ MINOR UNDERCUTTING FOR 2 FT. ALONG PAVED DITCH.
KK MAJOR UNDERCUTTING AT END OF PAVED DITCH.
LL SOIL COLLAPSE 2 FT. WIDE, 1 FT. DEEP, BEDROCK EXPOSED.
MM 1/2 IN. COMPLETE CRACK IN PAVED DITCH.
NN 1 IN. COMPLETE CRACK IN PAVED DITCH WITH 2 IN. DISPLACEMENT, AND 20 FT. MINOR UNDERCUTTING WITH 2 MAJOR UNDERCUT HOLES ALONG PAVED DITCH.
PP 1 IN. COMPLETE DISPLACED CRACK ALONG PAVED DITCH.
RR 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
SS VARIOUS SIZED UNDERCUT HOLES, ABOUT 6 FT. APART ALONG 50 FT. OF PAVED DITCH.
TT MINOR UNDERCUTTING ALONG 30 FT. OF PAVED DITCH.
UU MINOR UNDERCUTTING ALONG 20 FT. OF PAVED DITCH.
VV 1 IN. COMPLETE CRACK IN PAVED DITCH.

SIGNS AND ROAD FEATURES

WW EXIT 48
255
PARK CITY
BROWNSVILLE
1 MILE

XX MEDIAN CROSS-OVER
LODGING - EXIT 48
YY GAS - EXIT 48

SHEET 165-14



- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
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- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO

* ***NO SURFACE INTERCEPTS FOR SINKS. NEXT GROUNDWATER INTERCEPT, RIGHT FORK OF HAWKINS RIVER, MCNP. GROUNDWATER TRAVEL TIMES TO RIGHT FORK OF HAWKINS RIVER: 4-150 HRS.***

(A) TYPE IV SINK IN WOODED AREA PARTIALLY WITHIN NORTHBOUND I65 R.O.W. SINK APPEARS TO HAVE DIFFUSE DRAINAGE WITH SOIL COLLAPSE WHICH TAKES SOME WATER.

(B) TYPE II SINK, 1 SIDE OF WHICH HAS BEEN CUT BY I65 CONSTRUCTION. SINK HAS 4 SINK POINTS, 1 AN UNDERCUT DROP BOX, OTHER 3 ARE SOIL COLLAPSES RANGING FROM 1 FT. WIDE TO 4 FT. WIDE AND 5 FT. DEEP.

(C) PERENNIAL POND 100 FT. FROM I65 R.O.W. POND RECEIVES FLOW FROM BOTH SIDES OFI65, INCLUDING MEDIAN VIA DRAINS 49C AND 49D.

(D) TYPE V SINK WITH DIFFUSE DRAINAGE AND NO OBVIOUS SINK POINT, LOCATED IN MEDIAN BETWEEN DRAINS 49D. AREA IS COVERED IN HEAVY BRUSH AND TREES.

(E) SMALL INTERMITTENT POND 150 FT. FROM I65 R.O.W. POND IS UP SLOPE AND IS NOT INFLUENCED BY I65.

(F) OPEN FIELD WITH NO OBVIOUS SINK POINT INDICATING THAT DRAINAGE IS DIFFUSE INTO SUBSURFACE. DRAINAGE FROM I65 IS GRADUAL IN THAT DIRECTION. A POND IS 500 YD. NORTHWEST OF DRAIN 49E, BUT DRAINAGE FROM I65 WOULD REACH IT ONLY UNDER EXTREME RAIN CONDITIONS.

(G) DRAINAGE (BEGINNING ON SHEET I65-15) IS DIRECTED TO INTERMITTENT STREAM WHICH CROSSES UNDER BOTH LANES OF I65 VIA 48 IN. PIPES (#49I). STREAM CONTINUES 300 FT. BEYOND IT'S NORTHWEST LEADING BEND WHERE IT TEMPORARILY PONDS IN TYPE V SINKHOLE, SITUATED IN WOOD AND THICKET.

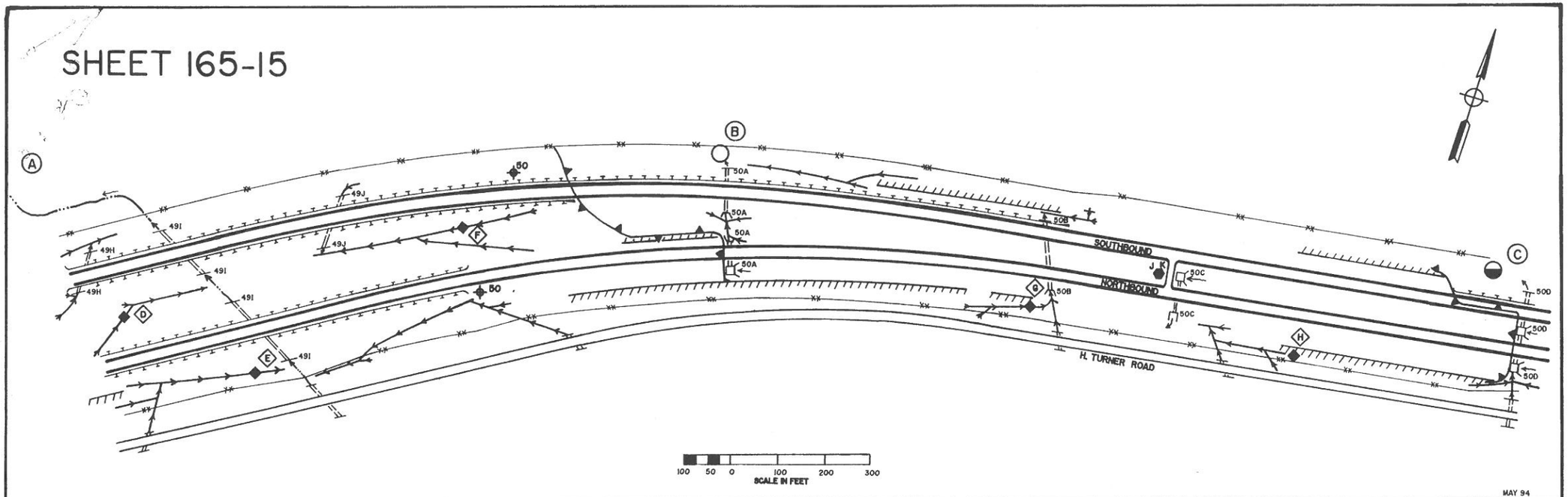
POTENTIAL HAZARDS

- (H) SOIL COLLAPSE, 6 FT. WIDE, 2+ FT. DEEP.
- (I) MAJOR UNDERCUTTING AROUND DROP BOX.
- (J) 1 IN. COMPLETE CRACK WITH 1 IN. DISPLACEMENT IN PAVED DITCH.
- (K) MINOR UNDERCUTTING ALONG PAVED DITCH.
- (L) MAJOR UNDERCUTTING ON 3 SIDES OF DROP BOX.
- (M) LARGE SOIL COLLAPSE, BEDROCK EXPOSED, 60 FT. LONG, 10 FT. WIDE. APPEARS CAPABLE OF TAKING LARGE QUANTITIES OF WATER. LOCATED 20 FT. BEYOND R.O.W. FENCE IN A SMALL GROVE OF CEDAR TREES.
- (N) SOIL COLLAPSE 3 FT. LONG, 2 FT. WIDE, 5 IN. DRAIN.
- (P) 2, 1/2 IN. COMPLETE CRACKS IN PAVED DITCH.
- (R) UNDERCUTTING AT HEAD OF PAVED DITCH.
- (S) SOIL COLLAPSE, 8 FT. WIDE, BEDROCK EXPOSED 5 FT. LONG, 5 FT. DEEP.
- (T) UNDERCUTTING ALL AROUND DROP BOX.
- (U) 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (V) 6 IN. UNDERCUTTING AT HEAD OF PAVED DITCH.
- (W) 1/2 IN. COMPLETE CRACK WITH 1 IN. DISPLACEMENT IN PAVED DITCH.
- (X) 1/2 IN. COMPLETE, DISPLACED CRACK AT JUNCTION OF 2 PAVED DITCHES.
- (Y) 3, 1/2 IN. COMPLETE CRACKS IN PAVED DITCH, 30-40 FT. APART.
- (Z) MINOR UNDERCUTTING ALONG PAVED DITCH 15 FT. LONG.
- (AA) 1/2 IN. COMPLETE CRACK, MAJOR UNDERCUT HOLES WITHIN A DISTANCE OF 80 FT. IN PAVED DITCH.
- (BB) CONTINUED UNDERCUTTING, 1/2 IN. COMPLETE CRACK IN PAVED DITCH.
- (CC) 2, 1/2 IN. COMPLETE CRACKS IN PAVED DITCH 20 FT. APART.
- (DD) 1 IN. COMPLETE CRACK WITH 1/2 IN. DISPLACEMENT IN PAVED DITCH.
- (EE) 1/2 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (FF) SOIL COLLAPSE, 1 FT. WIDE, 1 FT. DEEP.
- (GG) 3 IN. DIAMETER, 6 IN. DEEP HOLE AT SOUTH END OF ROCK OUTCROP.
- (HH) 3 MAJOR UNDERCUTS 30-40 FT. APART. UNDERCUTS REACH TO BOTTOM OF PAVED DITCH.

SIGNS AND ROAD FEATURES

(II) EXIT 48
255
PARK CITY
BROWNSVILLE
2 MILES

SHEET 165-15



- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
- TYPE II SINKHOLE
- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO

- ***NO SURFACE INTERCEPT FOR SINKS. NEXT GROUNDWATER INTERCEPT, RIGHT FORK OF HAWKINS RIVER, MCNP. GROUNDWATER TRAVEL TIMES TO RIGHT FORK OF HAWKINS RIVER: 4-150 HRS.***

(A) DRAINAGE (CONTINUES ON SHEET I65-14) IS DIRECTED TO INTERMITTENT STREAM WHICH CROSSES UNDER BOTH LANES OF I65 VIA 48 IN. PIPES (#491). STREAM CONTINUES 300 FT. BEYOND IT'S NORTHWEST LEADING BEND WHERE IT TEMPORARILY PONDS IN A TYPE V SINKHOLE, SITUATED IN WOOD AND THICKET.

(B) TYPE V SINK AT THE BASE OF FILL SLOPE. THE SINK IS COVERED BY A DENSE WOOD AND THICKET. DRAINAGE TEMPORARILY PONDS IN SINK. THE 18 IN. PIPE (#50A) WHICH DELIVERS FLOW FROM PORTIONS OF MEDIAN AND NORTHBOUND SHOULDER IS PARTIALLY PLUGGED AND HIDDEN BY DEBRIS IN SINK.

(C) TYPE III SINK AT WEST END OF FILL SLOPE. NO PONDING AS WATER IMMEDIATELY DISAPPEARS INTO THE GROUND. SINK IS STEEP, ROCKY AND PARTIALLY COVERED BY DENSE BRIARS. DRAINAGE (CONTINUES ON SHEET I65-16).

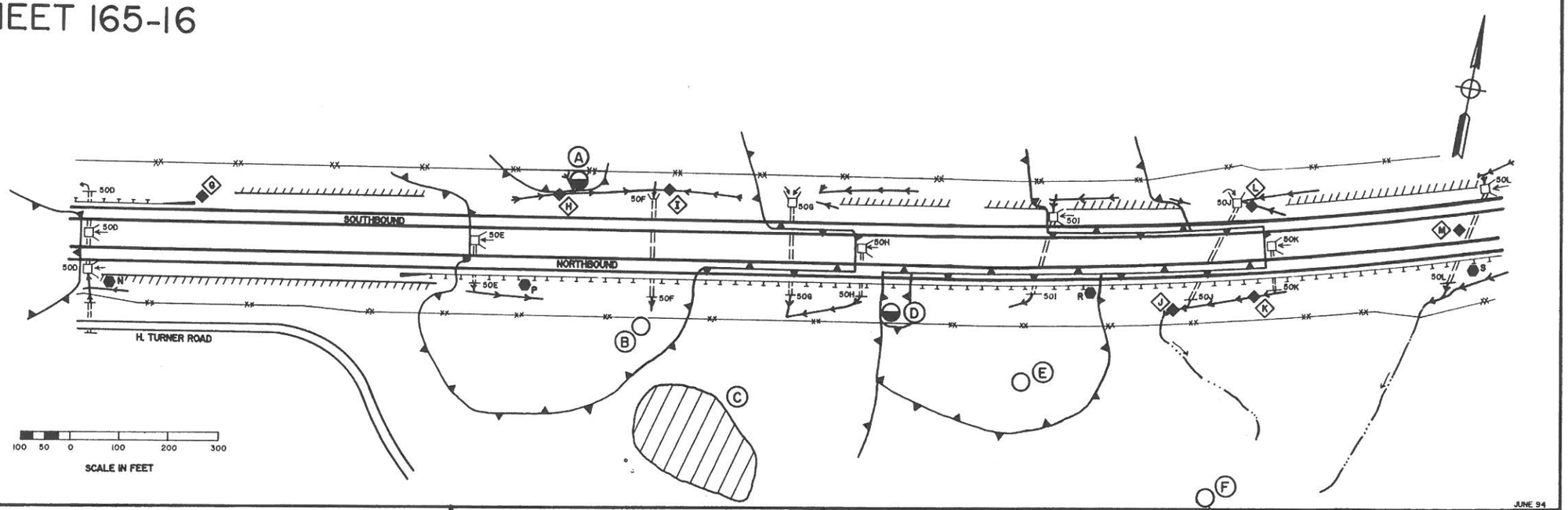
POTENTIAL HAZARDS

- (D) MINOR UNDERCUTTING ALONG EDGES OF PAVED DITCH.
- (E) MINOR UNDERCUTTING ALONG EDGES OF PAVED DITCH, FOR 25 FT.
- (F) MODERATE UNDERCUT, 2 FT. LONG, ON SOUTH EDGE OF PAVED DITCH.
- (G) MINOR UNDERCUTTING ALONG EDGES OF LOWER PORTION OF PAVED DITCH.
- (H) OPEN SOIL CAVITY, 18 IN. WIDE, IN BOTTOM OF SURFACE DITCH.

SIGNS AND ROAD FEATURES

- (J) NO "U" TURN
- (K) MEDIAN CROSSOVER, PAVED

SHEET 165-16



JUNE 94

- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
- TYPE II SINKHOLE
- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAPS: PARK CITY AND GLASGOW NORTH 7.5' TOPOS

NO SURFACE INTERCEPTS FOR SINKS. NEXT GROUNDWATER INTERCEPT, RIGHT FORK OF HAWKINS RIVER, MCNP. GROUNDWATER TRAVEL TIMES TO RIGHT FORK OF HAWKINS RIVER: 4-150 HRS.

(A) TYPE III SINK, 8 FT. DEEP, STEEP SOIL WALLS WITHIN I65 R.O.W. SINK HAS COLLAPSED AND UNDERMINED SHORT PAVED DITCH SPUR. DITCH IS STILL INTACT, HOWEVER CRACKS ROUTE FLOW DIRECTLY INTO SINK. COLLAPSE CURRENTLY DOES NOT ALTER FLOW ALONG MAIN PAVED DITCH.

(B) TYPE V SINK WHICH EXTENDS FROM A PASTURE INTO ADJACENT I65 R.O.W. AT BASE OF FILL SLOPE. DRAINAGE MAY POND TEMPORARILY BUT NOT TO SIGNIFICANT DEPTH. EXTREME RUNOFF CONDITIONS MAY CAUSE OVERFLOW DIRECTED TOWARD THE NEARBY POND "C".

(C) POND IN PASTURE ADJACENT TO I65 R.O.W. TAKES IN RUNOFF FROM ADJACENT AREA AND FROM MEDIAN SECTION DRAINED BY DROP BOX & HEADWALL 50H, AND SOUTHBOUND R.O.W. DRAINED BY DROP BOX & HEADWALL 50G.

(D) TYPE III SINK IN WOODS ALONG I65 R.O.W. NO DEFINED CHANNELS LEADING INTO THIS SHALLOW SINK.

(E) TYPE V SINK IN PASTURE ADJACENT TO I65 R.O.W. RECEIVES FLOW FROM SECTION OF SOUTHBOUND R.O.W. VIA DROP BOX & HEADWALL 50I.

(F) TYPE V SINK 400 FT. SOUTH OF I65 TAKING FLOW THROUGH PASTURE ALONG 2 TREE LINED INTERMITTENT STREAMS. WATER MAY TEMPORARILY POND IN THE SOUTHWEST CORNER OF THE SINK.

POTENTIAL HAZARDS

(G) BEDROCK EXPOSED IN BOTTOM OF GRASS DITCH, WITH SMALL FISSURE 1 IN. WIDE. 1 FT. LONG. FISSURE MAY ACT AS DRAIN FOR RUNOFF DESCENDING FROM THE EAST.

(H) MINOR TO MODERATE UNDERCUTTING ALONG EDGES OF UPPER PORTION OF MAIN PAVED DITCH.

(I) MINOR UNDERCUTTING ALONG EDGES OF LOWER PORTION OF PAVED DITCH.

(J) SEVERE UNDERCUTTING OF BASE AND LOWER 20 FT. OF PAVED DITCH.

(K) MINOR TO MODERATE UNDERCUTTING ALONG EDGES OF PAVED DITCH.

(L) MINOR UNDERCUTTING ALONG EDGES OF LOWER PORTION OF SOUTHERN PAVED DITCH LEG.

(M) SOIL COLLAPSE IN BOTTOM OF MEDIAN GRASS DITCH, 18 IN. WIDE AND 6-12 IN. DEEP. WILL COLLECT RUNOFF DESCENDING FROM EAST AND MAY ACT AS A DRAIN.

SIGNS AND ROAD FEATURES

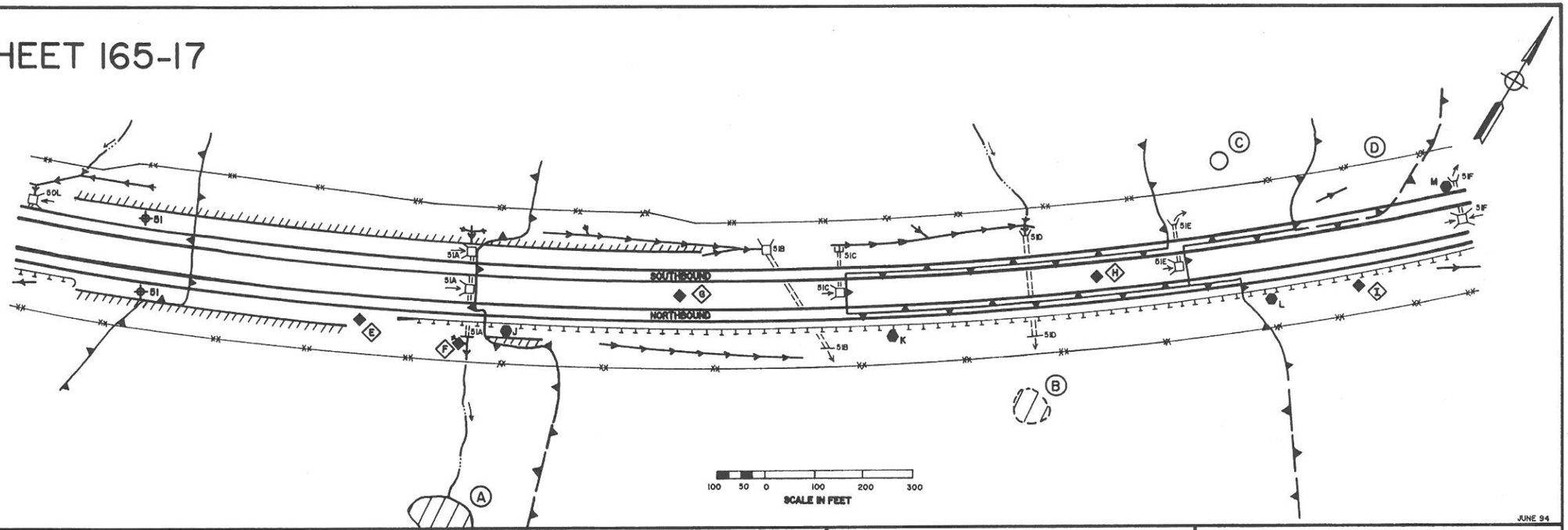
(N) EXIT 53
HOSPITAL
NEXT RIGHT

(P) EXIT 53
70 90
CAVE CITY
GLASGOW
2 MILES

(R) CAMPING - EXIT 53

(S) EXIT 53
MAMMOTH CAVE NATIONAL PARK
GUNTOWN MOUNTAIN AMUSEMENT PARK
NEXT RIGHT

SHEET 165-17



JUNE 94

INTERSTATE 65
U.S. ROUTE
STATE ROUTE
LOCAL ROUTE
RAILROAD
ACCESS CONTROL FENCE
SIGN
MILE MARKER
GUARDRAIL
ROCK OUTCROP
PAVED DITCH
AGGREGATE LINED CHANNEL
PIPE HEADWALL
BOX CULVERT HEADWALL
DROP BOX INLET
DOUBLE DROP BOX INLET
SLOPED BOX INLET
SLOPED & FLARED BOX INLET
22 SIDE TAPERED INLET

SLOPED BOX OUTLET
SLOPED & FLARED BOX OUTLET
DRAINAGE BASIN BOUNDARY
INFERRED DRAINAGE BASIN BOUNDARY
CLASS V INJECTION WELL
TYPE I SINKHOLE
TYPE II SINKHOLE
TYPE III SINKHOLE
TYPE IV SINKHOLE
TYPE V SINKHOLE
POTENTIAL HAZARD
SWALE
INTERMITTENT STREAM
PERENNIAL STREAM
EPHEMERAL POND
PERENNIAL POND

RECHARGE FEATURES

BASE MAP: GLASGOW NORTH AND HORSE CAVE 7.5' TOPOS

NO SURFACE INTERCEPTS FOR SINKS. NEXT GROUNDWATER INTERCEPT, LOGSDON RIVER, MCNP. GROUNDWATER TRAVEL TIMES TO LOGSDON RIVER: 4-30 HRS.

(A) POND 400 FT. SOUTH OF I65. DRAINAGE IS DIRECTED TO AN INTERMITTENT STREAM WHICH FLOWS THROUGH A WOODED PASTURE AND EMPTIES POND.

(B) EPHEMERAL POND IN PASTURE ADJACENT TO I65 R.O.W. POND AREA IS SWAMPY AND SURROUNDED BY TREES AND THICKET. FLOW DELIVERED BY 30 IN. PIPE TO HEADWALL 51D IS PARTIALLY OBSTRUCTED BY DEBRIS AND MAY COLLECT AT THAT POINT.

(C) TYPE V SINK IN DENSE WOODS AND THICKET ADJACENT TO I65 R.O.W. DRAINAGE BASIN AND SINK ARE NOT WELL DEFINED BY CHANGES IN GRADIENT. SINK ALSO TAKES IN FLOW FROM SECTION OF MEDIAN STRIP DRAINED BY DROP BOX & HEADWALL 51E.

(D) SWALE ADJACENT TO I65 R.O.W. HIGHWAY PLANS CALL FOR DRAINAGE TO BE DIRECTED TOWARD SLOPED & FLARED INLET 51G (SHEET I65-18), HOWEVER GROUND IS APPARENTLY NOT SLOPED ENOUGH FOR THIS TO OCCUR.

POTENTIAL HAZARDS

(E) EXCAVATION BORE HOLE PRESENT IN BOTTOM OF DITCH, APPROXIMATELY 3 IN. WIDE WITH UNKNOWN DEPTH. HOLE MAY ACT AS DRAIN FOR RUNOFF DESCENDING FROM SOUTHWEST. MINOR UNDERCUTTING OF PAVED DITCH LEG JUST BEFORE CONNECTION WITH MAIN PAVED DITCH.

(F) MINOR UNDERCUTTING OF PAVED DITCH JUST UPSLOPE FROM JUNCTION OF MAIN PAVED DITCH

(G) BEDROCK EXPOSED IN BOTTOM OF MEDIAN GRASS DITCH, WITH SMALL FISSURE 1 IN. WIDE 6 IN. LONG. FISSURE MAY DRAIN RUNOFF DESCENDING FROM SOUTHWEST.

(H) 2 SOIL COLLAPSES IN BOTTOM OF MEDIAN GRASS DITCH. ONE IS 5 FT. WIDE AND OTHER 2 FT., WITH DEPTHS OF 6 IN. THEY WILL COLLECT RUNOFF DESCENDING FROM SOUTHWEST AND MAY ACT AS A DRAIN.

(I) SOIL COLLAPSE HAS DEVELOPED IN TREE ROOT SYSTEM WHICH EXTENDS INTO GRASS DITCH. BEDROCK AND CRACKS ARE VISIBLE INSIDE COLLAPSE WHICH IS 4 FT. WIDE AND UP TO 12 IN. DEEP. COLLAPSE MAY INTERCEPT FLOW DESCENDING FROM SOUTHWEST.

SIGNS AND ROAD FEATURES

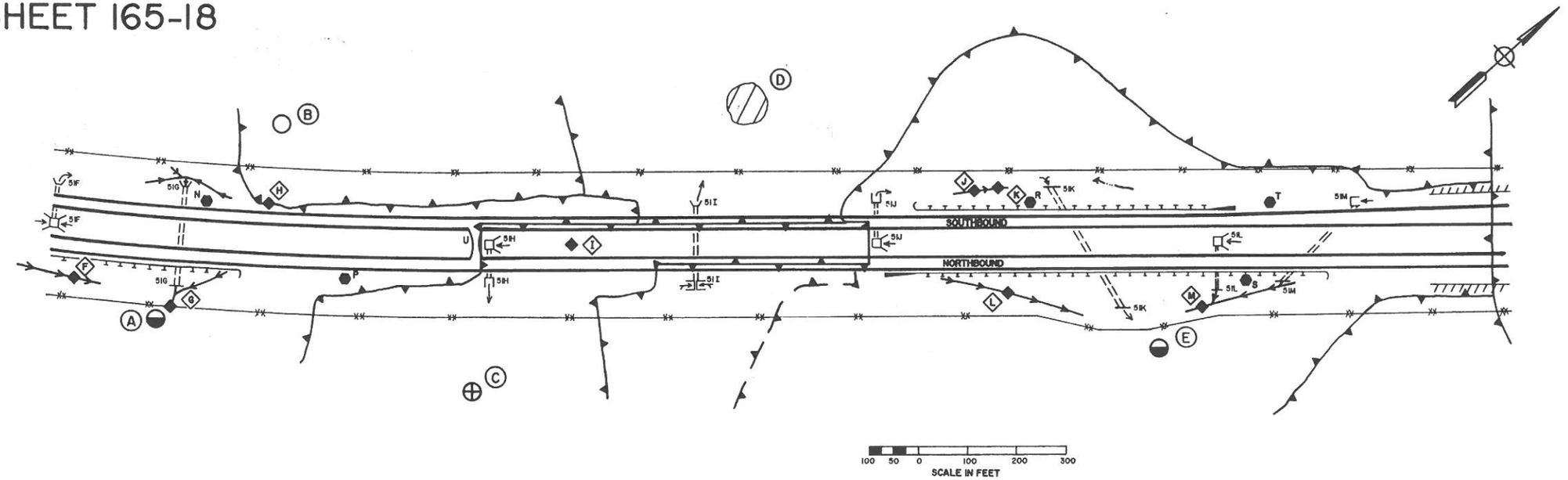
(J) LODGING - EXIT 53

(K) EXIT 53
70 90
CAVE CITY
GLASGOW
1 MILE

(L) FOOD - EXIT 53

(M) EMERGENCY STOPPING ONLY

SHEET 165-18



JULY 94

- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
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- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: HORSE CAVE 7.5' TOPO

- ***NO SURFACE INTERCEPTS FOR SINKS. GROUNDWATER INTERCEPT, LOGSDON RIVER, MCNP. GROUNDWATER TRAVEL TIMES TO LOGSDON RIVER: 4-30 HRS.***

(A) TYPE III SINK IMMEDIATELY ADJACENT TO I65 R.O.W. IN PASTURE. SINK HAS STEEP SOIL WALLS AND IS FILLED WITH TRASH AND DEBRIS. SHORT STREAM DELIVERS RUNOFF FROM PAVED DITCH IMMEDIATELY TO NORTH, BUT STREAM GRADUALLY SINKS AS IT FLOWS TO EDGE OF SINK. SHAPE OF THE BASIN IS IRREGULAR AND INCLUDES AN ISOLATED FINGER EXTENDING ALONG SOUTHBOUND SHOULDER.

(B) TYPE V SINK IN FIELD ADJACENT TO I65 R.O.W. APPEARS TO HAVE BEEN EXCAVATED FOR USE AS A POND, BUT SHOWS NO SIGNS OF WATER RETENTION.

(C) TYPE IV SINK IN PASTURE ADJACENT TO I65 R.O.W. SINK IS 5-10 FT. DEEP WITH STEEP SOIL WALLS AND IS FILLED WITH BRUSH.

(D) PERENNIAL POND IN FIELD ADJACENT TO I65 R.O.W. BASIN IS AUGMENTED BY FLOW FROM NORTHBOUND AREA DRAINED BY INLET AND OUTLET BOXES 51I.

(E) TYPE III SINK IMMEDIATELY ADJACENT TO I65 R.O.W., IN A PASTURE. SINK IS APPROXIMATELY 25 FT. DEEP, HAS VERY STEEP SOIL WALLS, AND CONTAINS BRUSH.

POTENTIAL HAZARDS

(F) MINOR UNDERCUTTING ALONG EDGES OF 25 FT. SEGMENT OF PAVED DITCH.

(G) INTERMITTENT STREAM IS UNDERCUTTING BASE OF PAVED DITCH. FLOW SINKS ALONG STREAMBED WHICH RUNS 25 FT. FROM DITCH TO SINK "A".

(H) PRIMARY GRASS DITCH ALONG SOUTHBOUND SHOULDER IS INTERSECTED BY A PERPENDICULAR GRASS DITCH. THE 2 DITCHES ARE SEPARATED BY SLIGHTLY ELEVATED GROUND, BUT DURING EXTREME RUNOFF FLOW MAY BE DIVERTED INTO THE SECONDARY DITCH WHICH DRAINS INTO SINK "B".

(J) SOIL COLLAPSE IN BOTTOM OF MEDIAN GRASS DITCH, 1 FT. WIDE AND 6 IN. DEEP. CAVITY WILL COLLECT RUNOFF DESCENDING FROM NORTHEAST AND MAY ACT AS A DRAIN.

(J) 1 IN. COMPLETE CRACK IN PAVED DITCH.

(K) MINOR UNDERCUTTING ALONG EDGES OF 3 FT. SEGMENT OF PAVED DITCH.

(L) MODERATE UNDERCUTTING ALONG EDGES OF 3 FT. SEGMENT OF PAVED DITCH WITH 1/4 IN. WIDE, COMPLETE CRACK OF DITCH.

(M) MINOR UNDERCUTTING ALONG EDGES OF 25 FT. SEGMENT OF PAVED DITCH WITH A 1/2 IN. WIDE, COMPLETE CRACK OF DITCH.

SIGNS AND ROAD FEATURES

(N) KEEP RIGHT EXCEPT TO PASS

(P) GAS - EXIT 53

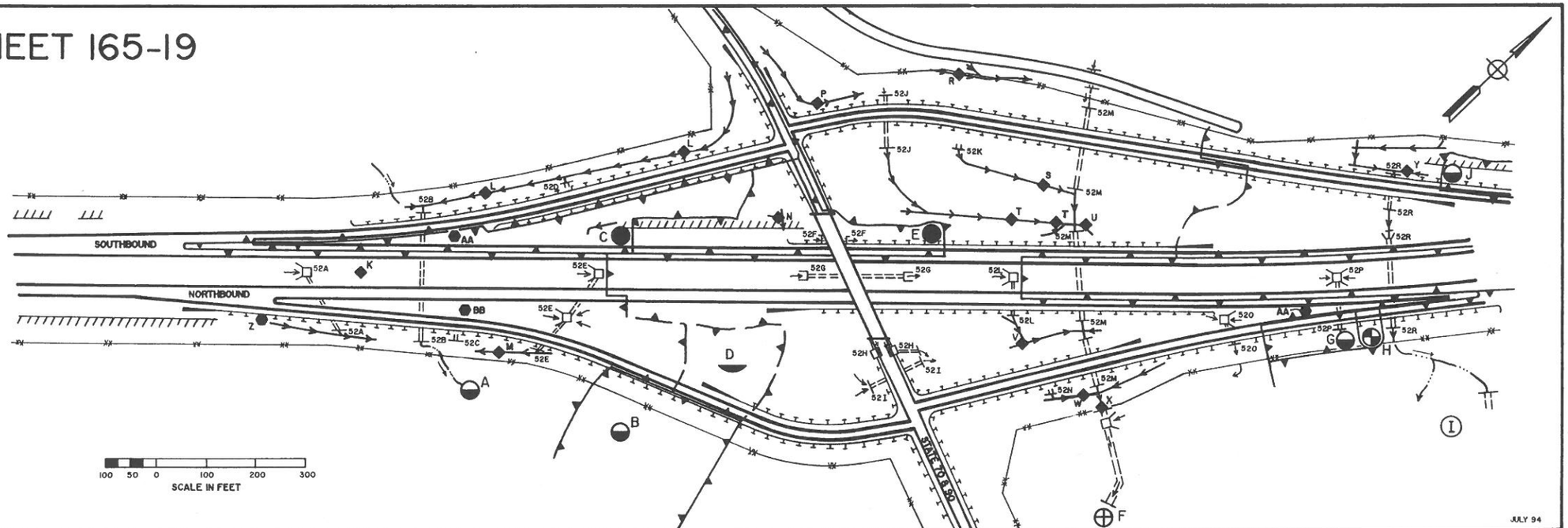
(R) PARK CITY 5
NASHVILLE 90

(S) EXIT 53
70 90
CAVE CITY
GLASGOW
NEXT RIGHT

(T) 65

(U) GRAVEL CROSSOVER

SHEET 165-19



- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
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- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: HORSE CAVE 7.5' TOPO

NO SURFACE INTERCEPTS FOR SINKS. NEXT GROUND-WATER INTERCEPT, LOGSDON RIVER, MCNP. GROUND-WATER TRAVEL TIMES TO LOGSDON RIVER: 4-30 HRS.

(A) TYPE III SINK TAKES DRAINAGE FROM BOTH LANES, MEDIAN, AND AREAS OF BOTH SOUTHBOUND ENTRANCE RAMP AND NORTH-BOUND EXIT RAMP. SINK IS IN DENSE WOOD AND BRUSH AREA IN FIELD ADJACENT TO R.O.W. AN INTERMITTENT STREAM CARRIES FLOW TO EAST END OF SINK WHERE IT IMMEDIATELY SINKS INTO GROUND.

(B) TYPE III SINK TAKES FLOW FROM PORTION OF NORTHBOUND EXIT RAMP. SINK IS IN THICKET IN FIELD ADJACENT TO R.O.W.

(C) TYPE I SINK IN GRASS DITCH JUST OFF SOUTHBOUND SHOULDER. SWALLET IS 3 FT. WIDE. FLOW DRAINS IMMEDIATELY INTO BEDROCK, OBSTRUCTED OPENING 2 FT. BELOW SURFACE.

(D) SWALE. HIGHWAY PLANS CALL FOR DRAINAGE TO BE DIRECTED TOWARD HEADWALL '52I' HOWEVER, A SLIGHT RISE IN TERRAIN TRAPS WATER IN THIS AREA.

(E) TYPE I SINK IN GRASS DITCH JUST OFF SOUTHBOUND SHOULDER. SWALLET IS 4 FT. WIDE. FLOW DRAINS IMMEDIATELY INTO BEDROCK, OBSTRUCTED OPENING 2 FT. BELOW SURFACE.

(F) TYPE IV SINK IN BRUSH AND WOODS BESIDE "DAYS INN" HOTEL PARKING LOT. FLOW FROM I65 AND INTERCHANGE IS DELIVERED BY PIPE AND HEADWALL NETWORK RUNNING BENEATH PARKING LOT. DRAINAGE FROM BASIN SEGMENT LOCATED SOUTH OF ROUTE 70 AND EAST OF INTERCHANGE IS DELIVERED BY HEADWALL LOCATED 150 FT. SOUTHWEST OF SINK. WATER MAY ACCUMULATE FOR A SHORT PERIOD IN SWALLET.

(G) TYPE III SINK RECEIVES DRAINAGE FROM PORTION OF MEDIAN STRIP AND NORTHBOUND ENTRANCE RAMP. SINK IS IN WOODED AREA OF I65 R.O.W. AND HAS BEEN LINED WITH AGGREGATE. FLOW IMMEDIATELY SINKS WITHIN 30 FT. OF HEADWALL '52P'.

(H) CAVE OPENING 8 FT. WIDE, 10 FT. DEEP, WITH VERTICAL SOIL WALLS IN WOODED SECTION OF I65 R.O.W. FEATURE DOES NOT DRAIN LARGE AREA NOR HAS FLOW BEEN OBSERVED IN PASSAGE BELOW OPENING.

(I) DRAINAGE FLOWS ACROSS VACANT LOTS BEHIND WENDY'S/ PIZZA HUT/TACO BELL RESTAURANTS AND INTO PIPE CULVERTS RUNNING BENEATH PARKING LOTS AND ROUTE 70. FLOW REEMERGES FROM A 48 IN. PIPE HEADWALL JUST NORTH OF JERRY'S RESTAURANT PARKING LOT AND CONTINUES NORTH-WARD 300 FT. WHERE IT IS DELIVERED TO SUBSURFACE VIA 2 CLASS V INJECTION WELLS IN FRONT OF COMFORT INN HOTEL.

(J) TYPE III SINK IN DITCH JUST OFF SHOULDER OF NORTHBOUND EXIT RAMP. SWALLET IS 5 FT. WIDE, 2 FT. DEEP.

POTENTIAL HAZARDS

(K) SOIL COLLAPSE IN MEDIAN GRASS DITCH, 6 IN. WIDE, 6 IN. DEEP. COLLAPSE WILL COLLECT FLOW DESCENDING FROM SOUTH-WEST AND MAY ACT AS A DRAIN.

(L) 400 FT. OF PAVED DITCH IS UNDERMINED BY INTERMITTENT STREAM. UNDERCUTTING BEGINS AT NORTHERN "L" POINT AND CONTINUES DOWNGRADE SUPPLEMENTED BY NUMEROUS CRACKS, RANGING FROM MINOR TO COMPLETE FAILURES OF DITCH. VIRTUALLY ENTIRE FLOW IS DRAINED INTO STREAM BENEATH THE DITCH. HOWEVER, STREAM SURFACES AT SOUTHERN "L" POINT FROM 3 IN. BY 8 IN. HOLE IN DITCH, AND IT'S FLOW RESUMES A NORMAL PATH WITHIN PAVED DITCH TOWARD HEADWALL '52B'.

(M) 1 IN. COMPLETE CRACK IN PAVED DITCH.

(N) 1 IN. COMPLETE CRACK IN PAVED DITCH LEG ABOVE CONNECTION WITH MAIN DITCH.

(P) 1 IN. COMPLETE CRACK IN THE PAVED DITCH.

(R) 1/2 IN. COMPLETE CRACK IN THE PAVED DITCH.

(S) MODERATE UNDERCUTTING ALONG EDGES OF 3 FT. SEGMENT OF PAVED DITCH.

(T) MODERATE TO SEVERE UNDERCUTTING ALONG 100 FT. SEGMENT OF PAVED DITCH. DITCH IS ALSO CRACKED IN SEVERAL LOCATIONS.

(U) MINOR UNDERCUTTING ALONG EDGES OF PAVED DITCH LEG.

(V) 1 IN. COMPLETE CRACK IN MAIN PAVED DITCH ABOVE INTERSECTION WITH SECONDARY DITCH.

(W) MINOR UNDERCUTTING ALONG EDGE OF PAVED DITCH WITH 1/2 IN. COMPLETE CRACK.

(X) FLOW DROPS FROM PAVED DITCH INTO SHORT STREAMBED BEFORE ENTERING PIPE HEADWALL AND CONTINUING TOWARD "F".

(Y) SEVERE UNDERCUTTING ALONG EDGES OF UPPER 25 FT. OF PAVED DITCH.

52C, 52D, 52K, 52N: PIPE ASSOCIATED WITH EACH OF THESE HEADWALLS EXTENDS ONLY INTO FILL SLOPE OF RESPECTIVE ACCESS RAMP. USED ONLY DURING INITIAL HIGHWAY CONSTRUCTION, NO LONGER ACTIVE.

SIGNS AND ROAD FEATURES

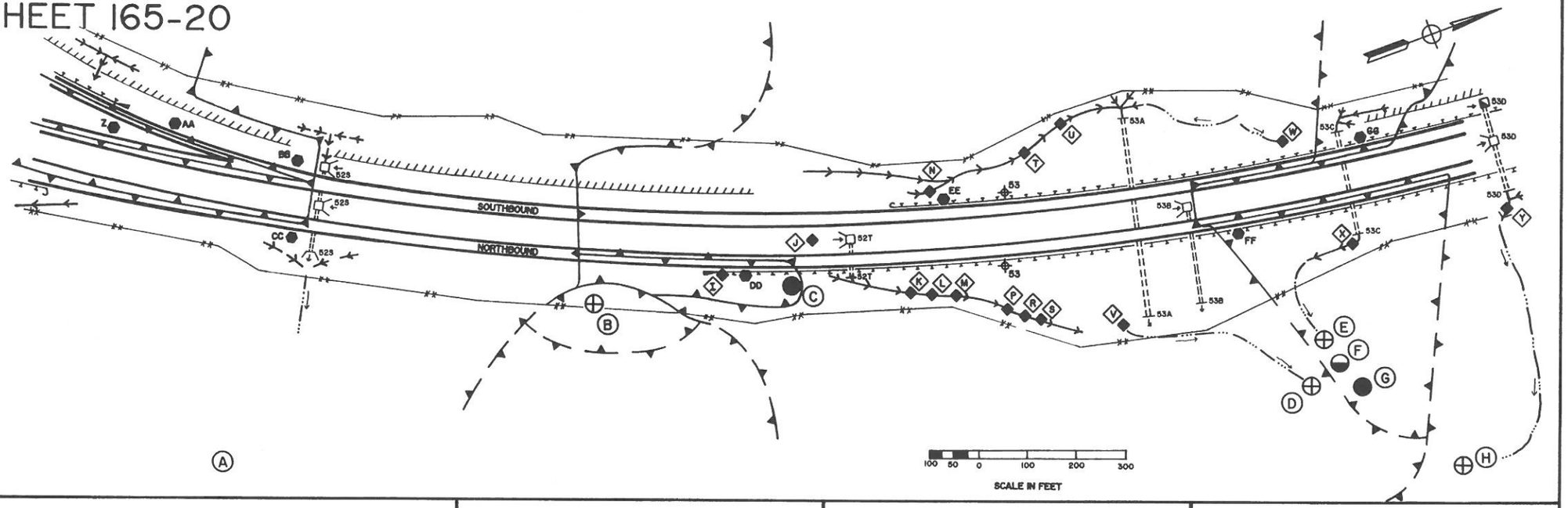
(Z) EXIT 53
70 90
CAVE CITY
GLASGOW
NEXT RIGHT

(AA) MERGING TRAFFIC SYMBOL

(BB) EXIT 53

52H CURB DROP BOXES

SHEET I65-20



- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
- TYPE II SINKHOLE
- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: HORSE CAVE 7.5' TOPO

NO SURFACE INTERCEPTS FOR SINKS. NEXT GROUND-WATER INTERCEPT, LOGSDON RIVER, MCNP. GROUND-WATER TRAVEL TIMES TO LOGSDON RIVER: 4-30 HRS.

(A) DRAINAGE FROM BOTH SIDES OF I65 AND MEDIAN VIA DRAINS 52S IS DIRECTED THROUGH CUT DRAINAGE DITCH, ACROSS OPEN FIELD INTO PIPE CULVERT RUNNING BENEATH ROUTE 70 AND ENTRANCE DRIVE TO COMFORT INN HOTEL AND TO 2 CLASS V INJECTION WELLS IN FRONT OF HOTEL.

(B) TYPE IV SINK IN OPEN FIELD ADJACENT TO I65 R.O.W. FENCE. NO DRAINAGE FROM I65 REACHES SINK DUE TO GRASS BANK.

(C) TYPE I SINK AT BASE OF CUT SLOPE. SINK IS 4 FT. WIDE WITH A 2 FT. HOLE LEADING UNDERGROUND.

(D) TYPE IV SINK IN WOODED AREA ADJACENT TO I65 R.O.W. SINK RECEIVES FLOW FROM BOTH SIDES OF I65 AND MEDIAN VIA DRAINS 53A & 53B. DRAINAGE SINKS DIFFUSELY IN LOWEST AND MOST CENTRALLY LOCATED AREA OF SINK. SINKS "E","F" & "G" ARE ALSO WITHIN BOUNDARIES OF THIS SINK, BUT ARE NORTH AND HIGHER IN ELEVATION THAN LIMITS OF THIS DRAINAGE.

(E) TYPE IV SINK IN WOODED AREA ADJACENT TO I65 R.O.W. DRAINAGE FROM BOTH SIDES OF I65, NOT INCLUDING MEDIAN, REACH THIS SINK VIA DRAIN 53C.

(F) TYPE III SINK IN WOODED AREA ADJACENT TO I65 R.O.W. DRAINAGE IS PRIMARILY RESTRICTED TO CONFINES OF WALLS OF THE SINK.

(G) TYPE I SINK JUST EAST AND UP SLOPE OF "F", IN SAME WOODED AREA. DRAINAGE IS PRIMARILY CONFINED TO WALLS OF SINK.

(H) TYPE IV SINK IN WOODED AREA 500 FT. FROM I65 R.O.W. DRAINAGE FROM BOTH SIDES OF I65, INCLUDING MEDIAN, REACHES THIS SINK VIA DRAINS 53D, PAVED DITCH, AND AN INTERMITTENT STREAM FLOWING INTO SINK.

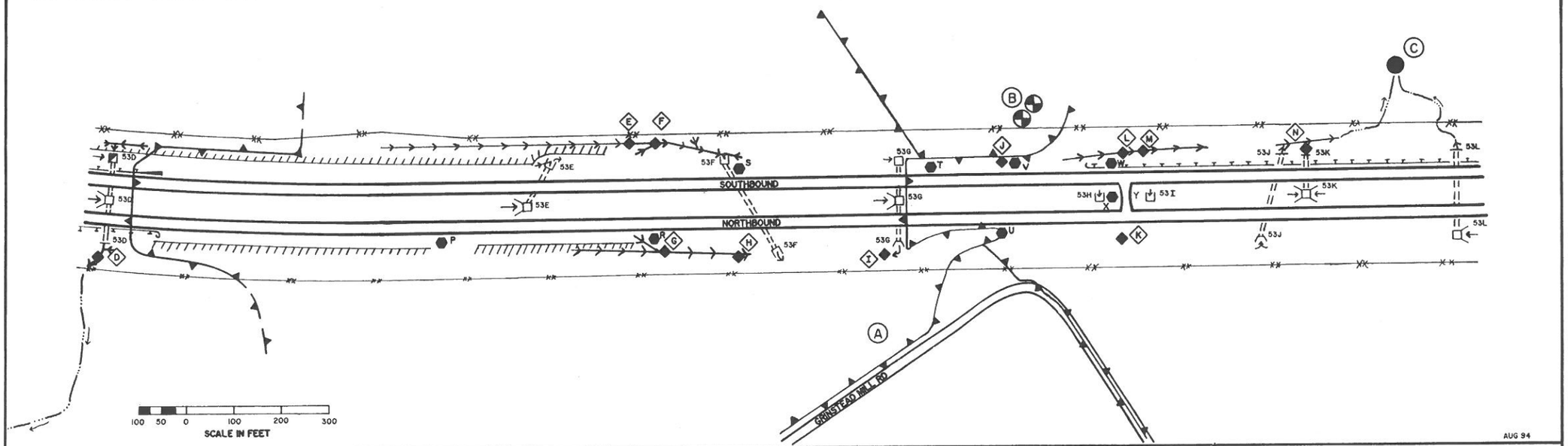
POTENTIAL HAZARDS

- (I) SOIL COLLAPSE AROUND BASE OF FIRST 2 GUARD RAIL PILINGS.
- (J) PROBABLE SINK FILL FILLED WITH AGGREGATE AND PAVEMENT. TAKES IN WATER.
- (K) MINOR UNDERCUTTING AND 1/2 IN. COMPLETE CRACK IN PAVED DITCH.
- (L) 3 IN. BY 8 IN. HOLE WITH 1/2 IN. COMPLETE CRACK IN PAVED DITCH.
- (M) 10 FT. MODERATE UNDERCUTTING IN PAVED DITCH.
- (N) 1 IN. COMPLETE CRACK IN PAVED DITCH.
- (P) MINOR UNDERCUTTING AND 1 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (R) 1/2 IN. COMPLETE CRACK IN PAVED DITCH.
- (S) 20 FT. SLIGHT TO MODERATE UNDERCUTTING IN PAVED DITCH.
- (T) 25 FT. MODERATE UNDERCUTTING IN PAVED DITCH.
- (U) 15 FT. MINOR UNDERCUTTING IN PAVED DITCH.
- (V) SPRING WITH VARIOUS OUTLETS AT BOTTOM OF FILL SLOPE.
- (W) SOIL COLLAPSE 40 FT. LONG, 4 FT. WIDE, AND 3 FT. DEEP.
- (X) 1 IN. COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (Y) 20 FT. MINOR UNDERCUTTING WITH 1 IN. COMPLETE CRACK IN PAVED DITCH. NOTED ON SHEET I65-21.

SIGNS AND ROAD FEATURES

- (Z) EXIT 53
- (AA) DIP
- (BB) EXIT 53 90 70 CAVE CITY GLASGOW
- (CC) BRIDGES FREEZE BEFORE ROADWAY
- (DD) I-65 SIGN
- (EE) EXIT 53 70 90 CAVE CITY GLASGOW NEXT RIGHT
- (FF) SPEED LIMIT 65
- (GG) GAS-EXIT 53

SHEET 165-21



INTERSTATE 65
U.S. ROUTE
STATE ROUTE
LOCAL ROUTE
RAILROAD
ACCESS CONTROL FENCE
SIGN
MILE MARKER
GUARDRAIL
ROCK OUTCROP
PAVED DITCH
AGGREGATE LINED CHANNEL
PIPE HEADWALL
BOX CULVERT HEADWALL
DROP BOX INLET
DOUBLE DROP BOX INLET
SLOPED BOX INLET
SLOPED & FLARED BOX INLET
SIDE TAPERED INLET

SLOPED BOX OUTLET
SLOPED & FLARED BOX OUTLET
DRAINAGE BASIN BOUNDARY
INFERRED DRAINAGE BASIN BOUNDARY
CLASS V INJECTION WELL
TYPE I SINKHOLE
TYPE II SINKHOLE
TYPE III SINKHOLE
TYPE IV SINKHOLE
TYPE V SINKHOLE
POTENTIAL HAZARD
SWALE
INTERMITTENT STREAM
PERENNIAL STREAM
EPHEMERAL POND
PERENNIAL POND

RECHARGE FEATURES

BASE MAP: HORSE CAVE 7.5' TOPO

* ***NO SURFACE INTERCEPTS FOR SINKS. NEXT GROUNDWATER INTERCEPT, LOGSDON RIVER, MCNP. GROUNDWATER TRAVEL TIMES TO LOGSDON RIVER: 4-30 HRS.***

(A) TYPE II SINK IN A FIELD IMMEDIATELY ADJACENT TO I65 R.O.W. SWALLET FILLED WITH BOULDERS, 8 FT. WIDE AND OF UNKNOWN DEPTH.

(B) TYPE II SINK IN FIELD ADJACENT TO I65 R.O.W. THIS SINK HAS 1 MAJOR SWALLET AND 1 SMALL. MAJOR SWALLET IS 5 FT. WIDE AND 4 FT. DEEP WITH A 3 IN. WIDE DRAIN. MINOR SWALLET IS BETWEEN ACCESS FENCE AND MAJOR SWALLET, AND IS 10 IN. WIDE AND 5 IN. DEEP.

(C) DRAINAGE FLOWS THROUGH HEAVY UNDERGROWTH TOWARD A TYPE I SINK, ALSO HEAVILY OVERGROWN, LOCATED ADJACENT TO I65 R.O.W. STREAMS FLOWING TOWARD SINK CONVERGE AND PROBABLY SINK IN VARIOUS POINTS BEFORE ENTERING A 2 FT. WIDE SWALLET OF UNKNOWN DEPTH, LINED WITH SOIL AND BEDROCK.

POTENTIAL HAZARDS

(D) MINOR UNDERCUTTING 20 FT. LONG WITH 1 IN. COMPLETE CRACK IN PAVED DITCH.

(E) MINOR UNDERCUTTING 10 FT. LONG WITH 1/2 IN. COMPLETE, DISJOINTED CRACK IN PAVED DITCH.

(F) 3, 1/2 IN. CRACKS WITHIN 15 FT. OF CONNECTION OF 2 PAVED DITCHES, 2 ALONG MAIN LEG AND 1 ALONG SHORT LEG OF DITCHES.

(G) 2, 1/2 IN. COMPLETE CRACKS AT CONNECTION OF 2 PAVED DITCHES.

(H) 1 IN. COMPLETE CRACK IN PAVED DITCH.

(I) SOIL COLLAPSE IN GRASS DITCH 3 FT. WIDE AND 1 FT. DEEP.

(J) SOIL COLLAPSE IN GRASS DITCH 6 IN. DEEP AND 6 IN. WIDE.

(K) SPRING FLOWING IN NORTHERLY DIRECTION, AND SINKING DIFFUSELY WITHIN A DISTANCE 30 YD. UNDER HEAVY RAIN-FALL THIS SPRING HAS POTENTIAL TO FLOW DOWN FILL SLOPE TO SLOPED AND FLARED DRAIN NUMBER 53J.

(L) 1/2 IN. COMPLETE CRACK IN PAVED DITCH.

(M) 1/2 IN. COMPLETE, DISJOINTED CRACK IN PAVED DITCH WITH 30 FT. OF MINOR UNDERCUTTING.

(N) HOLE IN PAVED DITCH 5 IN. DEEP AND 5 IN. WIDE, AT POINT WHERE PIPE HEADWALL EMPTIES INTO DITCH.

SIGNS AND ROAD FEATURES

(P) EMERGENCY STOPPING ONLY

(R) KEEP RIGHT EXCEPT TO PASS

(S) FOOD - EXIT 53

(T) SEAT BELT SYMBOL - STATE LAW

(U) HORSE CAVE 7
LOUISVILLE 82

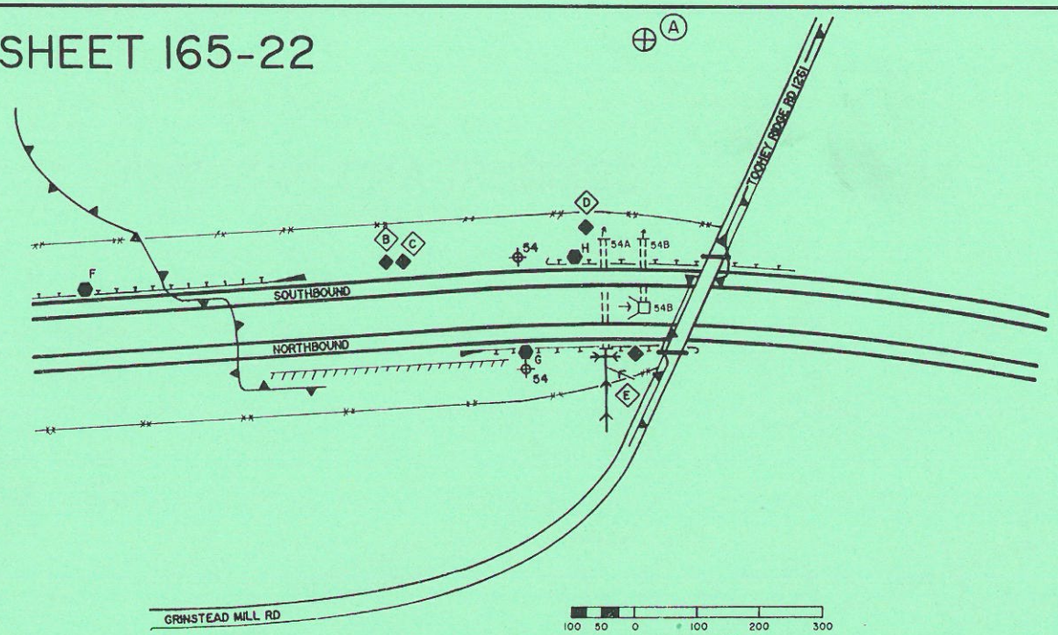
(V) FALLEN ROCK ZONE

(W) EXIT 53
BARREN RIVER LAKE
STATE RESORT PARK
MAMMOTH CAVE
NATIONAL PARK
NEXT RIGHT

(X) NO U - TURN SYMBOL

(Y) MEDIAN CROSS-OVER

SHEET 165-22



AUG 94

- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
- TYPE II SINKHOLE
- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: HORSE CAVE 7.5' TOPO

- *NO SURFACE INTERCEPT FOR SINKS. NEXT GROUNDWATER INTERCEPT, LOGSDON RIVER, MCNP. GROUNDWATER TRAVEL TIMES TO LOGSDON RIVER, 4-30 HRS.*

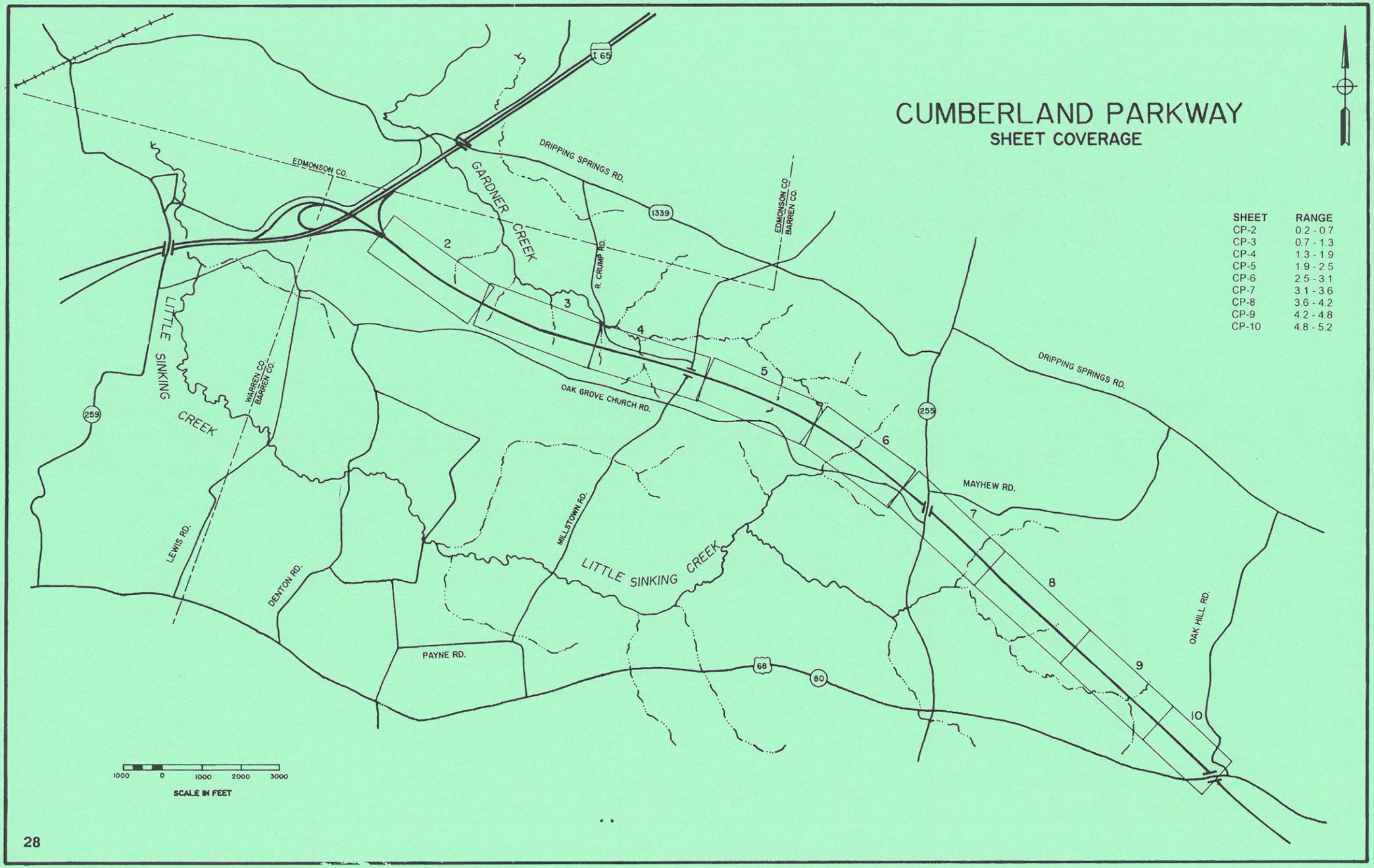
(A) TYPE IV SINK IN FIELD 400 FT. WEST OF I65 R.O.W. FENCE. SINK NOW CONTAINS SMALL AMOUNT OF WATER DUE TO AN EARTHEN DAM THAT BREACHED. WATER IS ADJACENT TO BREACH.

POTENTIAL HAZARDS

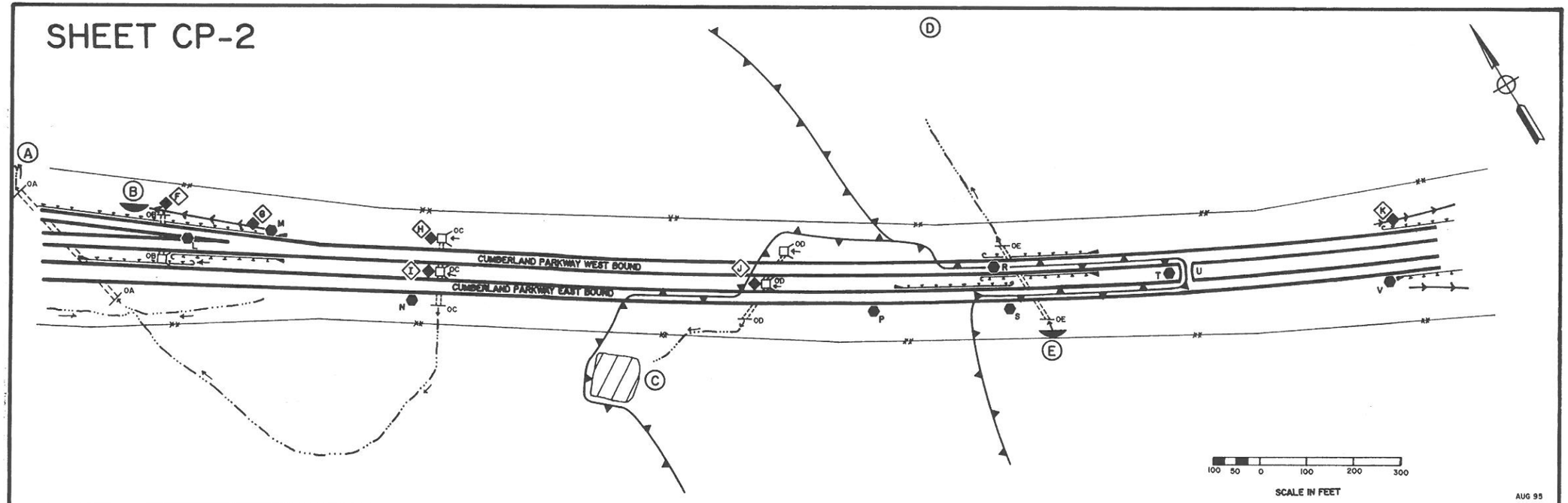
- (B) SOIL COLLAPSE, ROCK LINED, 1 FT. WIDE, 1 FT. DEEP, 2 IN. DRAIN, IN FOOT OF CUT SLOPE.
- (C) SOIL COLLAPSE, ROCK LINED, 2 FT. WIDE, 1 FT. DEEP, 3 IN. DRAIN, IN FOOT OF CUT SLOPE.
- (D) SOIL COLLAPSE, 3 FT. WIDE, 1 FT. DEEP IN FOOT OF CUT SLOPE.
- (E) SOIL COLLAPSE, 5 FT. WIDE, 3 FT. DEEP IN FOOT OF CUT SLOPE.

SIGNS AND ROAD FEATURES

- (F) EXIT 53
70 90
CAVE CITY
GLASGOW
1 MILE
- (G) HART COUNTY
- (H) LODGING - EXIT 53


CUMBERLAND PARKWAY
SHEET COVERAGE
SHEET RANGE
CP-2 0.2 - 0.7
CP-3 0.7 - 1.3
CP-4 1.3 - 1.9
CP-5 1.9 - 2.5
CP-6 2.5 - 3.1
CP-7 3.1 - 3.6
CP-8 3.6 - 4.2
CP-9 4.2 - 4.8
CP-10 4.8 - 5.2
I 65
EDMONSON CO.
DRIPPING SPRINGS RD.
1339
GARDNER CREEK
R. CRUMP RD.
EDMONSON CO
BARREN CO.
2
3
4
5
6
7
8
9
10
OAK GROVE CHURCH RD.
DRIPPING SPRINGS RD.
255
259
LITTLE SINKING CREEK
WARREN CO.
BARREN CO.
MAYHEW RD.
MILLSTOWN RD.
LEWIS RD.
DENTON RD.
LITTLE SINKING CREEK
OAK HILL RD.
PAYNE RD.
68
80
1000 0 1000 2000 3000
SCALE IN FEET

SHEET CP-2



AUG 95

- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
- TYPE II SINKHOLE
- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO.

- ***NEXT SURFACE WATER INTERCEPT, GARDNER CREEK AT 1339 BRIDGE.***
- ***FINAL SURFACE WATER INTERCEPT, GARDNER CREEK AT 1339 BRIDGE.***
- ***NEXT GROUNDWATER INTERCEPT, MILL HOLE, PERRY SEBAUGH, 3221 CHAUMONT ROAD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 4-42 HRS.***

(A) TYPE II SINK WITHIN NORTHBOUND ONRAMP MEDIAN. SINK RECEIVES DRAINAGE FROM PKWY VIA INTERMITTENT STREAM AND DRAINS 0A, 0B, AND 0C. POSSIBLE PONDING UNDER HIGH FLOW.

(B) SWALE AT BASE OF ROADWAY EXTENDING 100 FT WEST TOWARDS INTERMITTENT STREAM "A".

(C) PERENNIAL POND 50 FT SOUTH OF PKWY R.O.W. FENCE. RECEIVES FLOW VIA DRAIN 0D.

(D) FLOW DIRECTED INTO INTERMITTENT STREAM FLOWING INTO GARDNER CREEK.

(E) SWALE AT SOUTH DRAIN 0E. GENERAL DIRECTION OF FLOW TO INTERMITTENT STREAM TO STREAM "D".

POTENTIAL HAZARDS

(F) 1/2 IN COMPLETE CRACK AT CONNECTION OF PAVED DITCH FROM DRAIN 0B.

(G) 1 IN CRACK AND 3 IN HOLE IN PAVED DITCH WHERE UNDERBED DRAIN CONNECTS. UNDERCUTTING AT HEAD OF UNDERBED DRAIN.

(H) UNDERCUTTING ON 3 SIDES OF DROP BOX.

(I) UNDERCUT HOLE 1 FT WIDE, 1 FT DEEP ON EAST SIDE OF DROP BOX.

(J) MINOR UNDERCUTTING ON EAST SIDE OF DROP BOX.

(K) MINOR UNDERCUTTING ALONG PAVED DITCH.

SIGNS AND ROAD FEATURES

(L) (GREEN OVER LANE SIGNS)
EXIT 1B I-65 SOUTH BOWLING GREEN
EXIT 1A I-65 NORTH LOUISVILLE

(M) (YELLOW)
RAMP
50
MPH

(N) EAST CUMBERLAND PARKWAY

(P) (WHITE)
SPEED
LIMIT
65

(R) (GREEN OVER LANE SIGNS)
EXIT 1B I-65 SOUTH BOWLING GREEN LEFT LANE
EXIT 1A I-65 NORTH LOUISVILLE RIGHT LANE

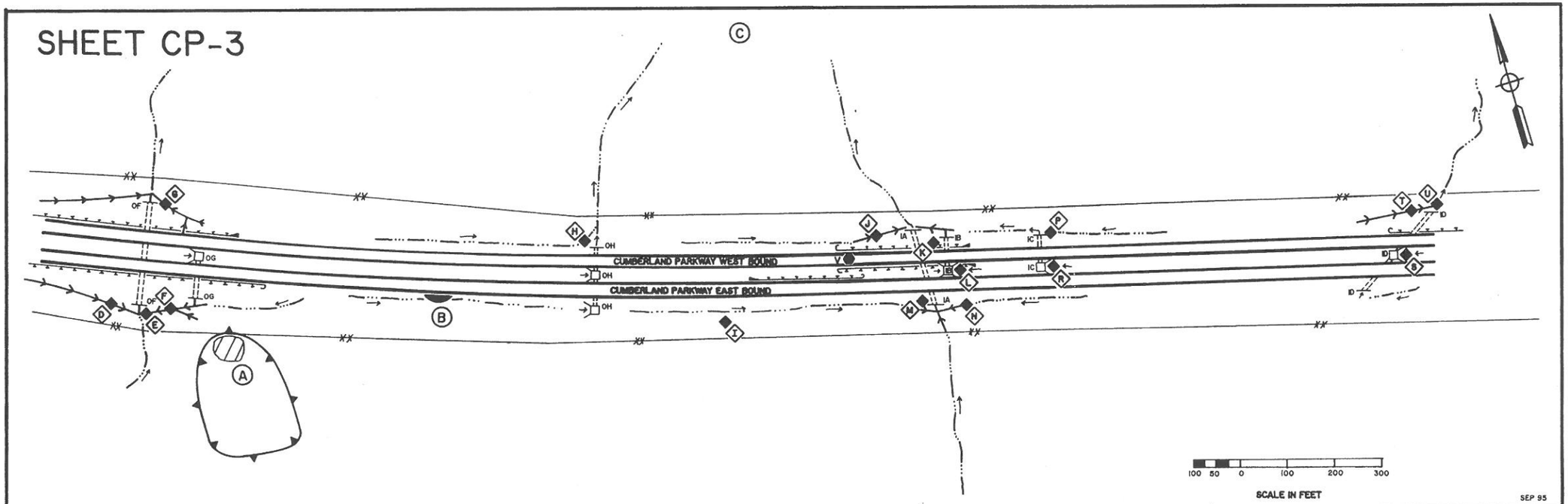
(S) (GREEN)
GLASGOW 12
SOMERSET 88

(T) (WHITE)
(NO U TURN SYMBOL)

(U) MEDIAN CROSS-OVER

(V) (WHITE)
KEEP RIGHT
EXCEPT
TO PASS

SHEET CP-3



- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- 30 SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
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- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO.

- ***NEXT SURFACE WATER INTERCEPT, GARDNER CREEK AT 1339 BRIDGE.***
- ***FINAL SURFACE WATER INTERCEPT, GARDNER CREEK AT 1339 BRIDGE.***
- ***NEXT GROUNDWATER INTERCEPT, MILL HOLE, PERRY SEBAUGH, 3221 CHAUMONT ROAD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 4-42 HRS.***

(A) POND IMMEDIATELY BEYOND PKWY R.O.W. FENCE. DRAINAGE FROM PKWY DOES NOT REACH POND.

(B) SWALE ALONG DRAINAGE DITCH. GENERAL DIRECTION OF FLOW IS TO DRAIN 0H.

(C) ALL INTERMITTENT STREAMS FLOW NORTH TO GARDNER CREEK.

POTENTIAL HAZARDS

(D) MINOR UNDERCUTTING AND MINOR UNDERCUT HOLES ALONG PAVED DITCH.

(E) MAJOR UNDERCUT HOLES AT LOWER END OF PAVED DITCH.

(F) 1 IN COMPLETE DISPLACED CRACK AND 1 FT UNDERCUT HOLE AT INTERSECTION OF PAVED DITCHES.

(G) 30 FT LONG MINOR UNDERCUTTING ALONG PAVED DITCH.

(H) 3 SOIL COLLAPSES ALONG DRAINAGE DITCH ADJACENT TO DRAIN 0H. LARGEST, 3 FT WIDE, 3 FT DEEP.

(I) SOIL COLLAPSE IN ROADSIDE BANK 8 FT WIDE, 20 FT LONG, 5 FT DEEP. DRAINAGE DOWN DITCH IS PONDED DUE TO SLUMP FROM THIS COLLAPSE.

(J) 40 FT LONG MINOR UNDERCUTTING ALONG PAVED DITCH.

(K) SOIL COLLAPSE IN ROADWAY BANK 1 FT WIDE, 2 FT LONG, 1 FT DEEP.

(L) MINOR UNDERCUTTING ON 2 SIDES OF DROP BOX.

(M) UNDERCUTTING ABOVE PIPE HEADWALL.

(N) UNDERCUTTING 1 FT WIDE, 1 FT DEEP AT HEAD OF PAVED DITCH.

(P) MAJOR UNDERCUTTING ABOVE PIPE HEADWALL.

(R) MINOR UNDERCUTTING ON EAST SIDE OF DROP BOX.

(S) MINOR UNDERCUTTING ON EAST SIDE OF DROP BOX.

(T) 20 FT LONG MAJOR UNDERCUTTING ALONG PAVED DITCH.

(U) PONDING IMMEDIATELY BEYOND PIPE HEADWALL.

SIGNS AND ROAD FEATURES

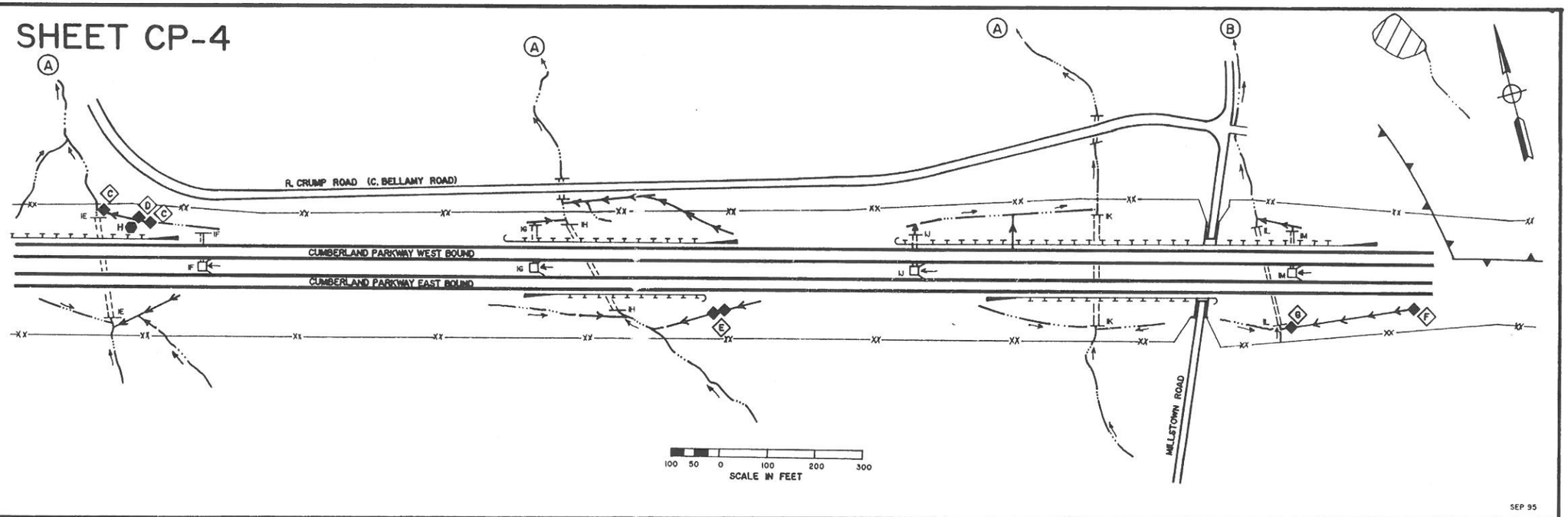
(GREEN OVER-LANE SIGNS)

EXIT 1B
I-65 SOUTH
BOWLING GREEN
LEFT LANE

(V)

EXIT 1A
I-65 NORTH
LOUISVILLE
RIGHT LANE

SHEET CP-4



SEP 95

- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
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- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO.

- *NEXT SURFACE WATER INTERCEPT FOR SINK B, INTERMITTENT STREAM AT R. CRUMP ROAD; SINK A, GARDNER CREEK AT 1339 BRIDGE.*
- *FINAL SURFACE WATER INTERCEPT, GARDNER CREEK AT 1339 BRIDGE.*
- *NEXT GROUNDWATER INTERCEPT, MILL HOLE, PERRY SEBAUGH, 3221 CHAUMONT ROAD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 4-42 HRS.*

(A) INTERMITTENT STREAM FLOWING NORTHWARD TO GARDNER CREEK.

(B) INTERMITTENT STREAM FLOWING NORTHWARD TO GARDNER CREEK.

POTENTIAL HAZARDS

(C) HOLE AT HEAD OF PAVED DITCH INTERCEPTS FLOW FROM INTERMITTENT STREAM. DRAINAGE PROBABLY BYPASSES PAVED DITCH AND EMERGES FROM HOLE AT BASE OF DITCH.

(D) 1 IN COMPLETE CRACK, 1 FT DEEP IN PAVED DITCH.

(E) PERIODIC UNDERCUTTING (MODERATE) ALONG 50 FT SEGMENT OF PAVED DITCH.

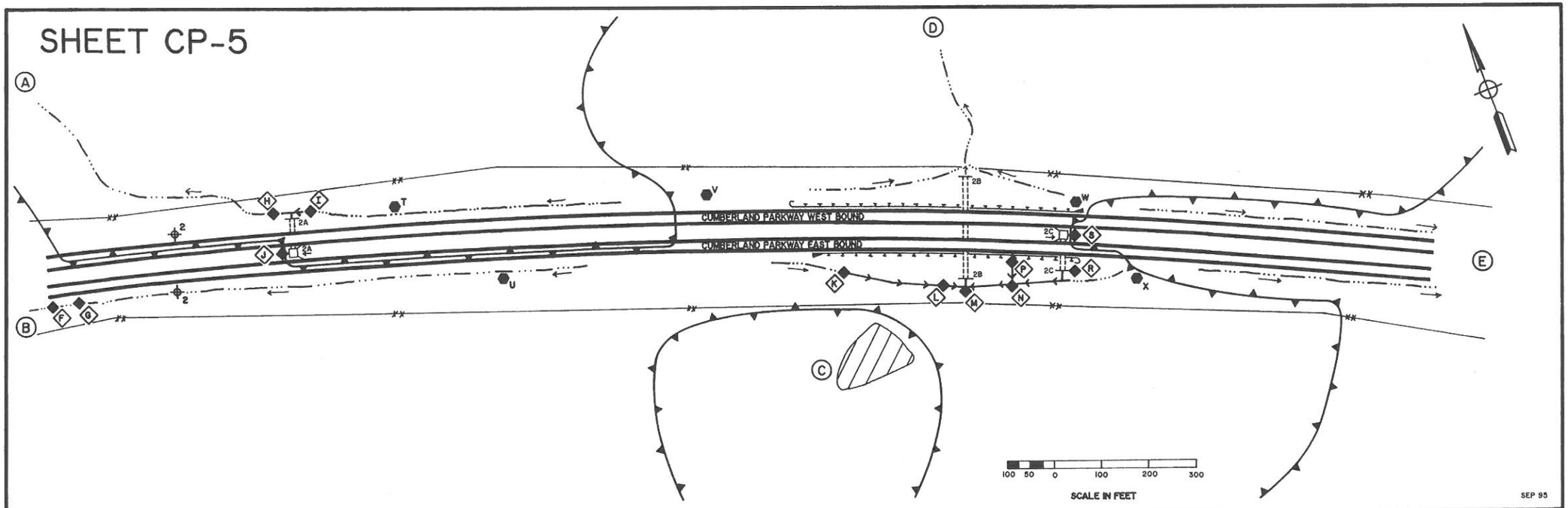
(F) SEVERE UNDERCUT AT HEAD OF PAVED DITCH THAT INTERCEPTS ALL DRAINAGE. FLOW EMERGES FROM UNDER BASE OF PAVED DITCH AT POINT G.

(G) ALL DRAINAGE FROM HEAD OF PAVED DITCH EMERGES FROM A SEVERELY UNDERCUT 2 IN DISPLACED CRACK.

SIGNS AND ROAD FEATURES

(H) (BROWN)
EXIT 1A
MAMMOTH CAVE
NATIONAL PARK
NEXT RIGHT

SHEET CP-5



- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- 32 SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
- TYPE II SINKHOLE
- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO.

- ***NEXT SURFACE WATER INTERCEPT, GARDNER CREEK AT MILLSTOWN ROAD BRIDGE.***
- ***FINAL SURFACE WATER INTERCEPT, GARDNER CREEK AT 1339 BRIDGE.***
- ***NEXT GROUNDWATER INTERCEPT, MILL HOLE, PERRY SEBAUGH, 3221 CHAUMONT ROAD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 4-42 HRS.***

(A) PERENNIAL POND NEAR PKWY R.O.W.

(B) DRAINAGE IS DIRECTED TO DRAIN 1L ON SHEET CP-4. ULTIMATELY FLOWS TO GARDNER CREEK.

(C) POND IMMEDIATELY BEYOND PKWY R.O.W. FENCE. DOES NOT RECEIVE DRAINAGE FROM PKWY.

(D) INTERMITTENT STREAM FLOWS TO GARDNER CREEK.

(E) DRAINAGE IS DIRECTED TO AN INTERMITTENT STREAM ON SHEET CP-6. ULTIMATELY FLOWS TO LITTLE SINKING CREEK.

POTENTIAL HAZARDS

(F) SOIL COLLAPSE 2 FT WIDE, 10 FT LONG, 1 FT DEEP ALONG DRAINAGE DITCH.

(G) SOIL COLLAPSE 2 FT WIDE, 6 FT LONG, 1 FT DEEP ALONG DRAINAGE DITCH.

(H) SOIL COLLAPSE AT BOTTOM OF PAVED DITCH, 3 FT WIDE, 6 FT LONG, 2 FT DEEP.

(I) SOIL COLLAPSE AT BOTTOM OF PAVED DITCH, 3 FT WIDE, 4 FT LONG, 3 FT DEEP.

(J) MINOR UNDERCUTTING ON 3 SIDES OF DROP BOX 2A.

(K) SOIL COLLAPSE AT HEAD OF PAVED DITCH 1 FT WIDE, 2 FT LONG, 1 FT DEEP.

(L) 1/2 COMPLETE CRACK IN PAVED DITCH.

(M) 2, 1/2 IN COMPLETE DISPLACED CRACKS 10 FT APART WITH MINOR UNDERCUTTING IN PAVED DITCH BELOW DRAIN 2B.

(N) 2, 1/2 IN COMPLETE DISPLACED CRACKS AT JUNCTION OF 2 PAVED DITCHES.

(P) 1/2 COMPLETE DISPLACED CRACK IN PAVED DITCH.

(R) MINOR UNDERCUTTING ABOVE PIPE HEADWALL 2C.

(S) MINOR UNDERCUTTING ON ALL SIDES OF DROP BOX.

SIGNS AND ROAD FEATURES

(T) (GREEN)
I-65
LOUISVILLE
BOWING GREEN
2 MILES

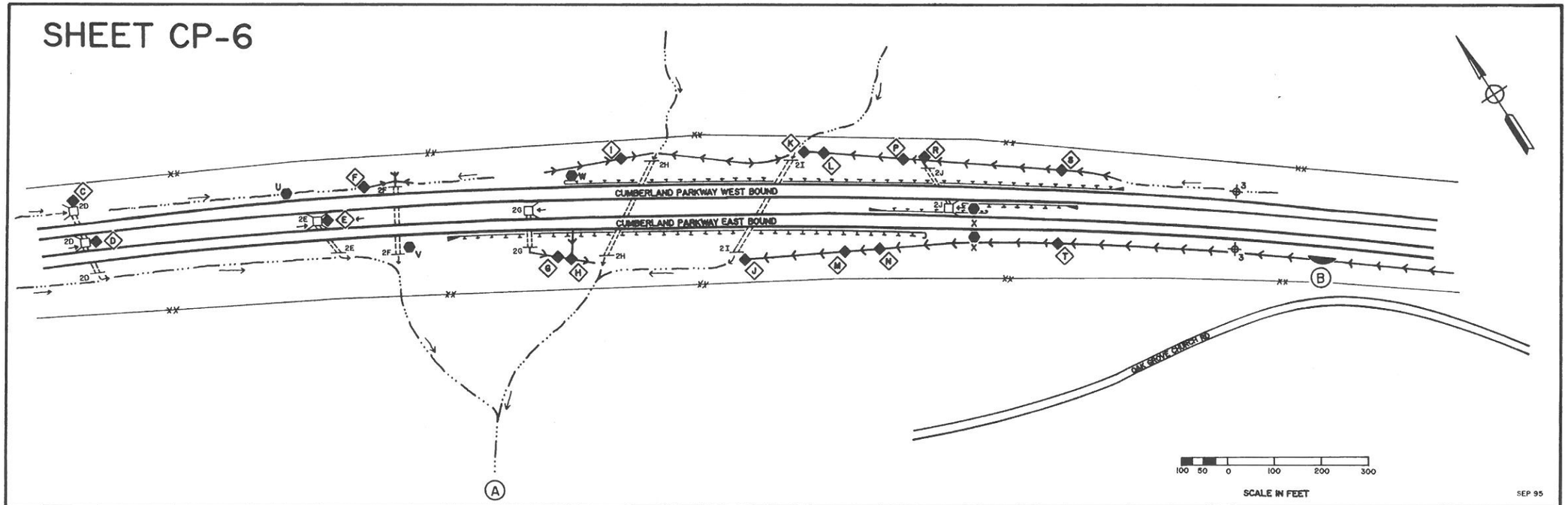
(U) (GREEN)
PAY TOLL
1 MILE
CARS 30 (CENTS)

(V) (WHITE)
KEEP
RIGHT
EXCEPT
TO PASS

(W) (GREEN)
BOWLING GREEN 25
LOUISVILLE 99

(X) (GREEN)
30 (CENTS) THRU CARS 30 (CENTS)
WITH EXACT CHANGE
KEEP LEFT

SHEET CP-6



- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
- TYPE II SINKHOLE
- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO.

- *NEXT SURFACE WATER INTERCEPT, INTERMITTENT STREAM AT OAK GROVE CHURCH ROAD.*
- *FINAL SURFACE WATER INTERCEPT, LITTLE SINKING CREEK, EARL LLOYD ESTES, 2783 HAYS LODGE ROAD.*
- *NEXT GROUNDWATER INTERCEPT, MILL HOLE, PERRY SEBAUGH, 3221 CHAUMONT ROAD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 4-42 HRS.*

(A) INTERMITTENT STREAM, ULTIMATELY FLOWS TO LITTLE SINKING CREEK.

(B) SWALE ALONG PAVED DITCH. CATTAILS INDICATE PONDED WATER. GENERAL DIRECTION OF FLOW IS WEST.

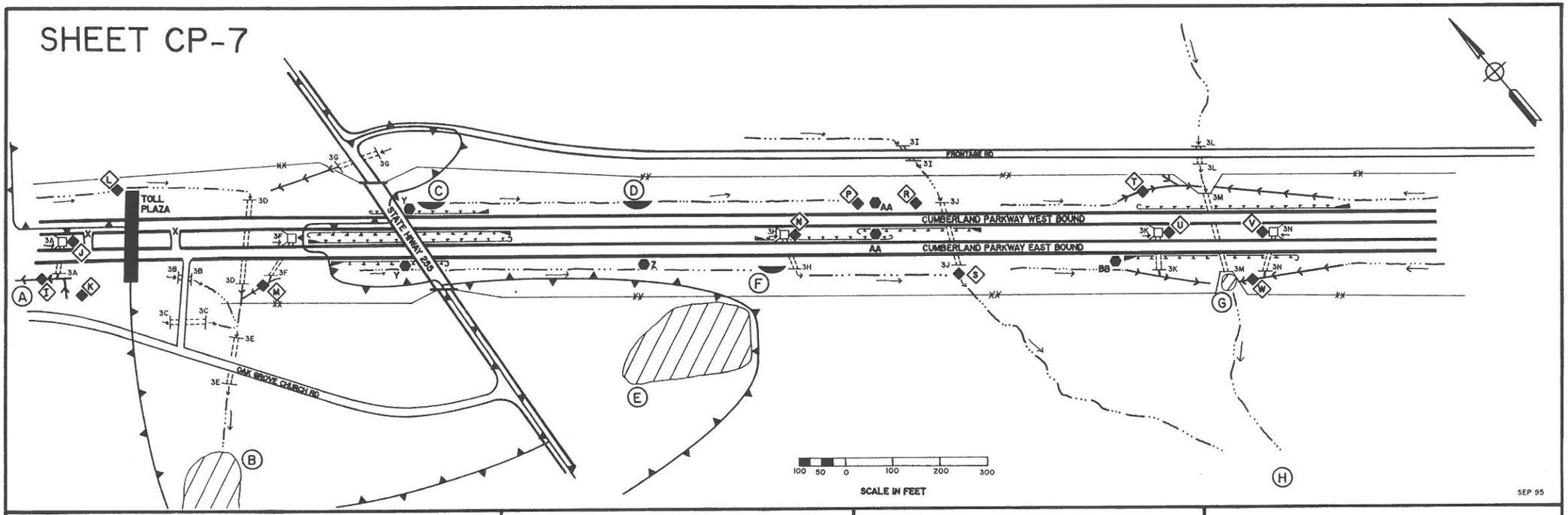
POTENTIAL HAZARDS

- (C) MINOR UNDERCUTTING ON 2 SIDES OF DROP BOX.
- (D) MINOR UNDERCUTTING ON 2 SIDES OF DROP BOX.
- (E) MINOR UNDERCUTTING ON 3 SIDES OF DROP BOX.
- (F) SMALL SOIL COLLAPSE AT HEAD OF PAVED DITCH.
- (G) 1/2 IN COMPLETE CRACK IN PAVED DITCH.
- (H) 3, 1 IN COMPLETE DISPLACED CRACKS AT JUNCTION OF 2 PAVED DITCHES.
- (I) MAJOR UNDERCUT HOLE 2 FT ACROSS ALONG PAVED DITCH.
- (J) LAST 30 FT OF PAVED DITCH IS BROKEN ALONG 2 DISPLACED CRACKS DUE TO MAJOR UNDERCUTTING. MAJOR UNDERCUTTING CONTINUES UP DITCH TO "P".
- (K) MAJOR UNDERCUTTING AT FOOT OF PAVED DITCH.
- (L) MINOR UNDERCUTTING ALONG PAVED DITCH CONTINUING UP TO DRAIN 2J.
- (M) 1 IN COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (N) MAJOR UNDERCUTTING ALONG PAVED DITCH.
- (P) 1/2 IN COMPLETE DISPLACED CRACK AND 3 IN HOLE IN PAVED DITCH.
- (R) 3 IN HOLE AT JUNCTION OF 2 PAVED DITCHES.
- (S) 1 IN COMPLETE DISPLACED CRACK ALONG PAVED DITCH.
- (T) 12, 1/2 IN COMPLETE CRACKS IN PAVED DITCH.

SIGNS AND ROAD FEATURES

- (U) (WHITE) SPEED LIMIT 65
- (V) (GREEN) TRUCKS-BUSSES CARS WITH TRAILERS KEEP RIGHT
- (W) WEST CUMBERLAND PARKWAY
- (X) (YELLOW) STOP AHEAD PAY TOLL

SHEET CP-7



- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
- TYPE II SINKHOLE
- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO.

- ***NEXT SURFACE WATER INTERCEPT FOR SINKS A-B, INTERMITTENT STREAM OAK GROVE CHURCH ROAD; SINKS C-H, INTERMITTENT STREAM AT KY 255 BRIDGE.***
- ***FINAL SURFACE WATER INTERCEPT, LITTLE SINKING CREEK, EARL LLOYD ESTES, 2783 HAYS LODGE ROAD.***
- ***NEXT GROUNDWATER INTERCEPT, MILL HOLE, PERRY SEBAUGH, 3221 CHAUMONT ROAD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 4-42 HRS.***

(A) DRAINAGE CONTINUES DOWN PAVED DITCH TO INTERMITTENT STREAM AND ULTIMATELY FLOWS TO LITTLE SINKING CREEK.

(B) PERENNIAL POND IN OPEN FIELD BEYOND OAK GROVE CHURCH ROAD. POND RECEIVES DRAINAGE FROM BOTH SIDES OF PKWY AND MEDIAN VIA DRAINS 3B-3G.

(C) (D) SWALE IN DITCH OF WEST BOUND LANE. CATTAILS PRESENT INDICATING PONDED WATER. GENERAL DIRECTION OF FLOW IS EAST TOWARDS DRAIN 3J.

(E) PERENNIAL POND DIRECTLY ADJACENT TO PKWY R.O.W. POND RECEIVES NO DRAINAGE FROM PKWY.

(F) SWALE ADJACENT TO DRAIN 3H OUTLET. CATTAILS PRESENT INDICATING PONDED WATER. GENERAL DIRECTION OF FLOW IS EAST TOWARD INTERMITTENT STREAM.

(G) SMALL PERENNIAL POND DIRECTLY BEYOND DRAIN 3M. GENERAL DIRECTION OF FLOW IS SOUTH TO INTERMITTENT STREAM.

(H) INTERMITTENT STREAM, ULTIMATELY FLOWS TO LITTLE SINKING CREEK.

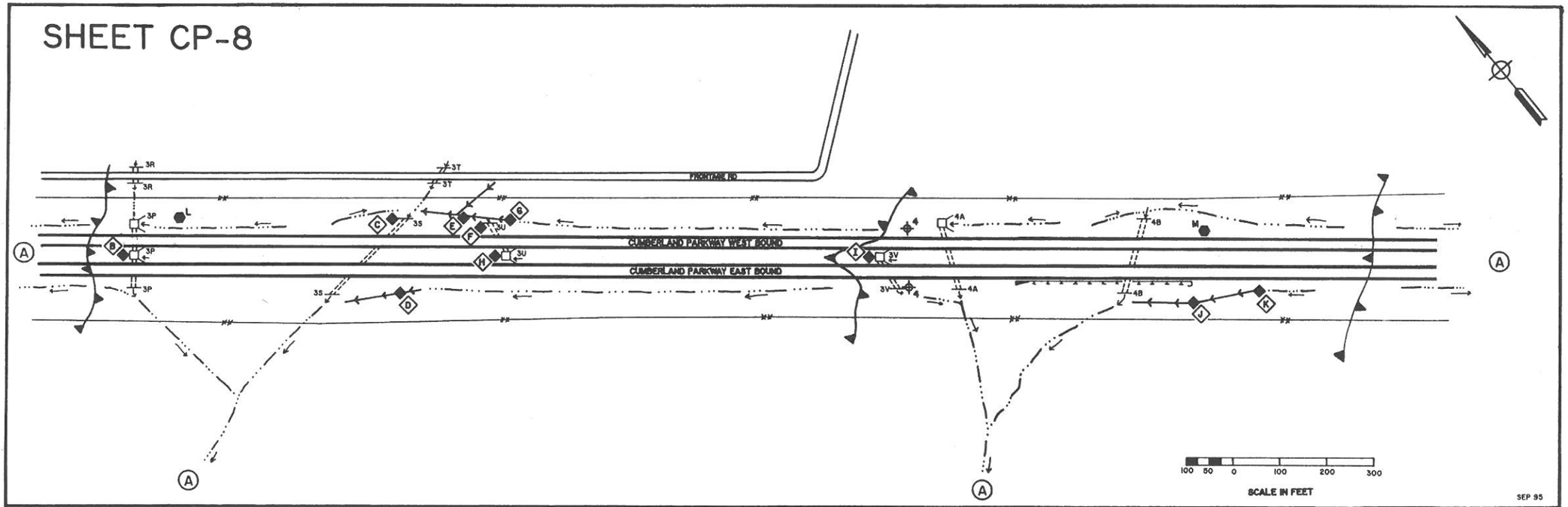
POTENTIAL HAZARDS

- (I) 1/2 IN COMPLETE CRACK IN PAVED DITCH.
- (J) MAJOR UNDERCUTTING ON EAST SIDE OF DROP BOX.
- (K) FENCED IN SEWAGE TREATMENT SYSTEM FOR TOLL PLAZA.
- (L) SOIL COLLAPSE 1 FT WIDE, 6 IN DEEP.
- (M) 1/2 IN COMPLETE CRACK IN PAVED DITCH.
- (N) MAJOR UNDERCUTTING ON ALL SIDES OF DROP BOX WITH BROKEN CORNER.
- (P) SOIL COLLAPSE 4 FT WIDE, 3 FT DEEP.
- (R) SOIL COLLAPSE 6 FT LONG, 3 FT WIDE, 3 FT DEEP.
- (S) MAJOR UNDERCUTTING BEYOND PIPE HEADWALL OUTLET.
- (T) 1/2 IN COMPLETE CRACK IN PAVED DITCH.
- (U) MINOR UNDERCUTTING ON 2 SIDES OF DROP BOX.
- (V) MINOR UNDERCUTTING ON 3 SIDES OF DROP BOX.
- (W) 1 IN COMPLETE DISPLACED CRACK IN PAVED DITCH.

SIGNS AND ROAD FEATURES

- (X) MEDIAN CROSS-OVER
- (Y) (GREEN) KY 255
- (Z) EAST CUMBERLAND PARKWAY
- (AA) (YELLOW) STOP AHEAD PAY TOLL
- (BB) (WHITE) SPEED LIMIT 65

SHEET CP-8



- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
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- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO.

- ***NEXT SURFACE WATER INTERCEPT, INTERMITTENT STREAM AT KY 255.***
- ***FINAL SURFACE WATER INTERCEPT, LITTLE SINKING CREEK, EARL LLOYD ESTES, 2783 HAYS LODGE ROAD.***
- ***NEXT GROUNDWATER INTERCEPT, MILL HOLE, PERRY SEBAUGH, 3221 CHAUMONT ROAD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 4-42 HRS.***

(A) ALL DRAINAGE ULTIMATELY FLOWS TO LITTLE SINKING CREEK.

POTENTIAL HAZARDS

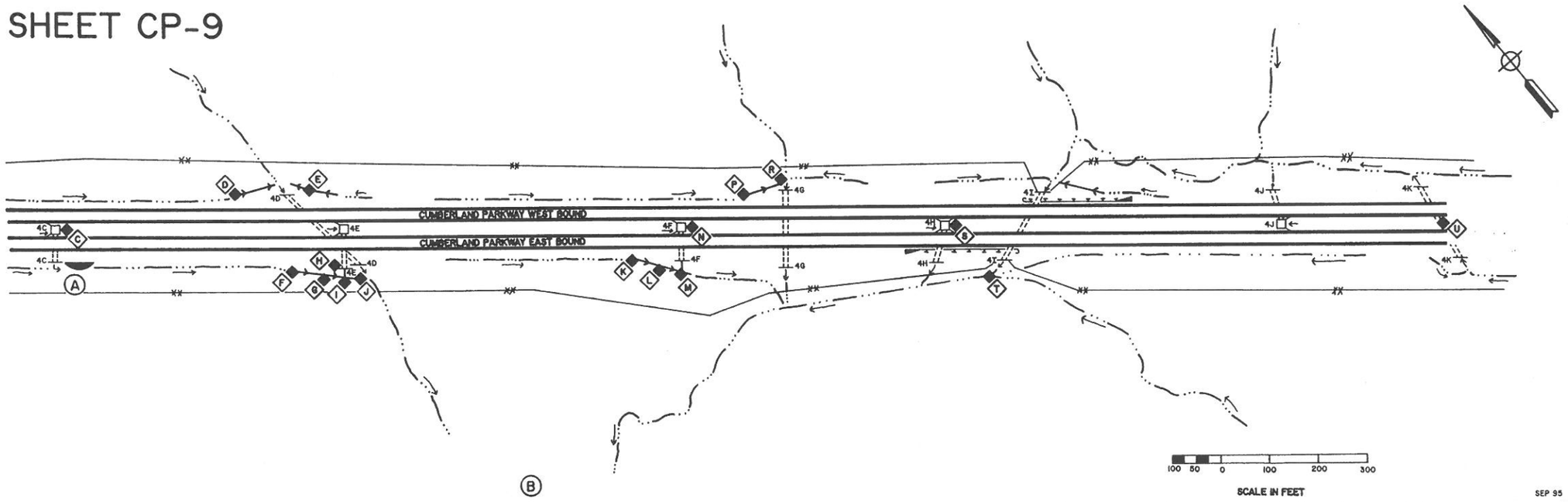
- (B) MINOR UNDERCUTTING ON EAST SIDE OF DROP BOX.
- (C) MAJOR UNDERCUT HOLE ABOVE PIPE HEADWALL INLET.
- (D) 1/2 IN COMPLETE CRACK IN PAVED DITCH.
- (E) 1/2 IN COMPLETE CRACK JUST ABOVE INTERSECTION OF 2 PAVED DITCHES.
- (F) MINOR UNDERCUTTING AROUND PIPE HEADWALL OUTLET.
- (G) SOIL COLLAPSE 6 FT LONG, 2 FT WIDE, AND 1 FT DEEP AT HEAD OF PAVED DITCH.
- (H) MAJOR UNDERCUTTING ON EAST SIDE OF DROP BOX.
- (I) MINOR UNDERCUTTING ON 3 SIDES OF DROP BOX.
- (J) 5 MAJOR UNDERCUT HOLES IN PAVED DITCH.
- (K) MAJOR UNDERCUTTING AT HEAD OF PAVED DITCH.

SIGNS AND ROAD FEATURES

(L) (GREEN)
TRUCKS-BUSSES
CARS WITH TRAILERS
KEEP RIGHT

(M) (GREEN)
PAY TOLL
1 MILE
CARS 30 CENTS

SHEET CP-9



SEP 95

- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
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- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO.

- ***NEXT SURFACE WATER INTERCEPT, INTERMITTENT STREAM AT KY 255.***
- ***FINAL SURFACE WATER INTERCEPT, LITTLE SINKING CREEK, EARL LLOYD ESTES, 2783 HAYS LODGE ROAD.***
- ***NEXT GROUNDWATER INTERCEPT, MILL HOLE, PERRY SEBAUGH, 3221 CHAUMONT ROAD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 4-42 HRS.***

(A) SWALE DIRECTLY ADJACENT TO OUTLET DRAIN 4C. GROWTH OF CATTAILS INDICATE WATERS PONDS. GENERAL DIRECTION OF FLOW IS TO THE EAST.

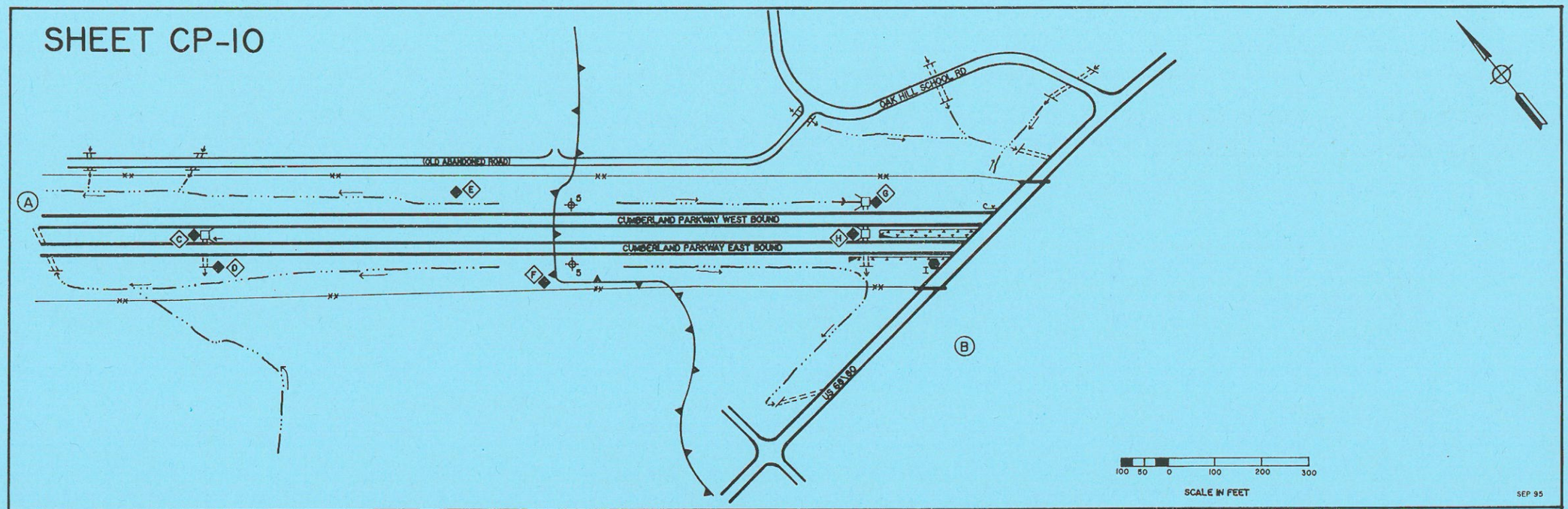
(B) ALL DRAINAGE ULTIMATELY FLOWS TO LITTLE SINKING CREEK.

POTENTIAL HAZARDS

- (C) MAJOR UNDERCUTTING OF EAST SIDE OF DROP BOX 4C.
- (D) SOIL COLLAPSE 10 FT LONG, 3 FT WIDE, AND 2 FT DEEP CAUSING A MAJOR UNDERCUT AT HEAD OF PAVED DITCH.
- (E) 1/2 IN COMPLETE CRACK IN PAVED DITCH.
- (F) MINOR UNDERCUTTING AT HEAD OF PAVED DITCH.
- (G) 4, 1 IN WIDE HOLES ALONG CRACK IN PAVED DITCH.
- (H) MINOR UNDERCUTTING ABOVE PIPE HEADWALL 4E.
- (I) 1 IN COMPLETE CRACK AT JUNCTION OF PAVED DITCHES.
- (J) MINOR UNDERCUTTING AT FOOT OF PAVED DITCH.
- (K) MINOR UNDERCUTTING AT HEAD OF PAVED DITCH.
- (L) 1/2 IN COMPLETE DISPLACED CRACK IN PAVED DITCH.
- (M) 1 IN COMPLETE CRACK IN PAVED DITCH FROM PIPE HEADWALL 4F.
- (N) MAJOR UNDERCUTTING ON EAST AND WEST SIDES OF DROP BOX 4F.
- (P) SOIL COLLAPSE 24 FT LONG, 3 FT WIDE, AND 2 FT DEEP CAUSING MAJOR UNDERCUTTING AT HEAD OF PAVED DITCH.
- (R) MAJOR UNDERCUTTING AT FOOT OF PAVED DITCH.
- (S) EAST SIDE OF DROP BOX 4H BROKEN ALONG 3 IN COMPLETE CRACK WITH MAJOR UNDERCUTTING ALONG EAST AND WEST SIDES.
- (T) PONDING ALONG INTERMITTENT STREAM JUST BEYOND PIPE HEADWALL 4I.
- (U) SOIL COLLAPSE 3 FT WIDE, 2 FT DEEP IN MEDIAN.

SIGNS AND ROAD FEATURES

SHEET CP-10



- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- RAILROAD
- ACCESS CONTROL FENCE
- SIGN
- MILE MARKER
- GUARDRAIL
- ROCK OUTCROP
- PAVED DITCH
- AGGREGATE LINED CHANNEL
- PIPE HEADWALL
- BOX CULVERT HEADWALL
- DROP BOX INLET
- DOUBLE DROP BOX INLET
- SLOPED BOX INLET
- SLOPED & FLARED BOX INLET
- SIDE TAPERED INLET
- SLOPED BOX OUTLET
- SLOPED & FLARED BOX OUTLET
- DRAINAGE BASIN BOUNDARY
- INFERRED DRAINAGE BASIN BOUNDARY
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
- TYPE II SINKHOLE
- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE
- INTERMITTENT STREAM
- PERENNIAL STREAM
- EPHEMERAL POND
- PERENNIAL POND

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO.

- *NEXT SURFACE WATER INTERCEPT FOR SINK A, INTERMITTENT STREAM AT KY 255 BRIDGE.*
- *FINAL SURFACE WATER INTERCEPT FOR SINK A, LITTLE SINKING CREEK, EARL LLOYD ESTES, 2783 HAYS LODGE ROAD. SINK B FLOWS INTO LITTLE BEAVER CREEK AND IS NOT WITHIN PARK'S GROUNDWATER BASIN.*
- *NEXT GROUNDWATER INTERCEPT FOR SINK A, MILL HOLE, PERRY SEBAUGH, 3221 CHAUMONT ROAD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 4-42 HRS.*

(A) SURFACE DRAINAGE ULTIMATELY SINKS INTO A TYPE I SINK AT LITTLE SINKING CREEK.

(B) SURFACE DRAINAGE ULTIMATELY REACHES LITTLE BEAVER CREEK AND IS NOT WITHIN THE PARK'S GROUNDWATER BASIN.

POTENTIAL HAZARDS

(C) MAJOR UNDERCUTTING OF EAST SIDE OF DROP BOX 4L. ONE CORNER ON WEST SIDE IS BROKEN.

(D) MAJOR UNDERCUTTING ABOVE AND BELOW PIPE HEADWALL 4L

(E) SOIL COLLAPSE 4 FT WIDE AND 1 FT DEEP.

(F) 2 SOIL COLLAPSES, 4 FT WIDE AND 1 FT DEEP, ONE HAS 3 IN DRAIN.

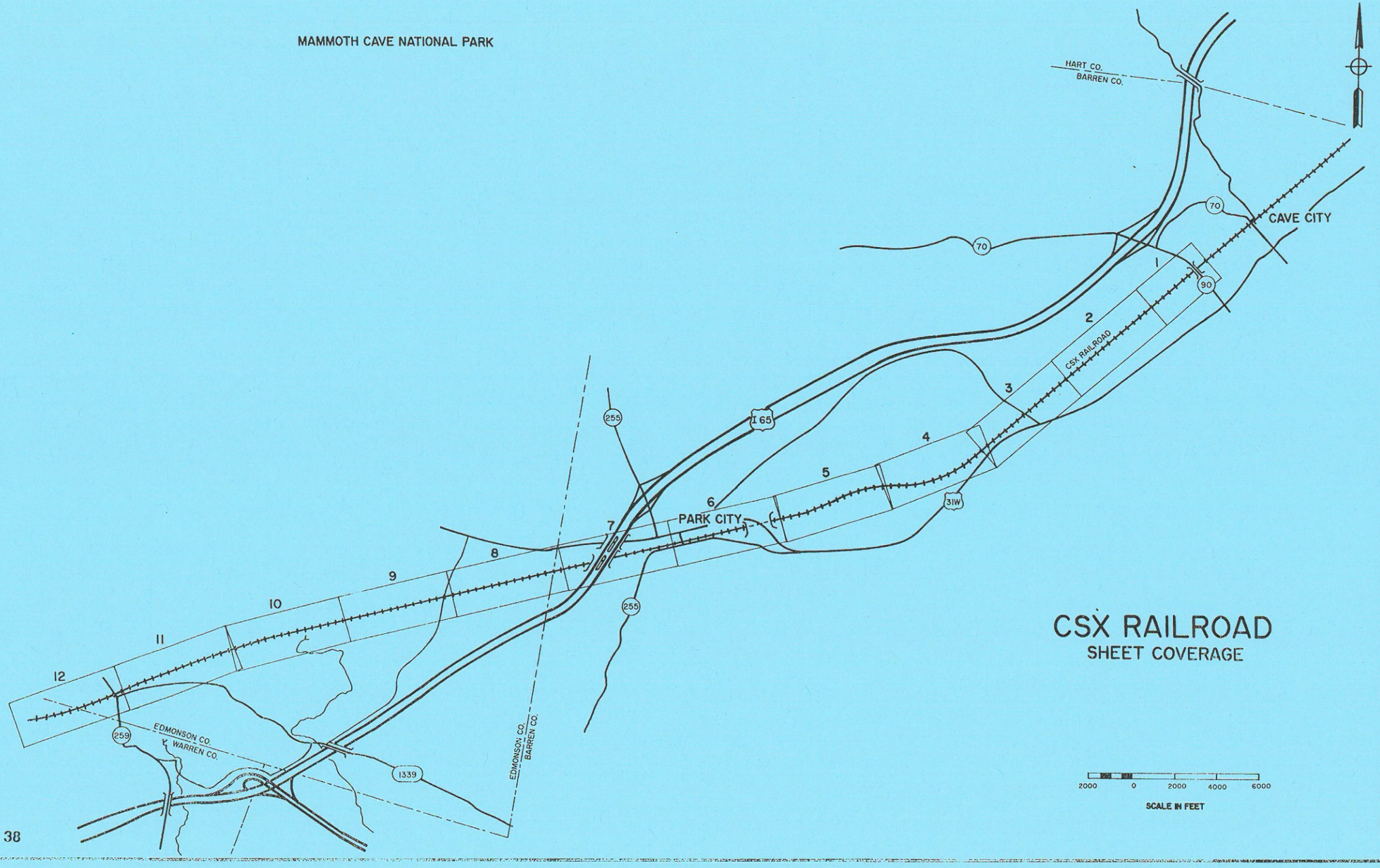
(G) MINOR UNDERCUTTING AROUND DROP BOX 5A AND 1/2 IN COMPLETE DISPLACED CRACK WHERE PAVED DITCH MEETS DROP BOX.

(H) MAJOR UNDERCUT HOLE 1 FT WIDE AND 1 FT DEEP.

SIGNS AND ROAD FEATURES

(I) (GREEN) US 68

MAMMOTH CAVE NATIONAL PARK

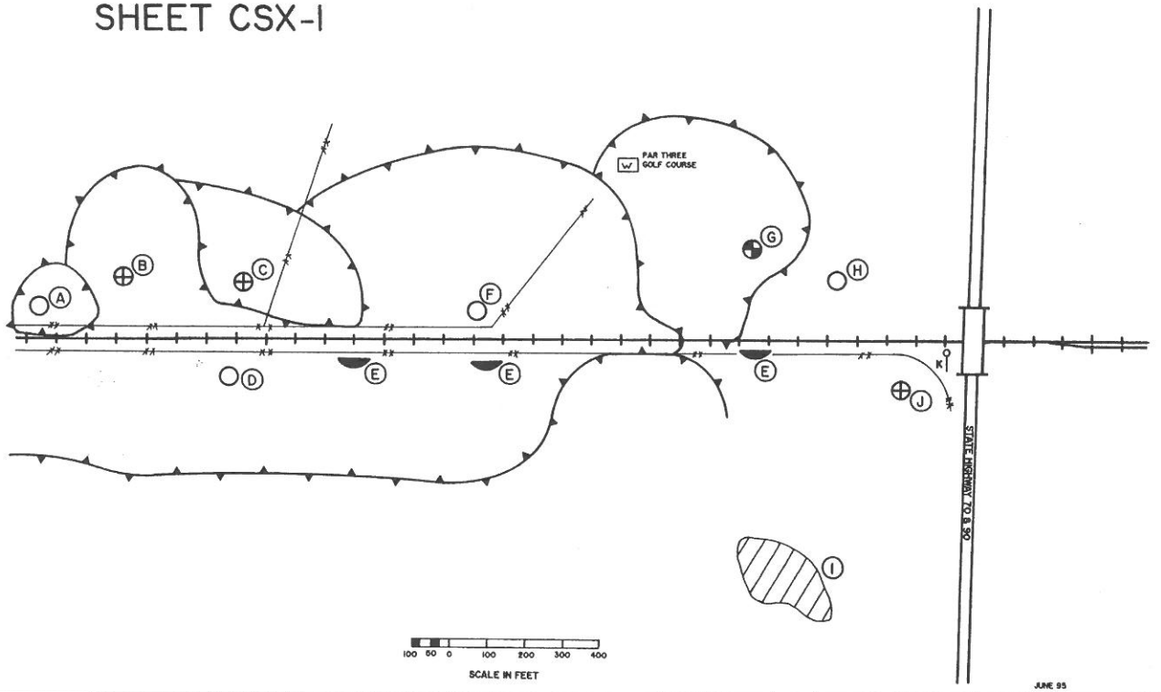


CSX RAILROAD
SHEET COVERAGE

2000 0 2000 4000 6000

SCALE IN FEET

SHEET CSX-I



RAILROAD
INTERSTATE 65
U.S. ROUTE
STATE ROUTE
LOCAL ROUTE
PRIVATE ROAD
FENCE
SIGN
MILE MARKER
RAILROAD TRAFFIC LIGHT
CONTROL/SWITCH BOX
CULVERT
BARN
HOUSE
BUSINESS
RETENTION WALL

ROCK OUTCROP
DRAINAGE BASIN BOUNDARY
INTERMITTENT STREAM
PERENIAL STREAM
EPHEMERAL POND
PERENIAL POND
CLASS V INJECTION WELL
TYPE I SINKHOLE
TYPE II SINKHOLE
TYPE III SINKHOLE
TYPE IV SINKHOLE
TYPE V SINKHOLE
POTENTIAL HAZARD
SWALE

RECHARGE FEATURES

BASE MAP: HORSE CAVE 7.5' TOPO. NEXT GROUNDWATER INTERCEPT; HIDDEN RIVER CAVE, AMERICAN CAVE AND KARST MUSEUM, HORSE CAVE. GROUNDWATER TRAVEL TIMES TO HIDDEN RIVER CAVE: 8-48 HRS.

(A) SMALL TYPE V SINK DIRECTLY ADJACENT TO CSX R.O.W. FENCE. SINK RECEIVES RUNOFF FROM CSX AND SURROUNDING AREA.

(B) TYPE IV SINK IN OPEN FIELD DIRECTLY ADJACENT TO CSX R.O.W. FENCE. SHORT TERM PONDING IS OBSERVED.

(C) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. FENCE AND DRIVING RANGE BOUNDARY FENCE. RUNOFF FROM CSX DOES NOT REACH SINK DUE TO SMALL RISE, ALTHOUGH DERAILED TRAIN WOULD REACH IT EASILY. EVIDENCE OF TEMPORARY PONDING IS VISIBLE.

(C) TYPE V SINK IN OPEN FIELD DIRECTLY ADJACENT TO CSX R.O.W. FENCE.

(D) SWALE ON EITHER SIDE OF CSX ROADBED.

(E) TYPE V SINK ADJACENT TO CSX R.O.W. FENCE AND DRIVING RANGE BOUNDARY FENCE. EVIDENCE OF TEMPORARY PONDING IS VISIBLE.

(F) TYPE II SINK ON GOLF COURSE ADJACENT TO CSX R.O.W. SINK HAS 3 SOIL COLLAPSES, EVIDENCE OF SHORT TERM PONDING IS VISIBLE.

(G) TYPE V SINK ON GOLF COURSE ADJACENT TO CSX R.O.W.

(I) PERENNIAL POND IN OPEN FIELD 500 FT EAST OF CSX R.O.W. DRAINAGE FROM CSX TO POND IS SLIGHT AND DIFFUSE.

(J) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. AND STATE HIGHWAY 90 R.O.W.

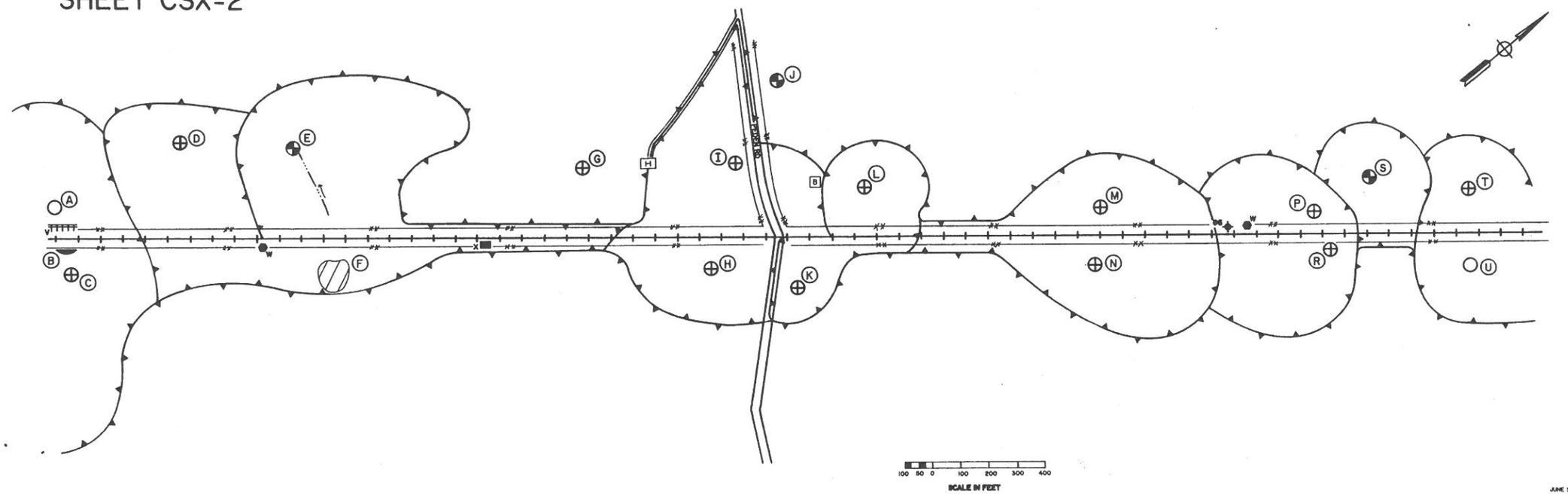
POTENTIAL HAZARDS

NO POTENTIAL HAZARDS

SIGNS AND RAILROAD FEATURES

(K) RAILROAD TRAFFIC LIGHT (NO LIGHT NUMBER)

SHEET CSX-2



JUNE 95

- RAILROAD
- INTERSTATE 65
- U.S. ROUTE
- STATE ROUTE
- LOCAL ROUTE
- PRIVATE ROAD
- FENCE
- SIGN
- MILE MARKER
- RAILROAD TRAFFIC LIGHT
- CONTROL/SWITCH BOX
- CULVERT
- BARN
- HOUSE
- BUSINESS
- RETENTION WALL
- ROCK OUTCROP
- DRAINAGE BASIN BOUNDARY
- INTERMITTENT STREAM
- PERENIAL STREAM
- EPHEMERAL POND
- PERENIAL POND
- CLASS V INJECTION WELL
- TYPE I SINKHOLE
- TYPE II SINKHOLE
- TYPE III SINKHOLE
- TYPE IV SINKHOLE
- TYPE V SINKHOLE
- POTENTIAL HAZARD
- SWALE

RECHARGE FEATURES

BASE MAP: HORSE CAVE AND GLASGOW NORTH 7.5' TOPOS. NEXT GROUNDWATER INTERCEPT FOR SINKS A-I, RIGHT FORK OF HAWKINS RIVER, MAMMOTH CAVE NATIONAL PARK. GROUNDWATER TRAVEL TIMES TO RIGHT FORK OF HAWKINS RIVER: 4-150 HRS. NEXT GROUNDWATER INTERCEPT FOR SINKS J-U, LEFT FORK OF HAWKINS RIVER, MAMMOTH CAVE NATIONAL PARK. GROUNDWATER TRAVEL TIMES TO LEFT FORK OF HAWKINS RIVER: 4-48 HRS.

(A) TYPE V SINK DIRECTLY ADJACENT TO CSX R.O.W. EVIDENCE OF PONDING IS VISIBLE.

(B) SWALE IN WOODED AREA DIRECTLY ADJACENT TO CSX R.O.W.

(C) TYPE IV SINK IN WOODED AREA ADJACENT TO CSX R.O.W. SEVERAL COLLAPSES APPEAR IN SINK ALLOWING WATER TO SINK RAPIDLY.

(D) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. EVIDENCE OF TEMPORARY PONDING IS VISIBLE.

(E) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS TRASH FILLED.

(F) PERENNIAL POND I N OPEN FIELD DIRECTLY ADJACENT TO CSX R.O.W.

(G) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W.

(H) TYPE IV SINK IN OPEN FIELD DIRECTLY ADJACENT TO CSX R.O.W. SINK IS FILLED WITH TRASH.

(I) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W.

(J) TYPE II SINK IN OPEN FIELD 150 FT FROM CSX R.O.W. SINK IS FILLED WITH TRASH AND HAS 2 SOIL COLLAPSES. DRAINAGE FROM CSX DOES NOT REACH SINK, BUT MAPPED DUE TO ITS PROXIMITY.

(K) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. AND PEDEN ROAD. SINK IS ROCK FILLED.

(L) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. EVIDENCE OF TEMPORARY PONDING IS VISIBLE.

(M) TYPE IV SINK ADJACENT TO SMALL WOODED AREA AND CSX R.O.W. EVIDENCE OF TEMPORARY PONDING VISIBLE.

(N) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. EVIDENCE OF PONDING VISIBLE.

(P) TYPE IV SINK IN OPEN FIELD DIRECTLY ADJACENT TO CSX R.O.W.

(R) TYPE IV SINK IN OPEN FIELD DIRECTLY ADJACENT TO CSX R.O.W.

(S) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS TRASH FILLED.

(T) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W.

(U) TYPE V SINK IN OPEN FIELD DIRECTLY ADJACENT TO CSX R.O.W.

POTENTIAL HAZARDS

NO POTENTIAL HAZARDS

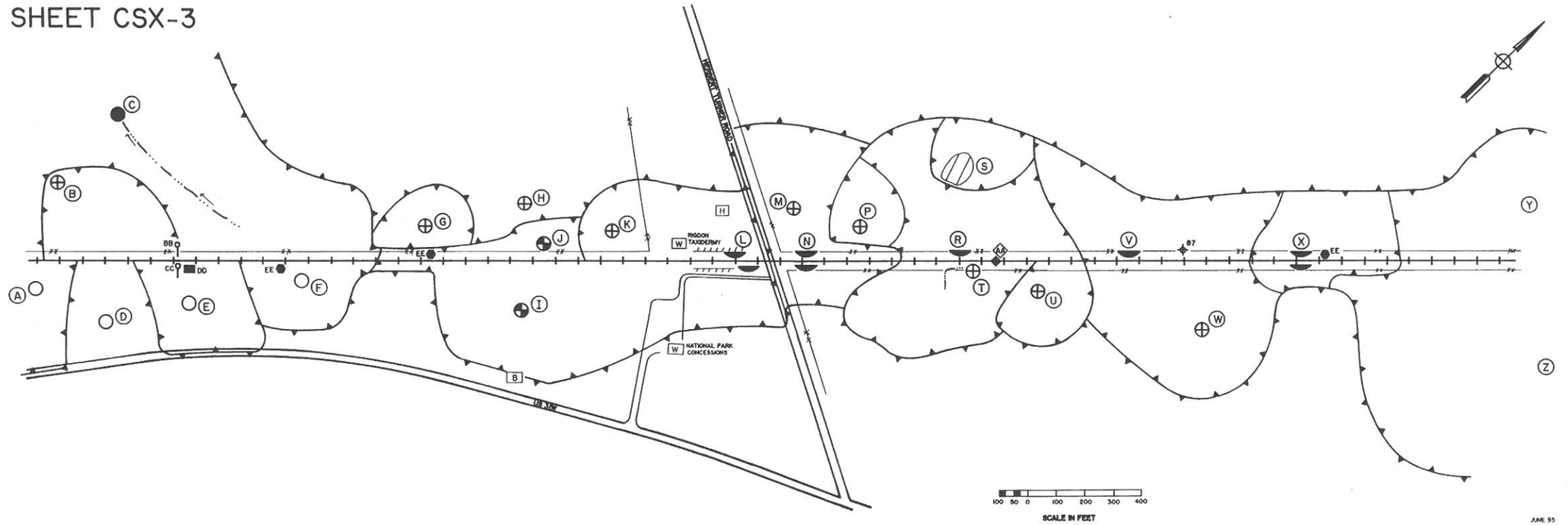
SIGNS AND RAILROAD FEATURES

(V) WOODEN RETENTION WALL

(W) (WHITE) W (WHISTLE SIGN)

(X) SILVER BOX 4'WIDE X 2.5'DEEP X 6'TALL

SHEET CSX-3



RAILROAD
INTERSTATE 65
U.S. ROUTE
STATE ROUTE
LOCAL ROUTE
PRIVATE ROAD
FENCE
SIGN
MILE MARKER
RAILROAD TRAFFIC LIGHT
CONTROL/SWITCH BOX
CULVERT
BARN
HOUSE
BUSINESS
RETENTION WALL

ROCK OUTCROP
DRAINAGE BASIN BOUNDARY
INTERMITTENT STREAM
PERENIAL STREAM
EPHEMERAL POND
PERENIAL POND
CLASS V INJECTION WELL
TYPE I SINKHOLE
TYPE II SINKHOLE
TYPE III SINKHOLE
TYPE IV SINKHOLE
TYPE V SINKHOLE
POTENTIAL HAZARD
SWALE

RECHARGE FEATURES

BASE MAP: GLASGOW NORTH 7.5' TOPO. NEXT GROUNDWATER INTERCEPT, RIGHT FORK OF HAWKINS RIVER, MAMMOTH CAVE NATIONAL PARK. GROUNDWATER TRAVEL TIMES TO RIGHT FORK OF HAWKINS RIVER: 4-150 HRS.

(A) TYPE V SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. EVIDENCE OF PONDING VISIBLE.

(B) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W.

(C) TYPE I SINK IN BRIAR THICKET IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK RECEIVES LARGE AMOUNT OF RUNOFF WITHOUT APPARENT PONDING.

(D) TYPE V SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. EVIDENCE OF PONDING VISIBLE.

(E) TYPE V SINK DIRECTLY ADJACENT TO CSX R.O.W. EVIDENCE OF PONDING IS VISIBLE IN THIS SHALLOW SINK.

(F) TYPE V SINK IN OPEN FIELD DIRECTLY ADJACENT TO CSX R.O.W. EVIDENCE OF PONDING VISIBLE.

(G) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK HAS 1 COLLAPSE.

(H) TYPE IV SINK IN WOODED AREA ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH SINK, BUT MAPPED DUE TO ITS PROXIMITY.

(I) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK HAS A 1 FT WIDE COLLAPSE ALLOWING WATER TO DRAIN QUICKLY.

(J) TYPE II SINKHOLE IN OPEN AREA DIRECTLY ADJACENT TO CSX R.O.W. SINK HAS 2 COLLAPSES, 2 FT AND 1 FT WIDE.

(K) TYPE IV SINK IN WOODED AREA DIRECTLY ADJACENT TO CSX R.O.W. EVIDENCE OF PONDING IS VISIBLE.

(L) SWALE ON BOTH SIDES OF ROADBED WITHIN CSX R.O.W. AND ADJACENT H. TURNER ROAD.

(M) TYPE IV SINK IN GROVE OF TREES IN OPEN FIELD ADJACENT TO CSX R.O.W. EVIDENCE OF PONDING VISIBLE.

(N) SWALE ON EITHER SIDE OF ROADBED AND WITHIN CSX R.O.W.

(P) TYPE IV SINK IN OPEN FIELD DIRECTLY ADJACENT TO CSX R.O.W.

(R) SWALE ADJACENT TO CSX R.O.W.

(S) PERENNIAL POND IN OPEN FIELD UP SLOPE FROM CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH THIS POND.

(T) TYPE IV SINK DIRECTLY ADJACENT TO CSX R.O.W. AFTER HEAVY RAINFALL, DRAINAGE FROM FIELD ADJACENT TO CSX R.O.W. FOLLOWS INTERMITTENT STREAM AND SINKS INTO SMALL HOLE 2 IN WIDE. THIS HOLE IS 75 FT FROM RIPRAP (POTENTIAL HAZARD "AA").

(U) TYPE IV SINK IN SMALL WOODED AREA DIRECTLY ADJACENT TO CSX R.O.W. SINK IS TRASH FILLED.

(V) SWALE DIRECTLY ADJACENT TO CSX R.O.W.

(W) TYPE IV SINK AT EDGE OF WOODED AREA AND OPEN FIELD ADJACENT TO CSX R.O.W. THIS LARGE SINK HAS STEEP WALLS AND PONDS WATER TEMPORARILY.

(X) SWALE ON EITHER SIDE OF CSX ROADBED.

(Y) TYPE V SINK ON SHEET CSX-2.

(Z) TYPE IV SINK ON SHEET CSX-2.

POTENTIAL HAZARDS

(AA) RIPRAP, BOULDERS UP TO 2 FT WIDE, AT BASE OF CSX ROADBED. PROBABLE SINKHOLE FILL.

SIGNS AND RAILROAD FEATURES

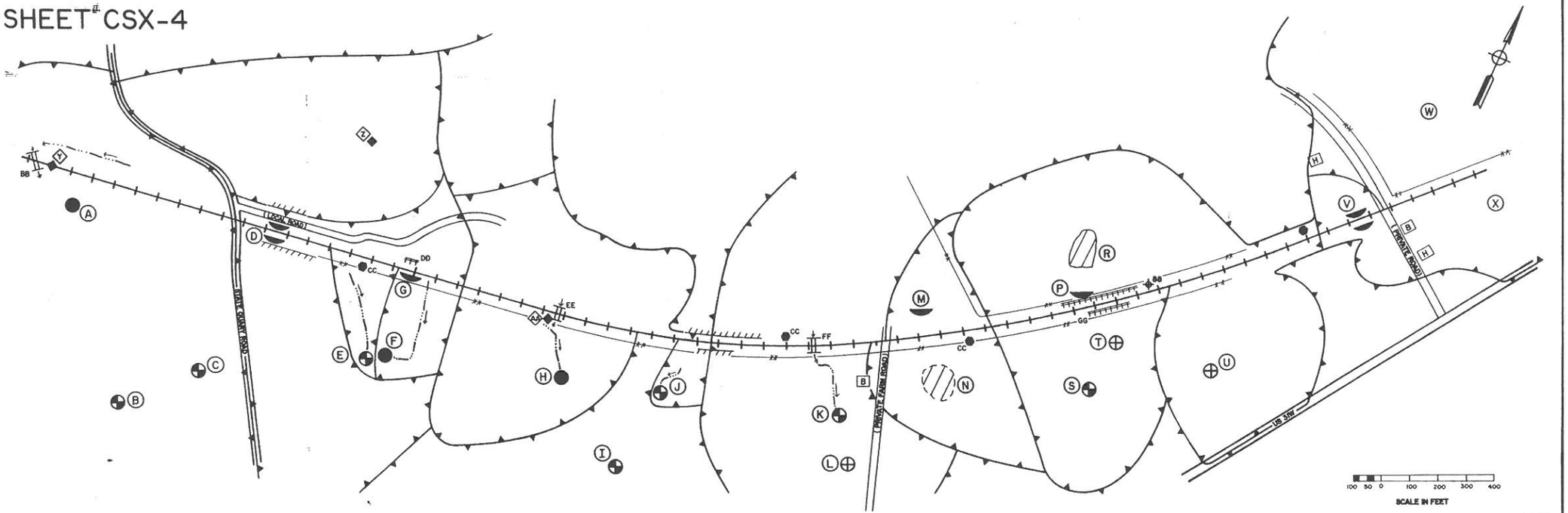
(BB) RAILROAD TRAFFIC LIGHT #871

(CC) RAILROAD TRAFFIC LIGHT #872

(DD) SILVER BOX 6'WIDE X 2'DEEP X 7.5'TALL

(EE) (WHITE) W (WHISTLE SIGN)

SHEET 4 CSX-4



RAILROAD
INTERSTATE 65
U.S. ROUTE
STATE ROUTE
LOCAL ROUTE
PRIVATE ROAD
FENCE
SIGN
MILE MARKER
RAILROAD TRAFFIC LIGHT
CONTROL/SWITCH BOX
CULVERT
G BARN
H HOUSE
W BUSINESS
RETENTION WALL

ROCK OUTCROP
DRAINAGE BASIN BOUNDARY
INTERMITTENT STREAM
PERENIAL STREAM
EPHEMERAL POND
PERENIAL POND
CLASS V INJECTION WELL
TYPE I SINKHOLE
TYPE II SINKHOLE
TYPE III SINKHOLE
TYPE IV SINKHOLE
TYPE V SINKHOLE
POTENTIAL HAZARD
SWALE

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO. NEXT GROUNDWATER INTERCEPT, RIGHT FORK HAWKINS RIVER, MAMMOTH CAVE NATIONAL PARK. GROUNDWATER TRAVEL TIMES TO RIGHT FORK HAWKINS RIVER: 4-150 HRS.

(A) TYPE I SINK IN WOODED AREA DIRECTLY ADJACENT TO CSX R.O.W. SINK IS 20 FT WIDE WITH 2 COLLAPSES. DRAINAGE FROM BOTH SIDES OF CSX REACHES THIS SINK VIA PIPE CULVERT "BB".

(B) TYPE II SINK IN SMALL GROVE OF TREES IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE TO THIS SINK FLOWS 700 FT ACROSS OPEN FIELD ALLOWING FLOW LOSS TO GROUND.

(C) TYPE II SINK IN OPEN FIELD 550 FT FROM CSX R.O.W. SINK IS TRASH FILLED.

(D) SWALE ON EITHER SIDE OF CSX ROADBED.

(E) TYPE II SINK IN WOODED AREA 450 FT FROM CSX R.O.W. AND 30 FT FROM SINK "F".

(F) TYPE I SINK IN WOODED AREA 450 FT FROM CSX R.O.W. AND 30 FT FROM SINK "E".

(G) SWALE AT BASE OF CSX ROADBED.

(H) TYPE I SINK IN WOODED AREA DIRECTLY ADJACENT TO CSX R.O.W. SINK IS A 4 FT HIGH ROCK SHELTER 30 FT WIDE WITH A 3 FT HIGH CRAWLWAY TAKING WATER.

(I) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK HAS 2 COLLAPSES 30 FT APART; FIRST IS 15 FT WIDE AND 10 FT DEEP, SECOND IS 10 FT WIDE, 6 FT DEEP AND TRASH FILLED.

(J) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK RECEIVES RUNOFF FROM CSX VIA INTERMITTENT STREAM.

(K) 2 TYPE II SINKS, 30 FT APART, AT END OF ROW OF TREES IN OPEN FIELD ADJACENT TO CSX R.O.W. SINKS RECEIVE FLOW FROM BOTH SIDES OF CSX VIA PIPE CULVERT "EE" AND INTERMITTENT STREAM FOLLOWING ROW OF TREES. BOTH SINKS ARE 6 FT WIDE WITH 2 FT DRAINS.

(L) TYPE IV SINK BEYOND SINKHOLE "J" IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK CONTAINS AT LEAST 10 COLLAPSES.

(M) SWALE IN WOODED AREA DIRECTLY ADJACENT TO CSX R.O.W.

(N) EPHEMERAL POND IN OPEN FIELD DIRECTLY ADJACENT TO CSX R.O.W.

(P) SWALE AT BASE OF CSX ROADBED.

(R) PERENNIAL POND UP SLOPE FROM BASE OF CSX ROADBED. RUNOFF FROM CSX DOES NOT REACH POND.

(S) TYPE II SINK IN SMALL WOODED AREA ADJACENT TO CSX R.O.W. RUNOFF FROM CSX FOLLOWS INTERMITTENT STREAM TO SINK.

(T) TYPE IV SINK IN SMALL WOODED AREA DIRECTLY ADJACENT TO CSX R.O.W.

(U) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. EVIDENCE OF A SMALL AMOUNT OF PONDING IS VISIBLE.

(V) SWALE DIRECTLY ADJACENT TO CSX AND PRIVATE ROAD.

(W) TYPE I SINK ON SHEET CSX-3.

(X) TYPE V SINK ON SHEET CSX-3.

POTENTIAL HAZARDS

(Y) ROADBED CONSTRUCTED OF RIPRAP (LARGE BOULDERS, 2FT WIDE) FOR 200 FT. RIPRAP COULD BE A FILL FOR A COLLAPSED SINK.

(Z) OLD ABANDONED ROCK QUARRY USED AROUND THE TURN OF THE CENTURY.

(AA) NORTH SIDE OF CULVERT RECEIVES WATER, BUT SOUTH SIDE OF CULVERT NOT FOUND. CULVERT MAY BE COVERED WITH ROADBED FILL, OR MAY DIRECTLY ENTER THE GROUND.

SIGNS AND RAILROAD FEATURES

(BB) STONE SLAB CULVERT (MOSTLY COVERED UP)

(CC) (WHITE) W (WHISTLE SIGN)

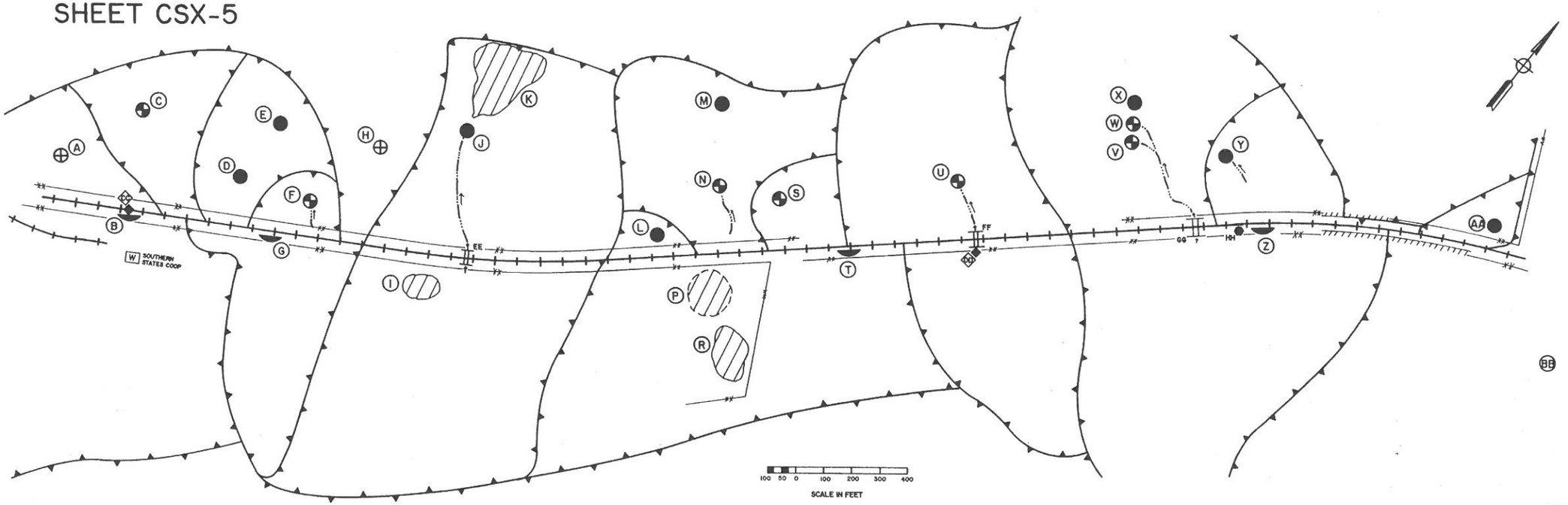
(DD) CONCRETE RETAINING WALL FOR OLD QUARRY OFFLOAD

(EE) PIPE CULVERT

(FF) CONCRETE PIPE CULVERT (RAIL ABOVE PAINTED WHITE)

(GG) WOODEN RETENTION WALL (ON BOTH SIDES OF RAILROAD)

SHEET CSX-5



JULY 95

RAILROAD
INTERSTATE 65
U.S. ROUTE
STATE ROUTE
LOCAL ROUTE
PRIVATE ROAD
FENCE
SIGN
MILE MARKER
RAILROAD TRAFFIC LIGHT
CONTROL/SWITCH BOX
CULVERT
BARN
HOUSE
BUSINESS
RETENTION WALL

ROCK OUTCROP
DRAINAGE BASIN BOUNDARY
INTERMITTENT STREAM
PERENIAL STREAM
EPHEMERAL POND
PERENIAL POND
CLASS V INJECTION WELL
TYPE I SINKHOLE
TYPE II SINKHOLE
TYPE III SINKHOLE
TYPE IV SINKHOLE
TYPE V SINKHOLE
POTENTIAL HAZARD
SWALE

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO. NEXT GROUNDWATER INTERCEPT, RIGHT FORK HAWKINS RIVER, MAMMOTH CAVE NATIONAL PARK. GROUNDWATER TRAVEL TIMES TO RIGHT FORK HAWKINS RIVER: 4-150 HRS.

(A) TYPE IV SINK IN SMALL GROVE OF TREES ADJACENT TO CSX R.O.W.

(B) SWALE DIRECTLY ADJACENT TO CSX ROADBED.

(C) TYPE II SINK IN SMALL GROVE OF TREES IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK HAS 4 COLLAPSES, LARGEST OF WHICH IS 10 FT WIDE AND 4 FT DEEP. EVIDENCE OF PONDING IS VISIBLE.

(D) TYPE I SINK IN OPEN FIELD DIRECTLY ADJACENT TO CSX R.O.W. SINK IS 10 FT WIDE AND RECEIVES A SMALL AMOUNT OF WATER.

(E) TYPE I SINK IN SMALL GROVE OF TREES IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS FULL OF TRASH AND WILL RECEIVE RUNOFF FROM CSX IF SINK "D" OVERFLOWS.

(F) TYPE II SINK IN OPEN FIELD DIRECTLY ADJACENT TO CSX R.O.W. SINK HAS 2 COLLAPSES.

(G) SWALE DIRECTLY ADJACENT TO CSX ROADBED.

(H) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W.

(I) PERENNIAL POND IN OPEN FIELD DIRECTLY TO CSX R.O.W. DRAINAGE THAT DOES NOT GO TO POND WILL BE DIRECTED TO SLAB CULVERT "DD" AND TO SINKHOLE "J".

(J) SMALL TYPE I SINK ALONG INTERMITTENT STREAM BED IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS A SMALL 6 IN HOLE UNDER A LARGE BOULDER. A LARGE AMOUNT OF FLOW WILL EASILY OVERRUN THIS SINK TO POND "K". DRAINAGE FROM BOTH SIDES OF CSX FLOWS TO THIS AREA VIA SLAB CULVERT "DD".

(K) PERENNIAL POND IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM BOTH SIDES OF CSX REACHES THIS AREA VIA SLAB CULVERT "DD".

(L) TYPE I SINK DIRECTLY ADJACENT TO CSX R.O.W.

(M) TYPE I SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 20 FT WIDE AND 6 FT DEEP.

(N) TYPE II SINK IN OPEN FIELD ADJACENT CSX R.O.W.

(P) EPHEMERAL POND DIRECTLY ADJACENT TO CSX R.O.W.

(R) PERENNIAL POND BEYOND EPHEMERAL POND "P" ADJACENT TO CSX R.O.W.

(S) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS FILLED WITH BOULDERS.

(T) SWALE ADJACENT TO CSX ROADBED.

(U) TYPE II SINK IN SMALL GROVE OF TREES IN OPEN FIELD. SINK IS 30 FT WIDE, 50 FT LONG AND 10 FT DEEP WITH A SMALL AMOUNT OF TRASH, AND FILLED WITH BRIARS. DRAINAGE FROM BOTH SIDES OF CSX REACHES THIS SINK VIA SLAB CULVERT "EE".

(V) TYPE II SINK LOCATED IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 15 FT WIDE AND FILLED WITH BOULDERS. DRAINAGE FROM BOTH SIDES OF CSX REACHES THIS AREA VIA SLAB CULVERT "FF".

(W) TYPE II SINK IN SMALL GROVE OF TREES IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 15 FT LONG, 5 FT WIDE AND 4 FT DEEP AND FILLED WITH BOULDERS. DRAINAGE FROM BOTH SIDES OF CSX REACHES THIS AREA VIA SLAB CULVERT "FF".

(X) TYPE I SINK IN SMALL GROVE OF TREES IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 20 FT WIDE AND 6 FT DEEP WITH EVIDENCE OF A SMALL AMOUNT OF PONDING.

(Y) TYPE I SINK ALONG A ROW OF TREES ADJACENT TO CSX R.O.W. SINK IS 15 FT WIDE, 4 FT DEEP AND FILLED WITH RAILROAD TIES AND BOULDERS.

(Z) SWALE DIRECTLY ADJACENT TO CSX ROADBED.

(AA) TYPE I SINK IN WOODED AREA DIRECTLY ADJACENT TO CSX R.O.W. SINK IS 10 FT LONG, 5 FT WIDE, 4 FT DEEP.

(BB) TYPE I SINK NOTED ON SHEET CSX-4.

POTENTIAL HAZARDS

(CC) BASE OF ROADBED CONSTRUCTED OF RIPRAP (LARGE BOULDERS). POSSIBLE SINK FILL.

(DD) SOUTH SIDE OF CULVERT MOSTLY FILLED OVER WITH ROADBED GRAVEL AND RAILROAD TIES. WATER APPEARS TO POOL UP BEFORE IT ENTERS CULVERT.

SIGNS AND RAILROAD FEATURES

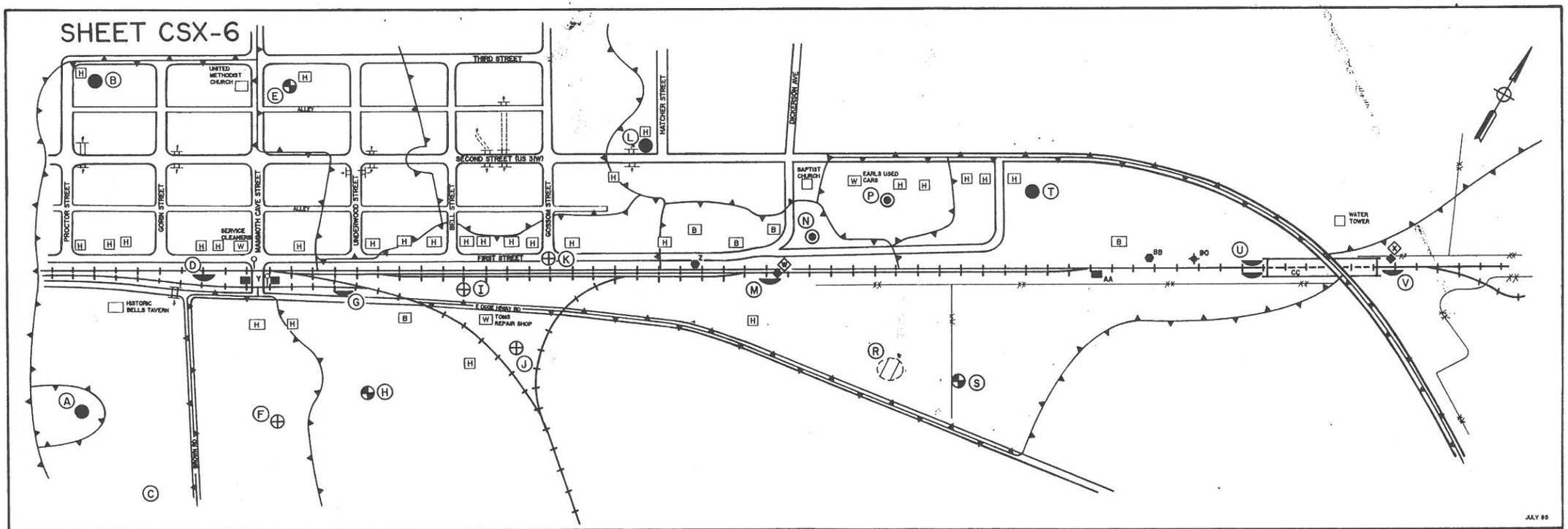
(EE) **STONE SLAB CULVERT, 3'WIDE X 2'TALL**

(FF) **STONE SLAB CULVERT, 3'WIDE X 2'TALL**

(GG) **STONE SLAB CULVERT, 3'WIDE X 2'TALL**

(HH) **(WHITE) W (WHISTLE SIGN)**

SHEET CSX-6



RAILROAD
INTERSTATE 65
U.S. ROUTE
STATE ROUTE
LOCAL ROUTE
PRIVATE ROAD
FENCE
SIGN
MILE MARKER
RAILROAD TRAFFIC LIGHT
CONTROL/SWITCH BOX
CULVERT
BARN
HOUSE
BUSINESS
RETENTION WALL

ROCK OUTCROP
DRAINAGE BASIN BOUNDARY
INTERMITTENT STREAM
PERENIAL STREAM
EPHEMERAL POND
PERENIAL POND
CLASS V INJECTION WELL
TYPE I SINKHOLE
TYPE II SINKHOLE
TYPE III SINKHOLE
TYPE IV SINKHOLE
TYPE V SINKHOLE
POTENTIAL HAZARD
SWALE

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO. NEXT GROUNDWATER INTERCEPT, RIGHT FORK HAWKINS RIVER, MAMMOTH CAVE NATIONAL PARK. GROUNDWATER TRAVEL TIMES TO RIGHT FORK HAWKINS RIVER: 4-150 HRS.

(A) TYPE I SINK 100 YD BEHIND HISTORIC BELL'S TAVERN IN WOODED AREA. SINK IS A CAVE THAT DROPS VERTICALLY 6 FT. DRAINAGE FROM CSX WOULD NOT REACH CAVE WHICH IS UP SLOPE FROM CSX.

(B) TYPE I SINK IN BACKYARD OF HOUSE 2 BLOCKS FROM CSX. SINK IS A CAVE THAT CONNECTS UNDERGROUND WITH SINK "A". CAVE RECEIVES RUNOFF FROM 2 SQUARE BLOCKS INCLUDING CSX.

(C) TYPE V SINK IN OPEN FIELD ADJACENT TO BROWN ROAD.

(D) SWALE WITHIN 2 SETS OF TRACKS AND MAMMOTH CAVE STREET.

(E) TYPE II SINK IN OPEN LOT NEXT TO HOUSE 2 BLOCKS FROM THE CSX. SINK HAS BEEN FILLED IN WITH GRASS AND LIMBS.

(F) TYPE IV SINK IN OPEN FIELD BEYOND E. DIXIE HIGHWAY. SINK HAS CEMENT SLAB 3 FT WIDE IN CENTER INDICATING THAT COLLAPSE MAY HAVE BEEN FILLED IN.

(G) SWALE BETWEEN E. DIXIE HIGHWAY AND CSX SIDE TRACK.

(H) TYPE II SINK IN OPEN FIELD ADJACENT TO E. DIXIE HIGHWAY. SINK HAS COLLAPSE 10 FT WIDE, 30 FT LONG, 3 FT DEEP WITH A 2 IN DRAIN.

(I) TYPE IV SINK DIRECTLY ADJACENT TO CSX AND E. DIXIE HIGHWAY. SINK IS A FILLED IN CAVE.

(J) TYPE IV SINK BEHIND TOM'S REPAIR SHOP ADJACENT TO CSX R.O.W.

(K) TYPE IV SINK AT INTERSECTION OF FIRST AND GOSSOM STREET. IN RECENT PAST SINK WAS FILLED IN, LEAVING LITTLE SURFACE EXPRESSION.

(L) TYPE I SINK AT CORNER OF HATCHER STREET AND US 31W. A 2 FT VERTICAL CULVERT WAS PLACED IN CENTER OF SINK TO ALLOW EASY ACCESS INTO CAVE BELOW.

(M) SWALE WITHIN CSX R.O.W.

(N) CLASS V INJECTION WELL IN BAPTIST CHURCH PARKING LOT. DRAIN DOES NOT HAVE ANY HORIZONTAL CULVERTS LEADING FROM BOTTOM. WATER MAY POND FOLLOWING HEAVY RAINS.

(P) CLASS V INJECTION WELL BETWEEN PARKING LOT OF EARL'S USED CARS AND HOUSE NEXT DOOR.

(R) EPHEMERAL POND IN OPEN FIELD ADJACENT CSX R.O.W.

(S) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W.

(T) TYPE I SINK IN BACK YARD OF HOUSE ON CORNER OF US 31W AND UNNAMED STREET.

(U) SWALES ON EITHER SIDE OF CSX ROADBED.

(V) SWALE DIRECTLY ADJACENT TO CSX ROADBED.

POTENTIAL HAZARDS

(W) RIPRAP AT BASE OF CSX ROADBED INDICATING A POSSIBLE SINKHOLE FILL.

(X) THROUGHOUT CUT OF TUNNEL ARE SEEPS WHERE WATER DRAINS FROM ROCK.

SIGNS AND RAILROAD FEATURES

(Y) TWO RAILROAD TRAFFIC LIGHTS AND TWO SILVER CONTROL BOXES

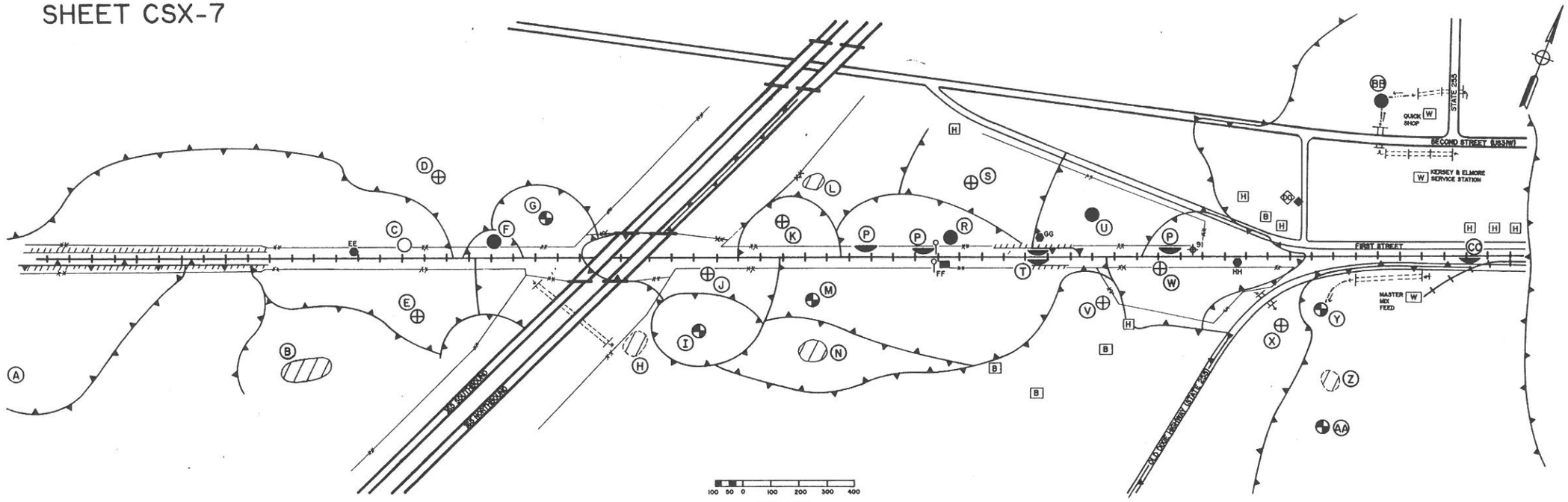
(Z) (WHITE) W (TRAIN WHISTLE SIGN)

(AA) SILVER CONTROL BOX

(BB) (WHITE) CORPORATE LIMIT (HIDDEN IN BRUSH)

(CC) CUT RAILROAD TUNNEL THROUGH A HILL UNDER US 31W

SHEET CSX-7



RAILROAD
INTERSTATE 65
U.S. ROUTE
STATE ROUTE
LOCAL ROUTE
PRIVATE ROAD
FENCE
SIGN
MILE MARKER
RAILROAD TRAFFIC LIGHT
CONTROL/SWITCH BOX
CULVERT
BARN
HOUSE
BUSINESS
RETENTION WALL

ROCK OUTCROP
DRAINAGE BASIN BOUNDARY
INTERMITTENT STREAM
PERENIAL STREAM
EPHEMERAL POND
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CLASS V INJECTION WELL
TYPE I SINKHOLE
TYPE II SINKHOLE
TYPE III SINKHOLE
TYPE IV SINKHOLE
TYPE V SINKHOLE
POTENTIAL HAZARD
SWALE

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO. NEXT GROUNDWATER INTERCEPT, FOR SINKS A-G, MILL HOLE, PERRY SEBAUGH, 3221 CHAUMONT RD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 2-42 HRS. NEXT GROUNDWATER INTERCEPTS FOR SINKS X-BB, RIGHT FORK HAWKINS RIVER, MAMMOTH CAVE NATIONAL PARK. GROUNDWATER TRAVEL TIMES TO RIGHT FORK HAWKINS RIVER; 4-150 HRS. SINKS H-W MAY DRAIN TO EITHER MILL HOLE AND/OR RIGHT FORK HAWKINS RIVER.

(A) TYPE II SINK DESCRIBED ON SHEET CSX-8.

(B) PERENNIAL POND IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT GO DIRECTLY TO POND, BUT IS NOTED DUE TO ITS PROXIMITY.

(C) TYPE V SINK IN SMALL WOODED AREA AT BASE OF CSX ROADBED. EVIDENCE OF PONDING IS VISIBLE.

(D) TYPE IV SINK IN SMALL WOODED AREA IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 60 FT WIDE AND 15 FT DEEP. EVIDENCE OF PONDING IS VISIBLE.

(E) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. EVIDENCE OF PONDING IS VISIBLE.

(F) TYPE I SINK IN SMALL WOODED AREA AT BASE OF CSX ROADBED. SINK IS FILLED WITH SCRAP METAL, ROCKS AND WOOD. 2 SIDES OF SINK APPEAR TO HAVE BEEN WALLED WITH LIMESTONE BLOCKS.

(G) TYPE II SINK IN SMALL WOODED AREA IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 30 FT WIDE, 6 FT DEEP AND FILLED WITH ROCK AND SCRAP METAL.

(H) EPHEMERAL POND ADJACENT TO I-65 R.O.W. FENCE. DRAINAGE FROM CSX FLOWS TO POND VIA A PIPE CULVERT UNDER I-65.

(I) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK HAS SMALL COLLAPSE 3 FT WIDE AND 2 FT DEEP.

(J) TYPE IV SINK AT BASE OF CSX ROADBED. EVIDENCE OF SMALL AMOUNT OF PONDING VISIBLE.

(K) TYPE IV SINK IN OPEN FIELD ADJACENT TO BASE OF CSX ROADBED.

(L) PERENNIAL POND IN OPEN FIELD ADJACENT TO I-65 R.O.W.

(M) TYPE II SINK IN PARTIALLY WOODED FIELD ADJACENT TO CSX ROADBED. SINK IS 40 FT WIDE, 15 FT DEEP WITH VERTICAL WALLS AND FILLED WITH LIMBS AND SCRAP METAL. BOTTOM WAS NOT VISIBLE DUE TO FILL.

(N) PERENNIAL POND N PARTIALLY WOODED AREA ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH POND BUT IS NOTED DUE TO ITS PROXIMITY.

(P) SWALE AT BASE OF CSX ROADBED.

(R) TYPE I SINK IN OPEN FIELD ADJACENT TO CSX ROADBED. SINK IS 15 FT WIDE, 5 FT DEEP AND IS PARTIALLY FILLED WITH ROCKS.

(S) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. EVIDENCE OF PONDING IS VISIBLE. DRAINAGE FROM CSX DOES NOT REACH THE SINK, BUT IS NOTED DUE TO ITS PROXIMITY.

(T) SWALE ON EITHER SIDE OF TRACKS WITHIN ROCK OUTCROPS.

(U) TYPE I SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 20 FT WIDE, HAS 10 FT VERTICAL WALLS AND IS FILLED WITH TIRES, WIRE, SCRAP METAL, LIMBS AND ROCKS.

(V) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK HAS A COLLAPSE 20 FT WIDE, 4 FOOT DEEP THAT PONDS WATER. DRAINAGE FROM CSX DOES NOT REACH SINK, BUT IS NOTED DUE TO ITS PROXIMITY.

(W) TYPE IV SINK IN OPEN FIELD ADJACENT TO BASE OF CSX ROADBED.

(X) TYPE IV SINK IN WOODED AREA ADJACENT TO OLD DIXIE HIGHWAY (STATE HIGHWAY 255).

(Y) TYPE II SINK IN OPEN FIELD BEHIND MASTER MIX FEED. SINK IS 5 FT WIDE, 4 FT DEEP WITH VERTICAL WALLS. SINK FORMED IN FALL OF 1994 WHEN SEWAGE LINE WAS CONNECTED TO THE PLANT. COLLAPSE IS 20 FT FROM SEWAGE LINE.

(Z) EPHEMERAL POND ADJACENT TO WOODED AREA BEHIND MASTER MIX FEED.

(AA) TYPE II SINK IN WOODED AREA BEHIND MASTER MIX FEED AND BEYOND POND "Z".

(BB) TYPE I SINK IN WOODED AREA ADJACENT TO US 31W (SECOND STREET) AND PARK CITY QUICK SHOP. SINK HAS 3 COLLAPSES, 2 OF WHICH ARE OF TYPE I CLASS, BUT MAIN DRAIN OF SINK HAS A 2 FT WIDE, 6+ FT COLLAPSE.

(CC) SWALE BETWEEN CSX AND OLD DIXIE HIGHWAY (STATE HIGHWAY 255).

POTENTIAL HAZARDS

(DD) A FILLED IN CAVE THAT HAS COLLAPSED A SMALL AMOUNT UNDER A TREE. DRAINAGE FROM CSX WILL NOT DRAIN DIRECTLY INTO COLLAPSE.

SIGNS AND RAILROAD FEATURES

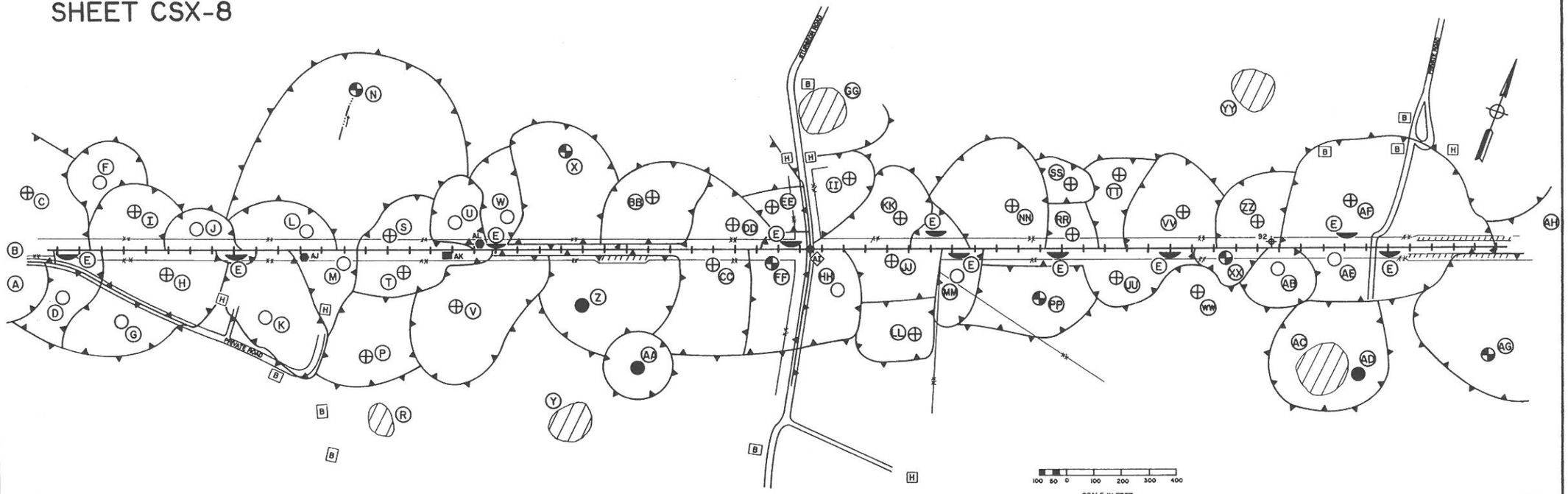
(EE) (WHITE) W & X (WHISTLE & CROSSING SIGN)

(FF) TWO RAILROAD TRAFFIC LIGHTS #911 & #912 AND A SILVER CONTROL BOX

(GG) BILLBOARD SIGN

(HH) (WHITE) W (WHISTLE SIGN)

SHEET CSX-8



RAILROAD
INTERSTATE 65
U.S. ROUTE
STATE ROUTE
LOCAL ROUTE
PRIVATE ROAD
FENCE
SIGN
MILE MARKER
RAILROAD TRAFFIC LIGHT
CONTROL/SWITCH BOX
CULVERT
BARN
HOUSE
BUSINESS
RETENTION WALL

ROCK OUTCROP
DRAINAGE BASIN BOUNDARY
INTERMITTENT STREAM
PERENIAL STREAM
EPHEMERAL POND
PERENIAL POND
CLASS V INJECTION WELL
TYPE I SINKHOLE
TYPE II SINKHOLE
TYPE III SINKHOLE
TYPE IV SINKHOLE
TYPE V SINKHOLE
POTENTIAL HAZARD
SWALE

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5TOPO. NEXT GROUNDWATER INTERCEPT, MILL HOLE, PERRYSEBAUGH, 3221 CHALMONT RD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 2-42HRS.

(A) DRAINAGE IS DIRECTED TO TYPE V SINK LOCATED ON SHEET CSX-9.

(B) DRAINAGE IS DIRECTED TO TWO SWALES LOCATED ON SHEET CSX-9.

(C, H, S, T, CC, II, JJ, KK, NN, TT, AF) TYPE IV SINK IN FIELD DIRECTLY ADJACENT TO CSX R.O.W.

(D)(G) TYPE V SINK IN FIELD ADJACENT TO CSX R.O.W. NOT FED DIRECTLY BY DRAINAGE FROM CSX.

(E) SWALE AT BASE OF CSX R.O.W.

(F)(W) TYPE V SINK IN FIELD ADJACENT TO CSX R.O.W. NOT FED DIRECTLY BY DRAINAGE FROM CSX. SOME EVIDENCE OF PONDING IS PRESENT.

(I, DD, RR, UU, VV, ZZ) TYPE IV SINK IN FIELD ADJACENT TO CSX R.O.W. EVIDENCE OF PONDING OBSERVED.

(J, M, U, AB) TYPE V SINK IN FIELD DIRECTLY ADJACENT CSX R.O.W. EVIDENCE OF PONDING OBSERVED.

(K, L, HH, MM, AE) TYPE V SINK IN FIELD ADJACENT TO CSX R.O.W.

(N) TYPE II SINK IN SMALL GROVE OF TREES ACROSS OPEN FIELD 600 FT. NORTH OF CSX R.O.W. SINK HAS COLLAPSE 20 FT. WIDE WITH DRAINAGE CHANNEL FLOWING FROM DIRECTION OF CSX.

(P, V, BB, EE, LL) TYPE IV SINK IN FIELD ADJACENT TO CSX R.O.W. NOT FED DIRECTLY BY DRAINAGE FROM CSX.

(R) PERENNIAL POND 600 FT. SOUTH OF CSX R.O.W. DRAINAGE FROM RAILROAD DOES NOT REACH POND, BUT IS DUE TO ITS PROXIMITY.

(X) TYPE II SINK IN OPEN FIELD 350 FT. NORTH OF CSX R.O.W. SINK HAS COLLAPSE 4 FT. WIDE, 3 FT. DEEP. DRAINAGE FROM CSX DOES NOT REACH SINK, BUT IS NOTED DUE TO ITS PROXIMITY.

(Y) PERENNIAL POND IN OPEN FIELD 600 FT. SOUTH OF CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH POND, BUT IS NOTED DUE TO ITS PROXIMITY.

(Z) TYPE I SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 20 FT. WIDE AND FILLED WITH BOULDERS. DRAINAGE FROM CSX DOES NOT REACH SINK, BUT IS NOTED DUE TO ITS PROXIMITY.

(AA) TYPE I SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 40 FT. WIDE AND FILLED WITH BOULDERS. DRAINAGE FROM CSX DOES NOT REACH SINK, BUT IS NOTED DUE TO ITS PROXIMITY.

(FF) TYPE II SINK AT BASE OF CSX ROADBED. SINK IS 30 FT. WIDE AND FILLED WITH ROCKS.

(GG) PERENNIAL POND DIRECTLY ADJACENT TO STURGEON ROAD BETWEEN A BARN AND UNOCCUPIED HOUSE. DRAINAGE FROM CSX DOES NOT REACH POND, BUT SHOULD BE NOTED.

(PP) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK HAS COLLAPSE 15 FT. WIDE, 5 FT. DEEP. DRAINAGE FROM CSX DOES NOT REACH SINK, BUT IS NOTED DUE TO ITS PROXIMITY.

(SS)(WW) TYPE IV SINK IN FIELD ADJACENT TO CSX R.O.W. NOT FED BY DRAINAGE FROM CSX. EVIDENCE OF PONDING IS OBSERVED.

(XX) TYPE II SINK AT BASE OF CSX ROADBED. SINK IS 40 FT. LONG, 20 FT. WIDE, 15 FT. DEEP WITH 3 FT. WIDE DRAIN OF UNKNOWN DEPTH.

(YY) PERENNIAL POND IN OPEN FIELD 500 FT. NORTH OF CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH POND, BUT IS NOTED DUE TO ITS PROXIMITY.

(AC) PERENNIAL POND IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH POND, BUT IS NOTED DUE TO ITS PROXIMITY.

(AD) TYPE I SINK, DIRECTLY ADJACENT TO "AC". SINK IS 20 FT. LONG, 15 FT. WIDE, 15 FT. DEEP. THERE IS A CAVE OF UNKNOWN SIZE IN BOTTOM OF SINK, AND MAY RUN TOWARD CSX.

(AG) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK HAS 2 SUBSTANTIAL COLLAPSES: ONE 20 FT. WIDE, 15 FT. DEEP, THE OTHER 50 FT. LONG, 20 FT. WIDE, 6 FT. DEEP. DRAINAGE FROM CSX DOES NOT REACH SINK, BUT IS NOTED DUE TO ITS PROXIMITY.

(AH) TYPE V SINK LOCATED ON SHEET CSX-7.

POTENTIAL HAZARDS

(AI) LOCATED AT CROSS ROAD OF STURGEON ROAD IS A SOFT SPOT WHERE WATER IS PUSHED UP THROUGH TRACKS. EROSION AROUND RAILROAD TIES HAS OCCURRED INDICATING WHERE WATER MAKES ITS WAY UNDER GROUND.

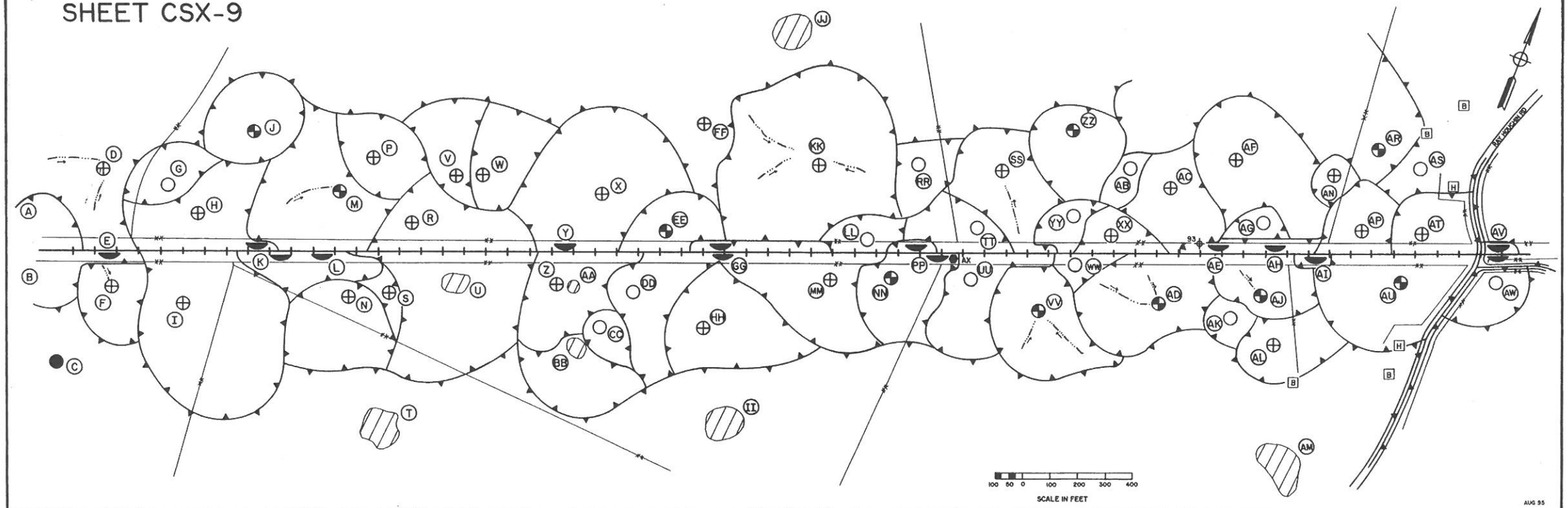
SIGNS AND RAILROAD FEATURES

(AJ) (WHITE) W X (WHISTLE & CROSSING SIGNS)

(AK) SILVER CONTROL BOX

(AL) (WHITE) W (WHISTLE SIGN)

SHEET CSX-9



RAILROAD
INTERSTATE 65
U.S. ROUTE
STATE ROUTE
LOCAL ROUTE
PRIVATE ROAD
FENCE
SIGN
MILE MARKER
RAILROAD TRAFFIC LIGHT
CONTROL/SWITCH BOX
CULVERT
BARN
HOUSE
BUSINESS
RETENTION WALL

ROCK OUTCROP
DRAINAGE BASIN BOUNDARY
INTERMITTENT STREAM
PERENIAL STREAM
EPHEMERAL POND
PERENIAL POND
CLASS V INJECTION WELL
TYPE I SINKHOLE
TYPE II SINKHOLE
TYPE III SINKHOLE
TYPE IV SINKHOLE
TYPE V SINKHOLE
POTENTIAL HAZARD
SWALE

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO. NEXT GROUNDWATER INTERCEPT, MILL HOLE, PERRY SEBAUGH, 3221 CHAUMONT RD. GROUNDWATER TRAVEL TIME TO MILL HOLE: 2-42 HRS.

(A) DRAINAGE DIRECTED TO TYPE IV SINK ON SHEET CSX-10.

(B) DRAINAGE DIRECTED TO TYPE V SINK ON SHEET CSX-10.

(C) TYPE I SINK IN WOODED AREA 400 FT. SOUTH OF CSX R.O.W. SINK IS 20 FT. WIDE, 10 FT. DEEP WITH 1 FT. DRAIN.

(D) TYPE IV SINK IN OPEN FIELD ADJACENT TO SMALL STAND OF TREES. RUNOFF WILL DRAIN QUICKLY INTO SUBSURFACE.

(E, AE, AI) (L, Y, AH) SWALE ADJACENT TO CSX ROADBED.

(F, P, W, AF, AN) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM RAILROAD DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY TO CSX ROADBED.

(G, RR, AB, AG, AK, AW) TYPE V SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(H, SS, AP, I, XX, AT, Z, AC) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W.

(J) TYPE II SINK LOCATED IN WOODED AREA IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK HAS 2 COLLAPSES, 10 FT. WIDE, 6 FT. DEEP WITH 6 IN. DRAIN.

(K, GG, AV, PP) 2 SWALES DIRECTLY ADJACENT TO CSX ROADBED.

(M) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK HAS 2 COLLAPSES 20 FT. APART, BOTH 20 FT. WIDE, 15 FT. DEEP.

(N, S) TYPE IV SINK IN WOODED AREA ADJACENT TO CSX R.O.W. EVIDENCE OF PONDING IS VISIBLE. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(R) TYPE IV SINK IN WOODED AREA ADJACENT TO CSX R.O.W.

(T, BB, II, JJ, AM) PERENNIAL POND IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH POND DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(U) PERENNIAL POND IN WOODED AREA DIRECTLY ADJACENT TO CSX R.O.W.

(V) TYPE IV SINK IN WOODED AREA ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH SINK, BUT IS NOTED DUE TO ITS PROXIMITY.

(X, MM) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. EVIDENCE OF PONDING IS VISIBLE.

(AA) PERENNIAL POND IN OPEN FIELD DIRECTLY ADJACENT TO CSX R.O.W.

(CC, AS) TYPE V SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY. EVIDENCE OF PONDING IS VISIBLE.

(DD) TYPE V SINK IN OPEN FIELD DIRECTLY ADJACENT TO CSX R.O.W. EVIDENCE OF PONDING IS VISIBLE.

(EE) TYPE II SINK AT EDGE OF CSX R.O.W. SINK HAS 2 COLLAPSES 10 FT. APART BOTH ARE 6 FT. WIDE. 1 IS 2 FT. DEEP AND OTHER IS 4 FT. DEEP WITH 1 FT. DRAIN.

(FF, HH, KK, AL) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY. EVIDENCE OF PONDING IS VISIBLE.

(LL) TYPE V SINK IN WOODED AREA DIRECTLY ADJACENT TO CSX R.O.W.

(NN) TYPE II SINK IN OPEN FIELD DIRECTLY ADJACENT TO CSX R.O.W. SINK HAS A COLLAPSE 3 FT. WIDE, 3 FT. DEEP WITH 3 IN. DRAIN.

(TT, UU, WW, YY) TYPE V SINK IN OPEN FIELD ADJACENT TO CSX R.O.W.

(VV) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 20 FT. WIDE, WITH VERTICAL WALLS AND FILLED WITH SCRAP WOOD.

(ZZ) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 30 FT. WIDE, 6+ FT. DEEP WITH GARBAGE THROWN INTO BOTTOM.

(AD) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 15 FT. WIDE, 10 FT. DEEP WITH GARBAGE IN BOTTOM

(AJ) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 40 FT. WIDE, 5 FT. DEEP WITH ROCKS AND BRIARS IN ABUNDANCE.

(AR) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 10 FT. WIDE, 4 FT. DEEP WITH GARBAGE IN BOTTOM.

(AU) TYPE II SINK UNDER A SMALL STAND OF TREES DIRECTLY ADJACENT TO CSX R.O.W. SINK IS 15 FT. WIDE, 6 FT. DEEP.

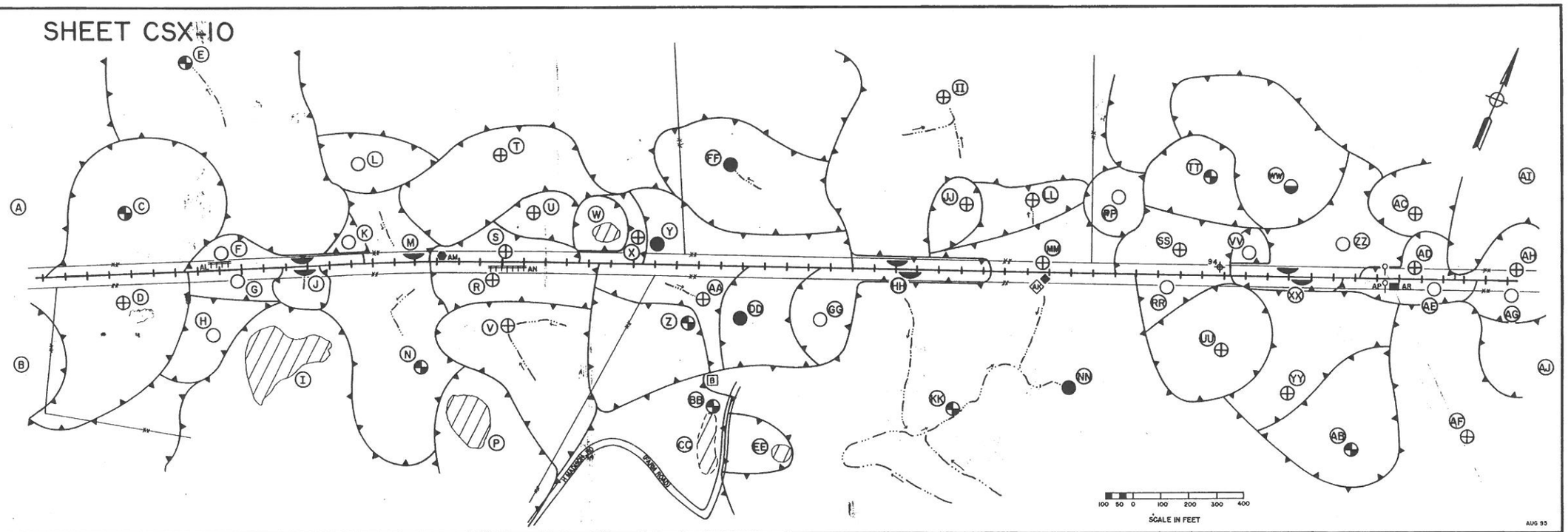
(AV) DRAINAGE DIRECTED TO TYPE IV SINK ON SHEET CSX-8.

(AW) DRAINAGE DIRECTED TO TYPE V SINK ON SHEET CSX-8.

SIGNS AND RAILROAD FEATURES

(AX) W (WHISTLE SYMBOL)

SHEET CSX-10



RAILROAD
INTERSTATE 65
U.S. ROUTE
STATE ROUTE
LOCAL ROUTE
PRIVATE ROAD
FENCE
SIGN
MILE MARKER
RAILROAD TRAFFIC LIGHT
CONTROL/SWITCH BOX
CULVERT
BARN
HOUSE
BUSINESS
RETENTION WALL

ROCK OUTCROP
DRAINAGE BASIN BOUNDARY
INTERMITTENT STREAM
PERENIAL STREAM
EPHEMERAL POND
PERENIAL POND
CLASS V INJECTION WELL
TYPE I SINKHOLE
TYPE II SINKHOLE
TYPE III SINKHOLE
TYPE IV SINKHOLE
TYPE V SINKHOLE
POTENTIAL HAZARD
SWALE

RECHARGE FEATURES

BASE MAP: PARK CITY 7.5' TOPO. NEXT GROUNDWATER INTERCEPT, MILL HOLE, PERRY SEBAUGH, 3221 CHAUMONT RD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 2-42 HRS.

(A) DRAINAGE DIRECTED TO TYPE IV SINK ON SHEET CSX-11.

(B) DRAINAGE DIRECTED TO PERENNIAL POND ON SHEET CSX-11.

(C) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK HAS COLLAPSE 1 FT. WIDE 4+ FT. DEEP.

(D, X, AA, R, S, MM, SS, AH) TYPE IV SINK NEAR SMALL WOODED AREA ADJACENT TO CSX R.O.W.

(E) TYPE II SINK 700 FT. NORTH OF CSX R.O.W. SINK IS 30 FT. WIDE, 10 FT. DEEP. EVIDENCE OF SLIGHT PONDING IS VISIBLE. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO PROXIMITY.

(F, G, AE) TYPE V SINK AT BASE OF CSX ROADBED. EVIDENCE OF PONDING IS VISIBLE.

(H, PP, VV) TYPE V SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(I, EE, P, W) PERENNIAL POND IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH POND DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(J, HH, XX) 2 SWALES DIRECTLY ADJACENT TO CSX ROADBED.

(K, L) TYPE V SINK DIRECTLY ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH DIRECTLY. EVIDENCE OF PONDING IS VISIBLE.

(M) SWALE DIRECTLY ADJACENT TO CSX ROADBED.

(N) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK HAS COLLAPSE 15 FT. WIDE, 4+ FT. DEEP, AND FILLED WITH ROCKS, LIMBS AND GARBAGE.

(T, U, YY, UU, AC, AF) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(V, JJ, LL) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(X) TYPE IV SINK IN WOODED AREA DIRECTLY ADJACENT TO CSX R.O.W.

(Y) TYPE I SINK IN WOODED AREA DIRECTLY ADJACENT TO CSX R.O.W. SINK IS 30 FT. WIDE, 20 FT. DEEP WITH 1 FT. DRAIN.

(Z) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 20 FT. WIDE, 15 FT. DEEP. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(AA) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W.

(BB) TYPE II SINK ADJACENT TO A BARN 500 FT. SOUTH OF CSX R.O.W. SINK IS 30 FT. WIDE, 10 FT. DEEP. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(CC) EPHEMERAL POND ADJACENT TO WOODED AREA 600 FT. SOUTH OF CSX R.O.W. DRAINAGE DOES NOT REACH POND DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(DD) TYPE I SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 40 FT. WIDE, 20 FT. DEEP.

(FF) TYPE I SINK IN WOODED AREA IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK HAS 2 DRAINS, 1 FT. WIDE. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(GG, RR, ZZ, AG) TYPE V SINK IN OPEN FIELD ADJACENT TO CSX R.O.W.

(II) TYPE IV SINK IN WOODED AREA ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH SINK, BUT IS NOTED DUE TO ITS PROXIMITY. UNDER HEAVY RAINFALL CONDITIONS RUNOFF WILL FLOW TO A TYPE IV SINK 200 FT. BEYOND "II".

(KK) TYPE II SINK IN WOODED AREA ADJACENT TO CSX R.O.W. SINK IS 15 FT. WIDE, 3 FT. DEEP WITH 1 FT. DRAIN AND IS ADJACENT TO GARDNER CREEK SINKPOINT.

(NN) TYPE I SINK IN WOODED AREA ADJACENT TO CSX R.O.W. THIS SINK IS THE TERMINUS OF GARDNER CREEK AND PONDS WATER UNDER EXTREME RAINFALL CONDITIONS. ALL RUNOFF IMMEDIATELY SINKS HERE UNDER NORMAL CONDITIONS.

(TT) TYPE II SINK IN SMALL GROVE OF TREES IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 30 FT. WIDE, 10 FT. DEEP, WITH 3 FT. DRAIN.

(WW) TYPE III SINK IN WOODED AREA ADJACENT TO CSX R.O.W. SINK IS STEEP AND 300 FT. WIDE.

(AB) TYPE II SINK AT EDGE OF WOODED AREA ADJACENT TO CSX R.O.W. SINK IS 20 FT. WIDE, 10 FT. DEEP WITH 3 FT. DRAIN.

(AD) TYPE IV SINK DIRECTLY ADJACENT TO CSX ROADBED. EVIDENCE OF PONDING IS VISIBLE.

(AI) DRAINAGE IS DIRECTED TO A TYPE IV SINK ON SHEET CSX-9.

(AJ) DRAINAGE IS DIRECTED TO A TYPE I SINK ON SHEET CSX-9.

POTENTIAL HAZARDS

(AK) SOUTH SIDE OF ROADBED CONSISTING OF LARGE BOULDERS.

SIGNS AND RAILROAD FEATURES

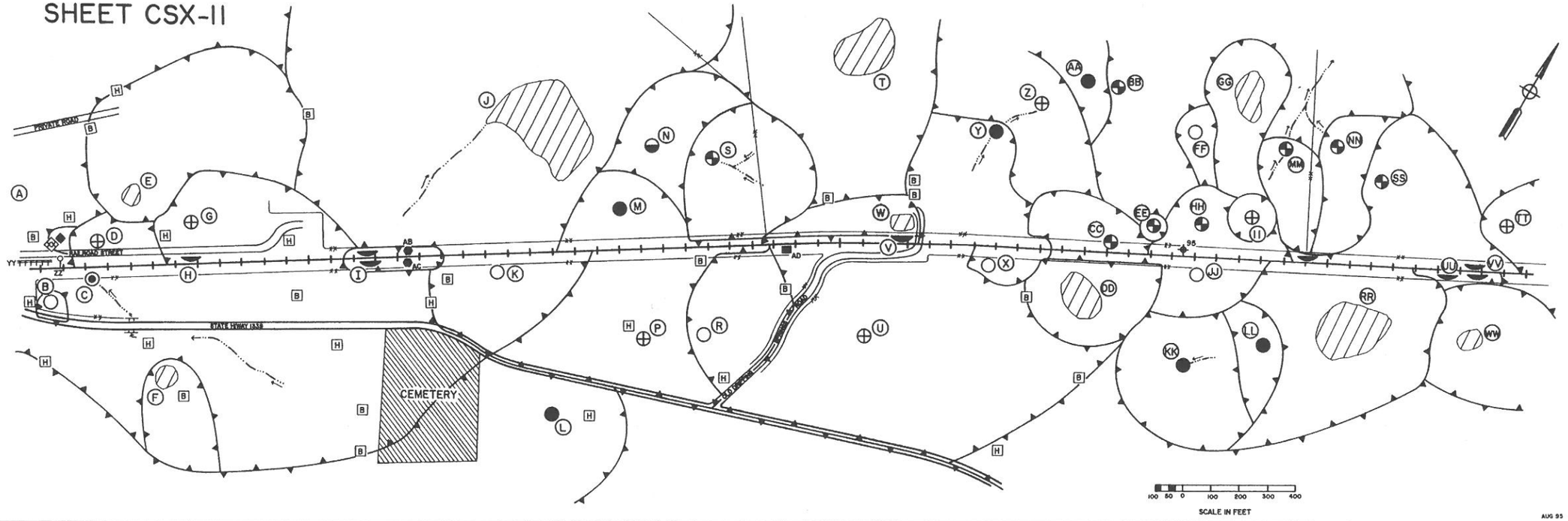
(AL, AH) WOODEN RETENTION WALL

(AM) (WHITE) W X (WHISTLE & CROSSING SYMBOLS)

(AP, AR) TWO RAILROAD TRAFFIC LIGHTS # 931 & # 932

SILVER CONTROL BOX

SHEET CSX-II



RAILROAD
INTERSTATE 65
U.S. ROUTE
STATE ROUTE
LOCAL ROUTE
PRIVATE ROAD
FENCE
SIGN
MILE MARKER
RAILROAD TRAFFIC LIGHT
CONTROL/SWITCH BOX
CULVERT
BARN
HOUSE
BUSINESS
RETENTION WALL

ROCK OUTCROP
DRAINAGE BASIN BOUNDARY
INTERMITTENT STREAM
PERENIAL STREAM
EPHEMERAL POND
PERENIAL POND
CLASS V INJECTION WELL
TYPE I SINKHOLE
TYPE II SINKHOLE
TYPE III SINKHOLE
TYPE IV SINKHOLE
TYPE V SINKHOLE
POTENTIAL HAZARD
SWALE

RECHARGE FEATURES

BASE MAP: PARK CITY AND SMITH'S GROVE 7.5' QPO
NEXT GROUNDWATER INTERCEPT, MILL HOLE, PERRYSBAUGH, 3221 CHAUMONT RD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 2-42 HRS.

(A) DRAINAGE IS DIRECTED TO TYPE IV SINK LOCATED ON SHEET CSX-12.

(B) SMALL TYPE V SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE INTO SINK IS CONFINED TO AREA AROUND SINK. EVIDENCE OF PONDING IS VISIBLE.

(C) CLASS V INJECTION WELL AT BASE OF CSX ROADBED. WELL IS A 6 IN. STEEL PIPE EXTENDING 30 TO 40 FT. INTO GROUND WITH WATER IN BOTTOM. PIPE IS EXPOSED 1.5 FT. ABOVE SURFACE.

(D) TYPE IV SINK ADJACENT TO RAILROAD STREET AT BASE OF CSX ROADBED. EVIDENCE OF PONDING IS VISIBLE.

(E) PERENNIAL POND IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH DIRECTLY TO POND, BUT IS NOTED DUE TO ITS PROXIMITY.

(F) PERENNIAL POND IN OPEN FIELD BETWEEN A BARN AND STATE ROUTE 1339. DRAINAGE FROM CSX DOES NOT REACH DIRECTLY TO POND, BUT IS NOTED DUE TO ITS PROXIMITY.

(G) TYPE IV SINK IN OPEN FIELD ADJACENT TO RAILROAD STREET AT BASE OF CSX ROADBED. SINK HAS A COLLAPSE 4 FT. WIDE AND FILLED WITH ROCKS AND GRASS.

(H, PP, V, UU) SWALE AT BASE OF CSX ROADBED.

(I, VV) 2 SWALES ON EITHER SIDE OF CSX ROADBED.

(J) PERENNIAL POND IN OPEN FIELD ADJACENT TO CSX R.O.W.

(K) TYPE V SINK IN FIELD ADJACENT TO CSX R.O.W. EVIDENCE OF PONDING IS VISIBLE.

(L) TYPE I SINK IN WOODED AREA SOUTH OF STATE ROUTE 1339. DRAINAGE FROM CSX DOES NOT REACH SINK, BUT IS NOTED DUE TO ITS PROXIMITY.

(M) TYPE I SINK IN WOODED AREA DIRECTLY ADJACENT TO CSX R.O.W. SINK IS 30 FT. WIDE AND 8 FT. DEEP WITH 2 FT. CRAWLWAY INTO A CAVE AT BOTTOM.

(N) TYPE III SINK IN SMALL WOODED AREA IN OPEN FIELD ADJACENT TO CSX R.O.W.

(P) TYPE IV SINK IN PARTIALLY WOODED FIELD ADJACENT TO CSX R.O.W. THERE IS A HOUSE TRAILER AT BOTTOM OF THIS STEEP SINK. EVIDENCE OF PONDING IS VISIBLE.

(R, X, JJ) TYPE V SINK IN OPEN FIELD ADJACENT TO CSX R.O.W.

(S) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 40 FT. WIDE, 60 FT. LONG, 25 FT. DEEP AND HAS SOME GARBAGE.

(T) PERENNIAL POND AT EDGE OF WOODED FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH POND, BUT IS NOTED DUE TO ITS PROXIMITY.

(U) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W.

(W) PERENNIAL POND DIRECTLY ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT DIRECTLY REACH POND, BUT IS NOTED DUE TO ITS PROXIMITY.

(Y) TYPE I SINK IN SMALL WOODED AREA IN OPEN FIELD 400 FT. NORTH OF CSX R.O.W. SINK HAS 2 COLLAPSES: ONE 10 FT. WIDE, 4 FT. DEEP, WITH 1 FT. DRAIN; THE OTHER, 30 FT. WIDE, 15 FT. DEEP, WITH 2 FT. HIGH CRAWLWAY.

(Z) TYPE IV SINK IN OPEN FIELD 500 FT. NORTH OF CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH SINK, BUT IS NOTED DUE TO ITS PROXIMITY.

(AA) TYPE I SINK IN SMALL WOODED AREA IN OPEN FIELD 600 FT. NORTH OF CSX R.O.W. SINK IS 60 FT. LONG, 30 FT. WIDE, 15 FT. DEEP WITH VERTICAL WALLS AND HAS AT LEAST 15 OLD CARS IN BOTTOM. DRAINAGE FROM CSX DOES NOT REACH SINK, BUT IS NOTED DUE TO ITS PROXIMITY.

(BB) TYPE II SINK IN OPEN FIELD 600 FT. NORTH OF CSX R.O.W. SINK IS 40 FT. WIDE, 20 FT. DEEP WITH VERTICAL WALLS AND GRASS, LIMBS AND GARBAGE IN BOTTOM. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(CC) TYPE II SINK AT BASE OF CSX ROADBED. SINK IS 60 FT. LONG, 30 FT. WIDE, 20 FT. DEEP AND FILLED WITH GARBAGE.

(DD) PERENNIAL POND IN OPEN FIELD DIRECTLY ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH POND DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(EE) TYPE II SINK IN WOODED AREA DIRECTLY ADJACENT TO CSX R.O.W. SINK IS 40 FT. WIDE AND 30 FT. DEEP.

(FF) TYPE V SINK IN OPEN FIELD 450 FT. NORTH OF CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(GG) PERENNIAL POND IN OPEN FIELD 500 FT. NORTH OF CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH POND DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(HH) TYPE II SINK IN SMALL WOODED AREA DIRECTLY ADJACENT TO CSX R.O.W. SINK IS 30 FT. WIDE AND 15 FT. DEEP.

(II) TYPE IV SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(KK) TYPE I SINK IN WOODED AREA IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 50 FT. WIDE, 30 FT. DEEP WITH A 20 FT. WIDE, 3 FT. HIGH ROCK SHELTER CAVE AT BOTTOM. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(LL) TYPE I SINK IN SMALL WOODED AREA IN OPEN FIELD. SINK IS 60 FT. WIDE, 20 FT. DEEP WITH A CAVE IN BOTTOM. WATER IS HEARD DRIPPING IN CAVE. ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH SINK, BUT IS NOTED DUE TO ITS PROXIMITY.

(MM) TYPE II SINK IN OPEN FIELD ADJACENT TO WOODED AREA 400 FT. NORTH OF CSX R.O.W. SINK IS 4 FT. WIDE, 5 FT. DEEP WITH 1 FT. DRAIN.

(NN) TYPE II SINK AT EDGE OF WOODED AREA 400 FT. NORTH OF CSX R.O.W.

(RR) PERENNIAL POND IN OPEN FIELD ADJACENT TO CSX R.O.W.

(SS) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W.

(TT) TYPE IV SINK IN OPEN FIELD DIRECTLY ADJACENT TO CSX R.O.W.

(WW) PERENNIAL POND IN SMALL WOODED AREA NEAR CSX R.O.W.

POTENTIAL HAZARDS

(Xx) AN OLD ICE HOUSE USED IN YEARS PAST WITH BUILDING STRUCTURE GONE. WHAT REMAINS IS A DEPRESSION WITH RAISED WALLS THAT APPEARS TO HOLD WATER.

SIGNS AND RAILROAD FEATURES

(YY) WOODEN RETENTION WALL

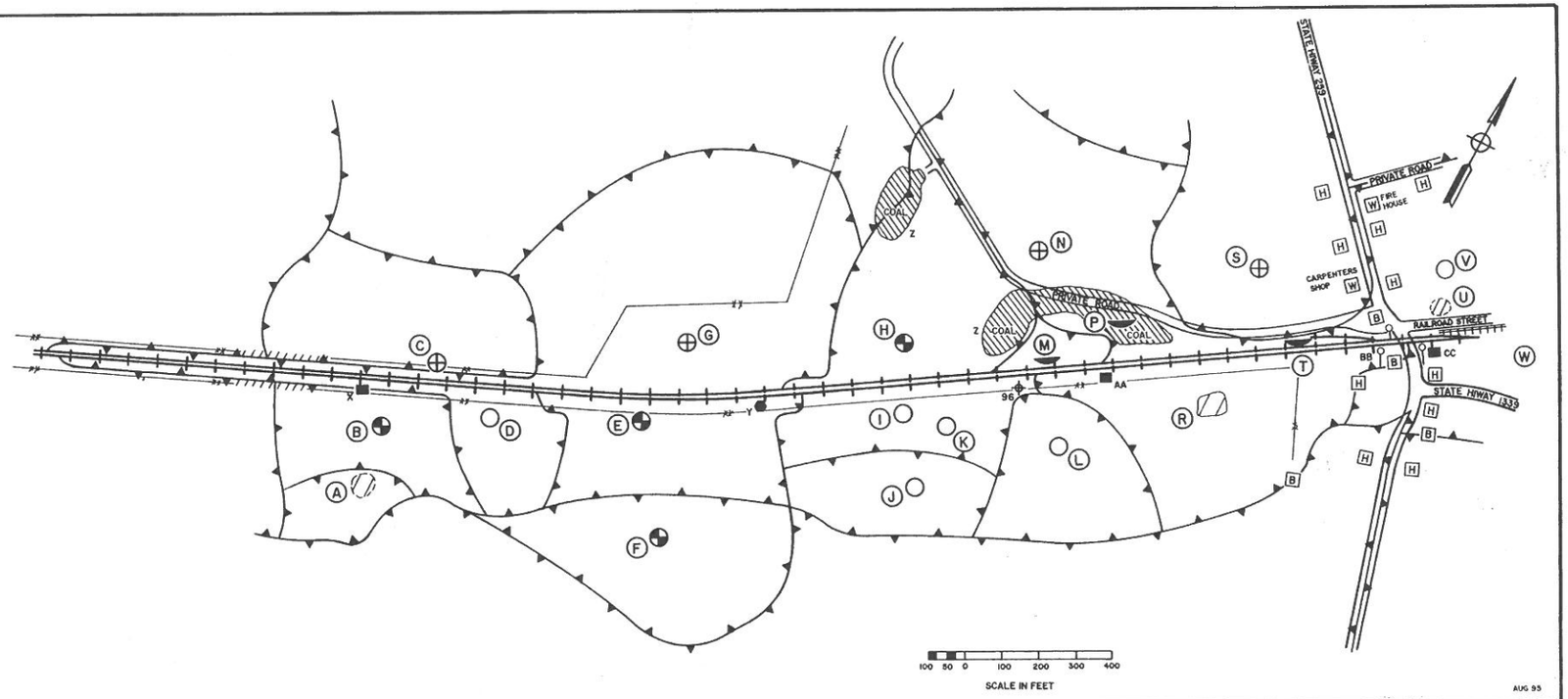
(ZZ) RAILROAD TRAFFIC LIGHT

(AB) (WHITE) W (WHISTLE SIGN)

(AC) (WHITE) W X (WHISTLE & CROSSING SIGN)

(AD) SILVER CONTROL BOX

SHEET CSX-12



RAILROAD
INTERSTATE 65
U.S. ROUTE
STATE ROUTE
LOCAL ROUTE
PRIVATE ROAD
FENCE
SIGN
MILE MARKER
RAILROAD TRAFFIC LIGHT
CONTROL/SWITCH BOX
CULVERT
BARN
HOUSE
BUSINESS
RETENTION WALL

ROCK OUTCROP
DRAINAGE BASIN BOUNDARY
INTERMITTENT STREAM
PERENIAL STREAM
EPHEMERAL POND
PERENIAL POND
CLASS V INJECTION WELL
TYPE I SINKHOLE
TYPE II SINKHOLE
TYPE III SINKHOLE
TYPE IV SINKHOLE
TYPE V SINKHOLE
POTENTIAL HAZARD
SWALE

RECHARGE FEATURES

BASE MAP: SMITH'S GROVE 7.5' TOPO. NEXT GROUNDWATER INTERCEPT, MILL HOLE, PERRY SEBAUGH, 3221 CHAUMONT RD. GROUNDWATER TRAVEL TIMES TO MILL HOLE: 2-42 HRS.

(A) EPHEMERAL POND IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH POND DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(B) TYPE II SINK IN SMALL GROVE OF TREES IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK HAS COLLAPSE .3 FT. WIDE, 2 FT. DEEP. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(C) TYPE IV SINK AT BASE OF CSX ROADBED.

(D) TYPE V SINK IN OPEN FIELD ADJACENT TO CSX R.O.W.

(E) TYPE II SINK AT BASE OF CSX ROADBED. SINK IS 20 FT. WIDE, 5+ FT. DEEP WITH SMALL AMOUNT OF GARBAGE.

(F) TYPE II SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. SINK IS 30 FT. WIDE, 5+ FT. DEEP AND FILLED WITH GARBAGE. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(G) TYPE IV SINK IN WOODED AREA WITH HEAVY UNDERGROWTH ADJACENT TO CSX R.O.W.

(H) TYPE II SINK IN WOODED AREA WITH HEAVY UNDERGROWTH AT BASE OF CSX ROADBED. SINK HAS 2 COLLAPSES; ONE IS 5 FT. WIDE, 4 FT. DEEP, THE OTHER 4 FT. WIDE, 3 FT. DEEP.

(I)(K) TYPE V SINK IN OPEN FIELD ADJACENT TO CSX R.O.W.

(J)(L) TYPE V SINK IN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(M)(T) SWALE ADJACENT TO CSX R.O.W.

(N) TYPE IV SINK IN WOODED AREA WITH HEAVY UNDERGROWTH ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(P) SWALE IN EXCESS COAL FLAT AND ADJACENT TO A SMALL HILL AND CSX R.O.W.

(R) PERENNIAL POND IN OPEN FIELD ADJACENT TO CSX R.O.W.

(S) TYPE IV SINK IN OVERGROWN OPEN FIELD ADJACENT TO CSX R.O.W. DRAINAGE FROM CSX DOES NOT REACH SINK DIRECTLY, BUT IS NOTED DUE TO ITS PROXIMITY.

(U) EPHEMERAL POND ADJACENT TO RAILROAD STREET. THIS POND WILL HOLD WATER UNDER HEAVY RAIN CONDITIONS FOR A DAY OR TWO.

(V) TYPE V SINK IN OPEN FIELD ADJACENT TO RAILROAD STREET. EVIDENCE OF PONDING IS PRESENT.

(W) DRAINAGE IS DIRECTED TO TYPE IV SINK LOCATED ON SHEET CSX-11.

SIGNS AND RAILROAD FEATURES

(X) SILVER CONTROL BOX

(Y) (WHITE) W (WHISTLE SIGN)

(Z) LEFT OVER COAL FROM WHEN IT WAS OFFLOADED IN YEARS PAST

(AA) SILVER CONTROL BOX 5'TALL X 1.5'WIDE X 1.5'DEEP

(BB) RAILROAD TRAFFIC LIGHT

(CC) TWO RAILROAD TRAFFIC LIGHTS AND CEMENT CONTROL BUILDING

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Project Identification - PMIS 204345	
Project Title: Endangered Kentucky Cave Shrimp Status and Trends	**Project Total Cost:** $121,187.40
Park/Unit: Mammoth Cave National Park	**Region:** Southeast
States: KY	**Congressional Districts:** KY02
	Reference Number:
Project Type: Non-facility , Multi-component , Partnership	**Financial System Package Number:** MACA 204345
Contact Person: Rick Olson	**Contact Phone:** 270-758-2138

Project Status - PMIS 204345	
Date Created: 10/30/13	**Review Status:** Draft Project / Awaiting Park Review
Date of Last Update: 10/31/13	**Updated By:** Rick Olson

Project Narratives - PMIS 204345

Description

The Kentucky Cave shrimp (Palaemonias ganteri)is a federally endangered species that is endemic to the Mammoth Cave area. Mammoth Cave is the type locality for the species. It is an important part of a cave biota that is considered to be one of the most diverse in the world and which has been recognized (through enshinement of Mammoth Cave as a world heritage site under criterion X) as one of the world's most important and significant natural habitats for in-situ conservation of biological diversity. A recent U. S. Fish and Wildlife Service (USFWS) review of Kentucky cave shrimp indicated a need for data in flooded passages to determine status and trends as a top priority. Data have been taken in cave stream passages on cave adapted fauna on an infrequent basis, but no observations have been made in totally flooded passages for three decades. The first step will be to conduct a cartographic survey of flooded passages so that biological data can be tied to documented stream segments.

Water quality is monitored long term, and coliform bacterial are monitored in shrimp habitat in the headquarters area. If shrimp census data indicate a recovery, then the park will work with USFWS to consider down-listing from endangered to threatened. If census data show no recovery, then the park will work with USFWS to effect removal of Lock and Dam #6 on Green River. We will also contact CSX Railroad to discuss catchment/filtration basins similar to those installed along Interstate Highway 65. Given the logistics of cave diving, and the requirement for clear water that only occurs under extended periods of base flow conditions, this will be a multi-year effort. The park has two outstanding partnerships that will insure success of the project: the Mammoth Cave International Center for Science and Learning, and the Cave Research Foundation. These organizations can provide both field support and fiscal management.

Justifications

Justifications

Introduction

The Kentucky Cave Shrimp inhabits water-table level underground passages in ten groundwater basins in the

Mammoth Cave area (USFWS 1988). Eight of these basins lie wholly or partially in MACA and two lie just upstream from the park. According to the most recent (and only range-wide) tentative population estimates, at least 95% of the shrimp's known population occurs in the park (USFWS, 1988). The designated critical habitat for the Kentucky Cave Shrimp is located entirely within the park (USFWS 1983). Therefore, the NPS is the primary agency responsible for ensuring the survival of the Kentucky Cave Shrimp. Problem Statement The shrimp's habitat consists of partially and completely flooded cave passages near and below the local water-table. Census work on shrimp in flooded passages was initially conducted nearly three decades ago, no such work has been conducted since then, and so USFWS has concluded that current data are needed in order to assess the status of this endangered species. The primary threat to the survival of the shrimp is the decline in groundwater quality, due to either long-term systemic changes in the groundwater quality (due to changes in land use) or rare episodic water quality crises caused by spills of various chemicals. For example, during flood pulses fecal coliform levels can exceed 20,000 colony forming units per 100 ml! (Meiman 2006). Impoundment of Green River by Lock and Dam#6 has caused habitat degradation as well (USFWS 1988 p. 15, Olson 2005). Specific threats listed by USFWS (2010, p. 6) include contamination from "random traffic accidents (e.g., trucks carrying toxic chemicals) along Interstate 65 (I-65) and other local highways; oil and gas activities; agriculture; permitted discharges from industry, wastewater treatment plants, and other sources; and general nonpoint-source pollution." Although some of these threats, such as those from septic systems, have probably lessened since the species was listed due to the installation and maintenance of a regional sewer system. In addition, other threats such as those represented by oil and gas development and the transport of chemicals along local transportation corridors have increased. Another source of stress to Kentucky cave shrimp populations is weather extremes, likely linked to climate change. Of the extremes, droughts deliver the most severe stress because organic matter normally transported into caves by rainwater through sinkholes is curtailed as is back flooding from Green River into base level cave passages where shrimp live. Shrimp and other members of the base level aquatic community such as Northern cave fish slowly starve until organic matter from the surface is replenished. Extreme flooding is also detrimental because animals may be physically damaged by water moving at high velocity, organic matter may be scoured from the bottoms of pools where it normally accumulates. During static and recessional phases of flooding, fine sediment can bury organic matter still in place, which renders it unavailable. Almost all known shrimp habitat is found within the park, but the groundwater basins that provide water to that habitat often extend well outside the park's boundary. So, although the NPS is largely responsible for the shrimp's survival, we do not control all of the threats to them.

Objectives

The proposed project will have the following objectives: 1. Within the designated critical habitat and associated cave stream passages, survey flooded cave stream passages to enable quantification of shrimp and other macro-aquatic biota and determine the geographic location of habitat. 2. Gather data on the densities and size-distributions of shrimp, fish, and crayfish within flooded cave streams in and near the park. 3. Produce GIS-based maps showing habitat locations and densities of macro-aquatic biota, particularly Kentucky cave shrimp. 4. If shrimp census data indicate no recovery, then restore habitat by working with USFWS to effect removal of Lock and Dam #6 on Green River and enhance protection by working with CSX Railroad to install retention/filtration basins like those now on Interstate Highway 65 to protect growundwater quality.

Methods

The first component of the project will implement a mapping program to identify and quantify the amount of submerged shrimp habitat within the designated critical habitat and associated cave stream passages. The 1980s census was done on a reconnaissance basis in that no underwater survey was conducted, and this was a serious deficiency. Developing a comprehensive map of the cave shrimp habitats is necessary to both be sure all areas are included in the new census and to provide quantitative area data for shrimp density and population trend estimates. There are at least six (6) submerged passages off Roaring River that need to be mapped, and based upon groundwater hydrology maps these could each go as much as mile, which woiuld add significantly to our understanding of Kentucky cave shrimp habitat. Mapping submerged cave shrimp habitat is a highly technical and challenging task. It involves mapping both submerged and partially submerged cave passages in 14°C water. First, dive line must be secured in the flooded passages for safety and to allow establishment of permanent survey stations. Data collected during cartographic survey include distance from station to station, compass bearing, inclination, and passage dimensions from each station (right wall, left wall, ceiling, floor). The divers can note depth with their depth gages. Some reviewers have wondered if the cartographic survey and biological census work could be done simultaneoulsly. The process of setting dive line and taking cartographic survey data is all-consuming. As well, the turbulence caused during the mapping process would also spook aquatic cave life, and they will take refuge in small spaces as they do when the leading edge of a flood pulse arrives.

The cave diving and mapping will be done by experienced, certified cave divers associated with the Cave Research Foundation (CRF). Some reviewers wondered how safety will be addressed. The divers must file a dive plan, and this will be reviewed by the SERO Dive Officer and Risk Management Officer. The CRF is a quasi-professional caving organization that has partnered with MACA on cave mapping, research, management, and education for over 50 years. The park and CRF will partner in support of the cave diving trips that are required to both map the shrimp habitat and