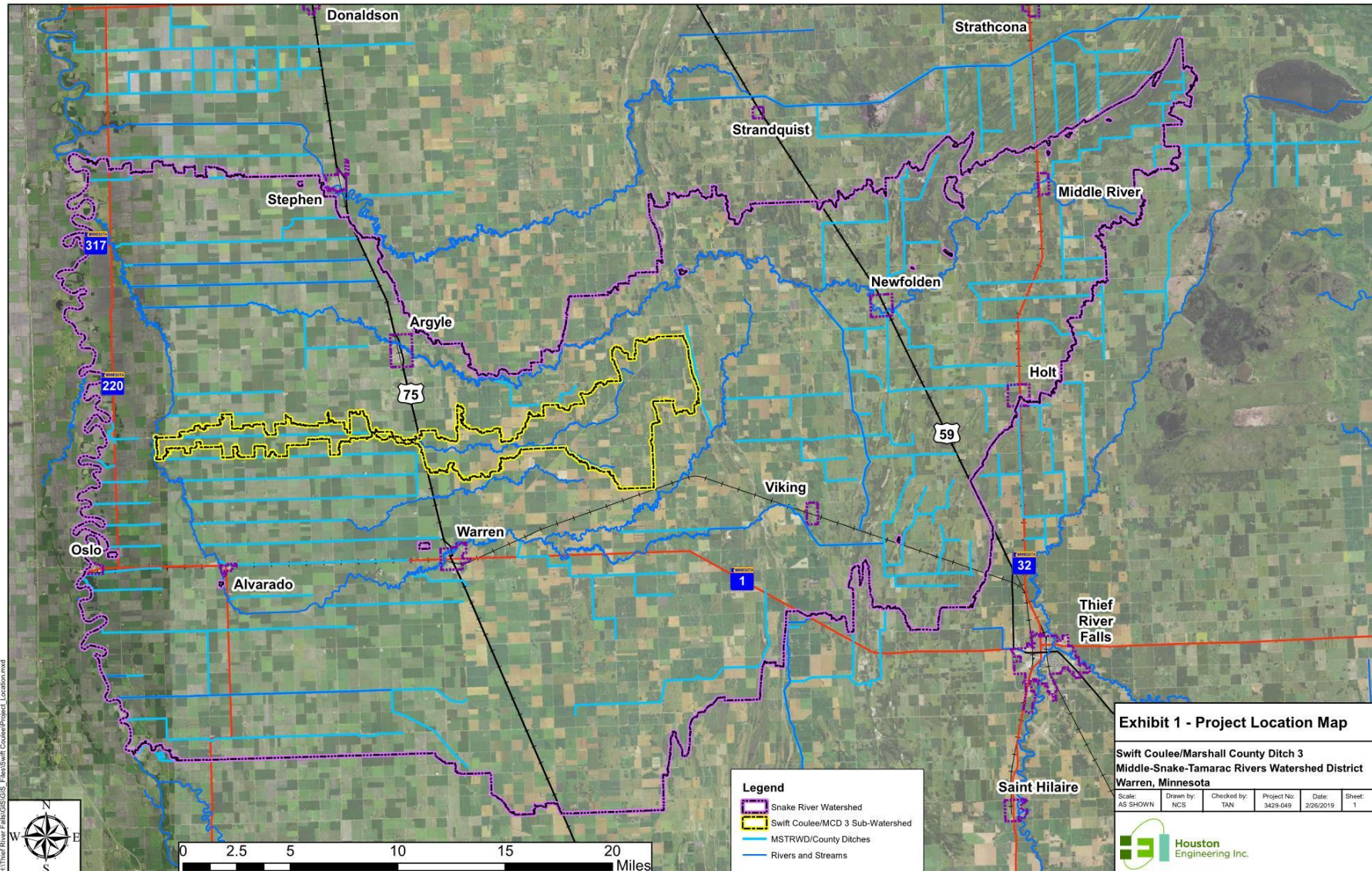


SWIFT COULEE / MARSHALL COUNTY DITCH #3

MIDDLE-SNAKE-TAMARAC RIVERS WATERSHED DISTRICT

FEBRUARY 11, 2021



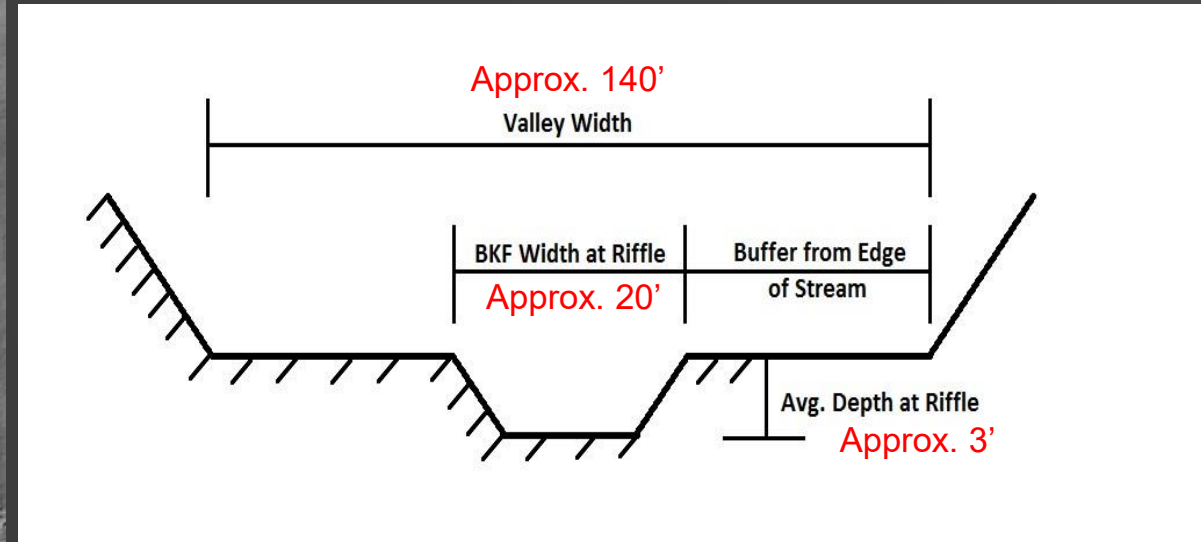
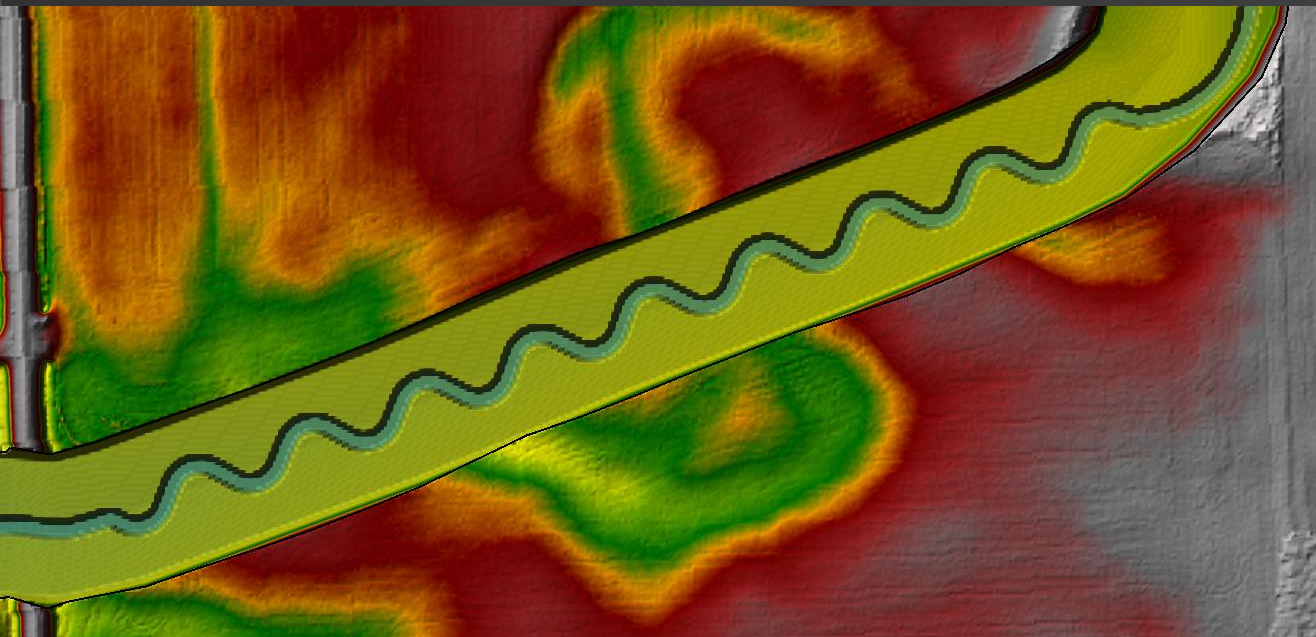


- Tasks completed
 - Purpose and Need of Project – Concurrence Point #1
 - Potential Alternatives and Alternatives to Carry Forward – Concurrence Point #2
 - Individual Meetings with Majority Landowners where Alternatives were Identified
 - Identification of the Selected Alternative – Concurrence Point #3
 - Task On-Going
 - Alt.11 of Restoration with Impoundment D shows the most benefit meeting the purpose and need
 - Landowner Unwillingness – Alt. 11
 - Last Project Team Meeting Landowners – Share Flooding Burden
 - Channel Restoration – Setback Levees Discussed and MSTRWD Board Moved Forward for Modeling
 - Today discuss channel restoration/setback levee/culvert sizing alternative
 - Project Team - Get feedback & make recommendation for alternative to MSTRWD Board

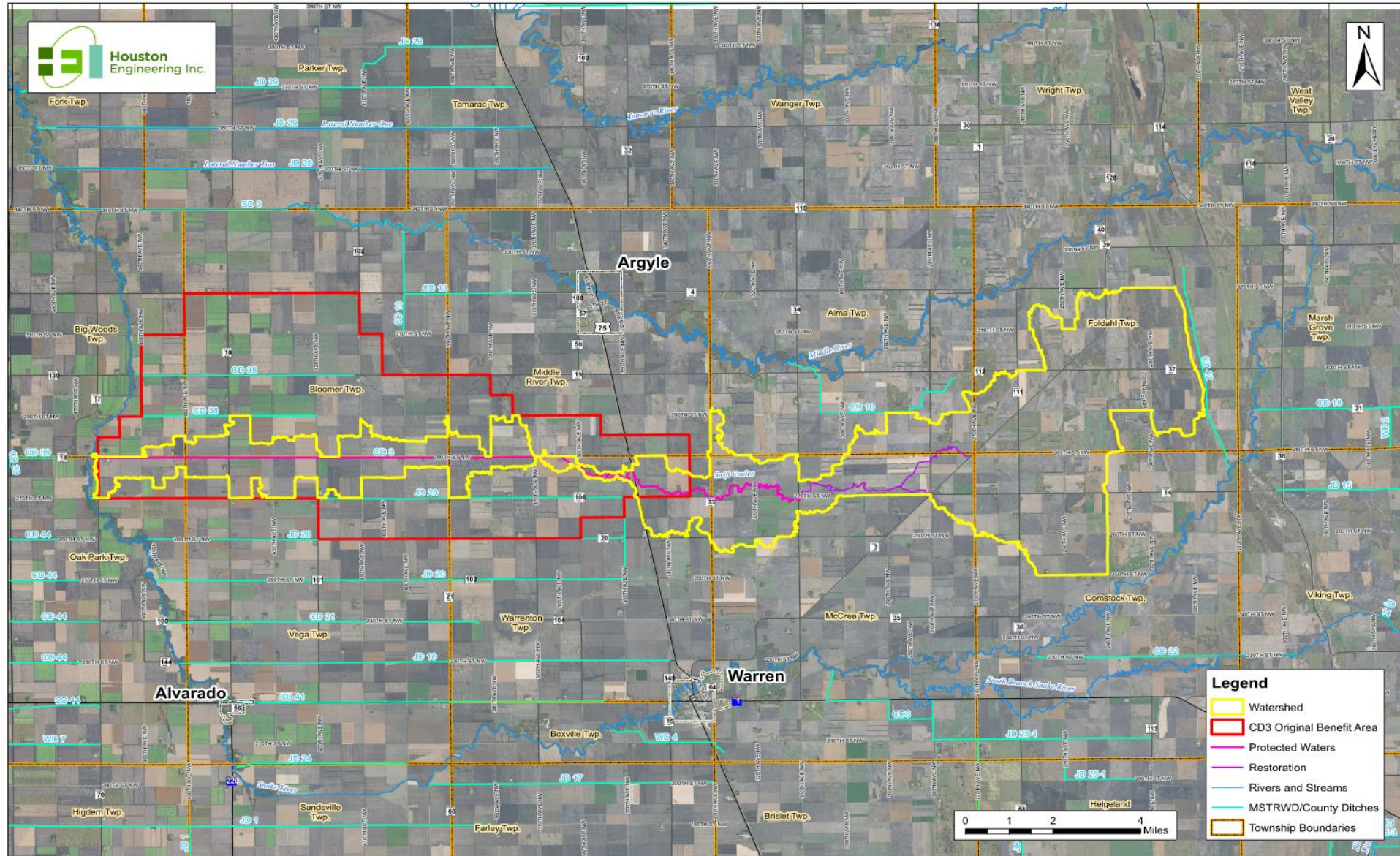
Review Hydraulic & Hydrologic Modeling Results

E- Channel Restoration

- Culvert to Culvert Profile – Multiple Centerline Culverts Modified to Simulate Existing 10-yr Peak Flows
- Historic Aerial Photography – Add Meander Back into Channel Alignment with Set Back Levees
- Image of 1.5-yr Meandering Channel with 10-yr Floodplain and Set Back Levees



CHANNEL RESTORATION/SETBACK LEVELLEE EXTENT

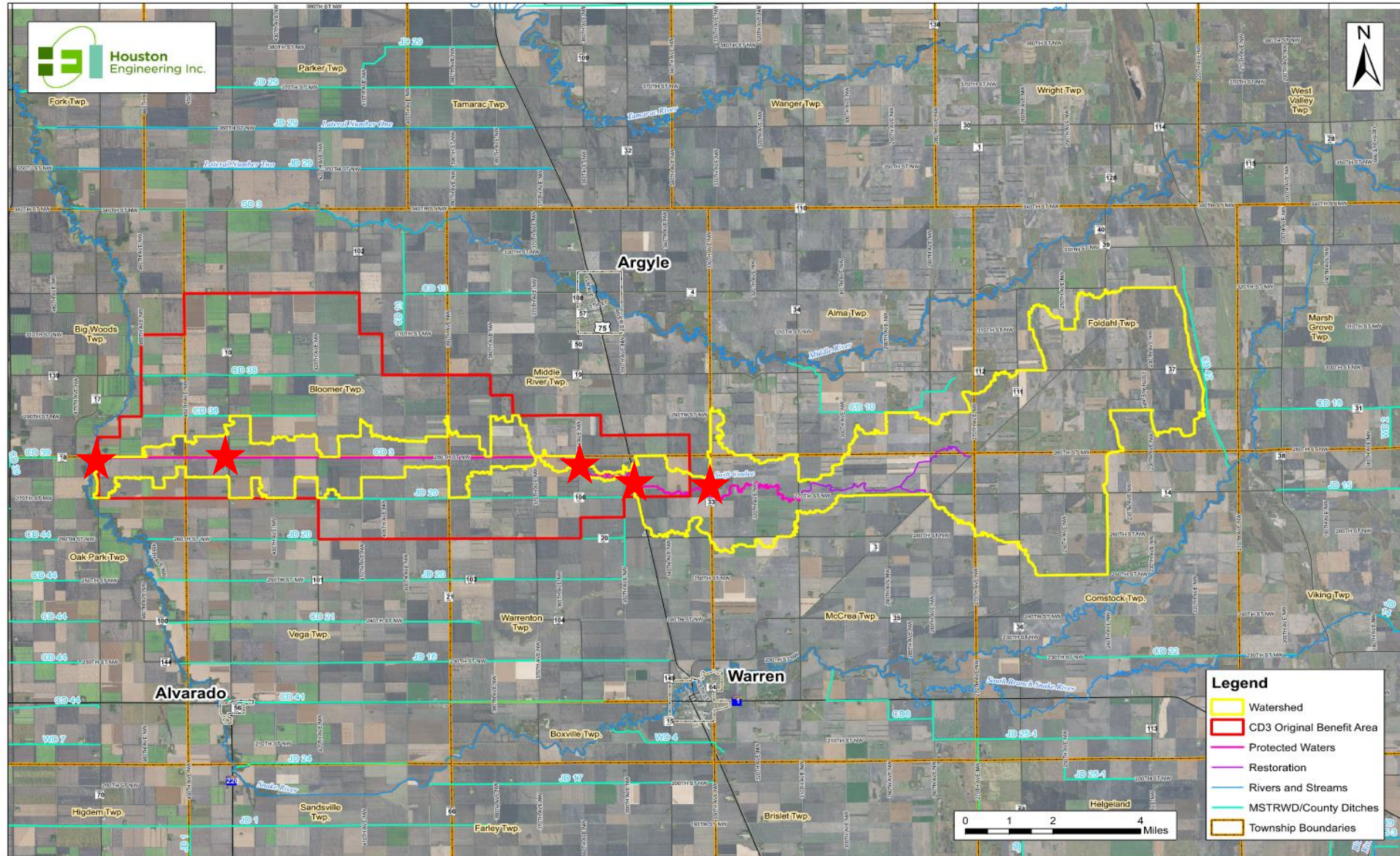


CHANNEL RESTORATION CULVERT CHANGES

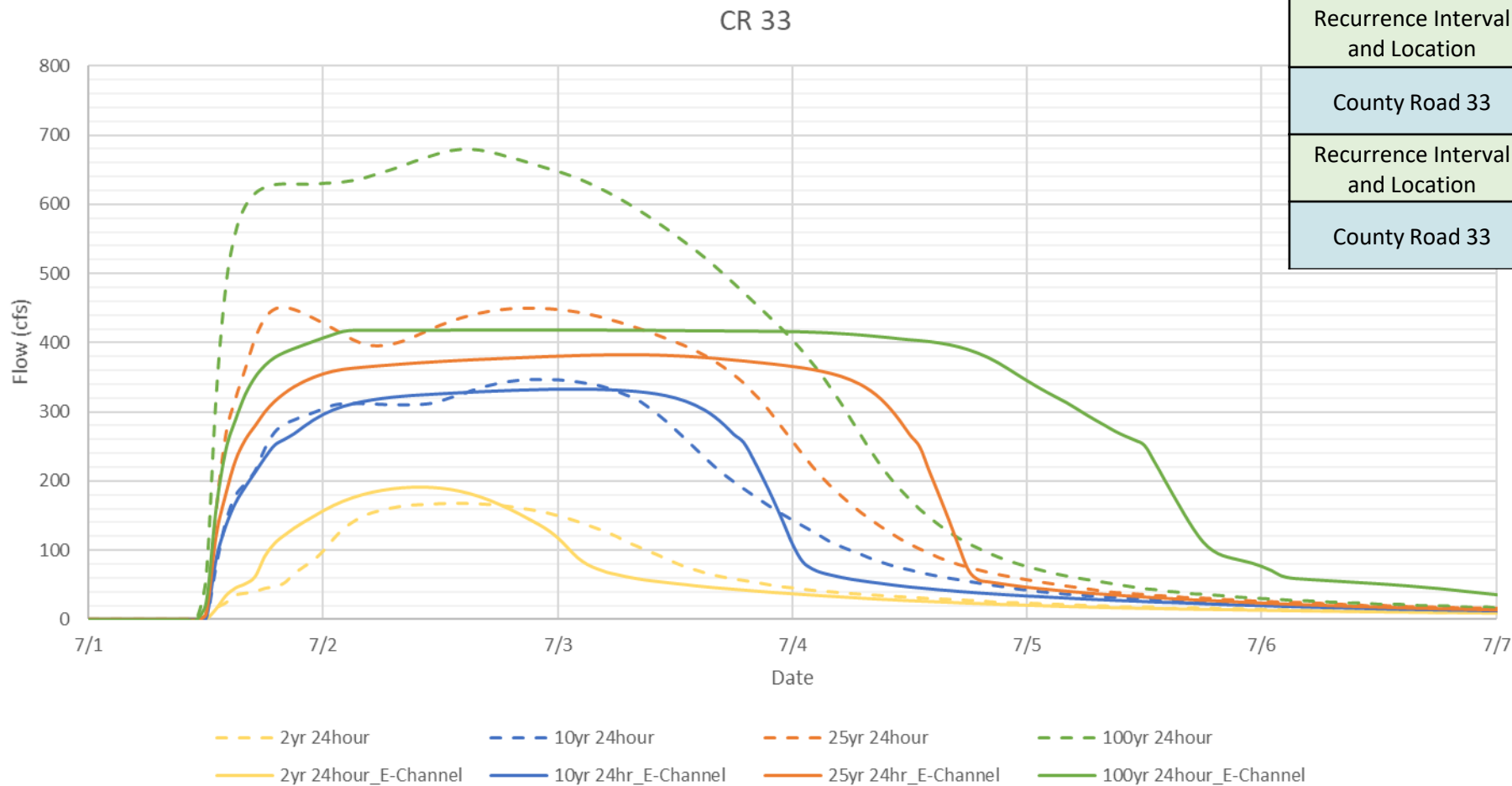


Location	Existing	Proposed
◆ County Ditch 3	Box Culverts 2- 12'X6'	Box Culvert 10'X5'
US Highway 75	Box Culverts 3 - 10'X5'	Box Culverts 3 - 10'X5'
◆ 340 th Ave NW	Box Culverts 2- 10'X6'	Box Culvert 8'X5'
◆ County Road 33	Box Culvert 12'X8'	Box Culvert - 6'X5'
◆ 320 th Ave NW	CMP 6' 5' & 5'	CMP 5' & 4'
◆ County Road 34	CMPA 2 - 6.08'X4.5'	CMPA 2 - 5.58'X3.4'
◆ 270 th St NW	CMP 2 - 5.5'	CMP 5' & 5'
◆ 300 th Ave NW	CMP 5' 4' & 3'	CMP 5' 3' & 2'
◆ 290 th Ave NW	CMP 5' & 3'	CMP 5' 3' & 2'
County Road 1	CMPA 6'X3.7'	CMPA 6'X3.7'
Driveway	CMP 6'	CMP 6'

REPORTING LOCATIONS



CHANNEL RESTORATION RESULTS –CR 33



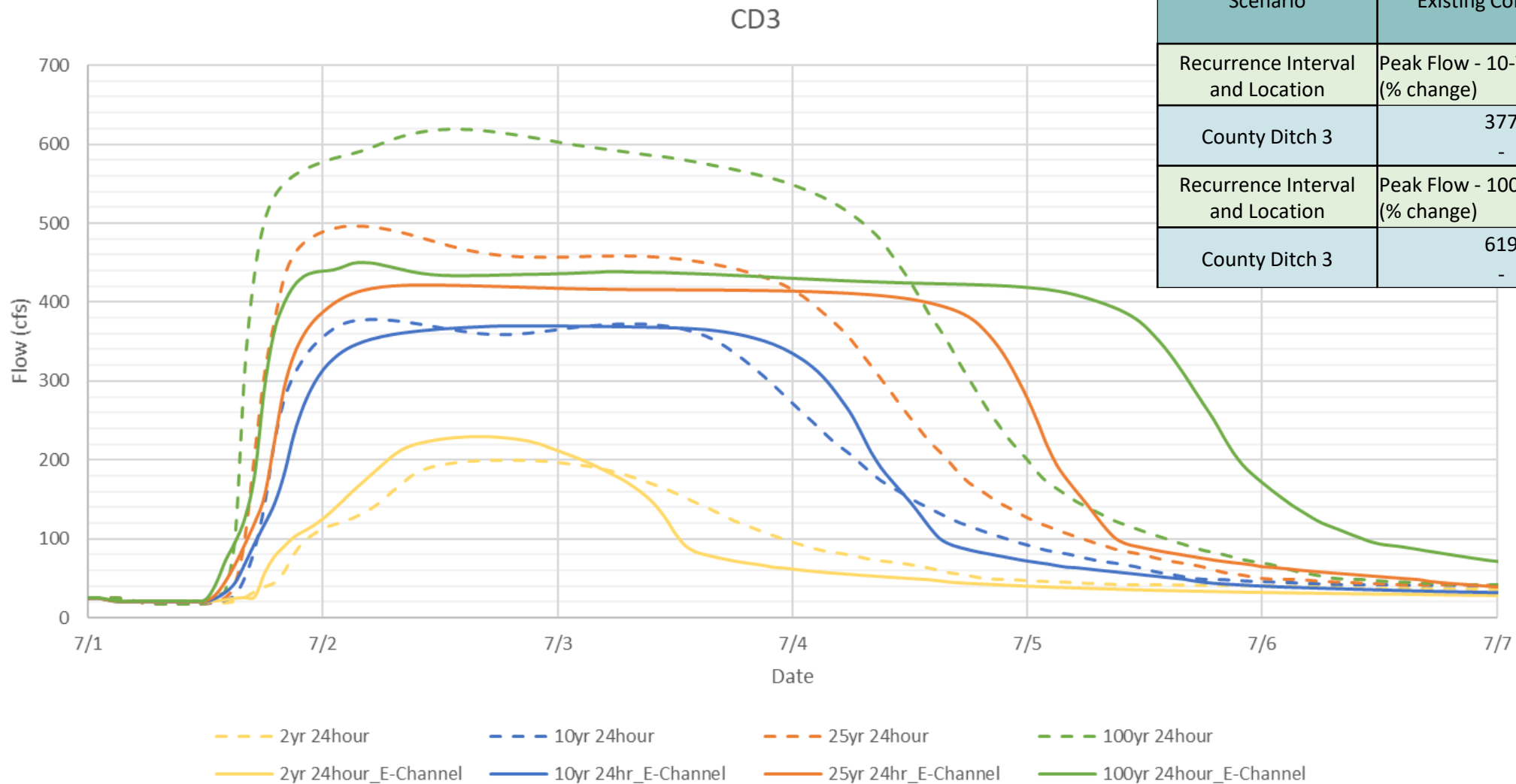
Scenario	Existing Conditions	Alternative 13: E-Channel Restoration with Floodplain/Centerline Culvert Sizing
Recurrence Interval and Location	Peak Flow - 10-Year, 24-Hour cfs (% change)	
County Road 33	347	333
	-	-4.0%
Recurrence Interval and Location	Peak Flow - 100-Year, 24-Hour cfs (% change)	
County Road 33	680	419
	-	-38.4%

CHANNEL RESTORATION RESULTS –HWY 75



Scenario	Existing Conditions	Alternative 13: E-Channel Restoration with Floodplain/Centerline Culvert Sizing
Recurrence Interval and Location	Peak Flow - 10-Year, 24-Hour cfs (% change)	
US HWY 75	384	371 -3.4%
Recurrence Interval and Location	Peak Flow - 100-Year, 24-Hour cfs (% change)	
US HWY 75	859	690 -19.7%

CHANNEL RESTORATION RESULTS –BEGINNING OF CD 3

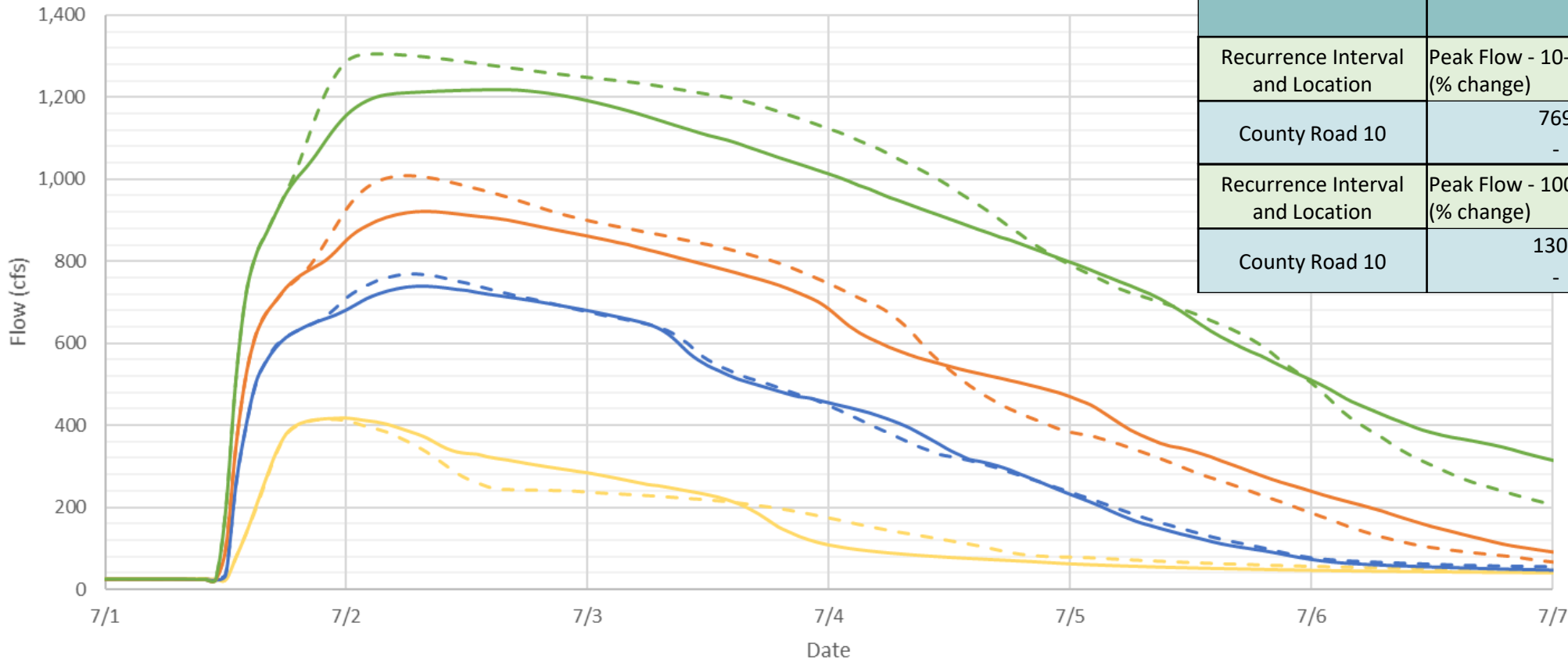


Scenario	Existing Conditions	Alternative 13: E-Channel Restoration with Floodplain/Centerline Culvert Sizing
Recurrence Interval and Location	Peak Flow - 10-Year, 24-Hour cfs (% change)	
County Ditch 3	377 -	369 -2.1%
Recurrence Interval and Location	Peak Flow - 100-Year, 24-Hour cfs (% change)	
County Ditch 3	619 -	450 -27.3%

CHANNEL RESTORATION RESULTS –CR 10



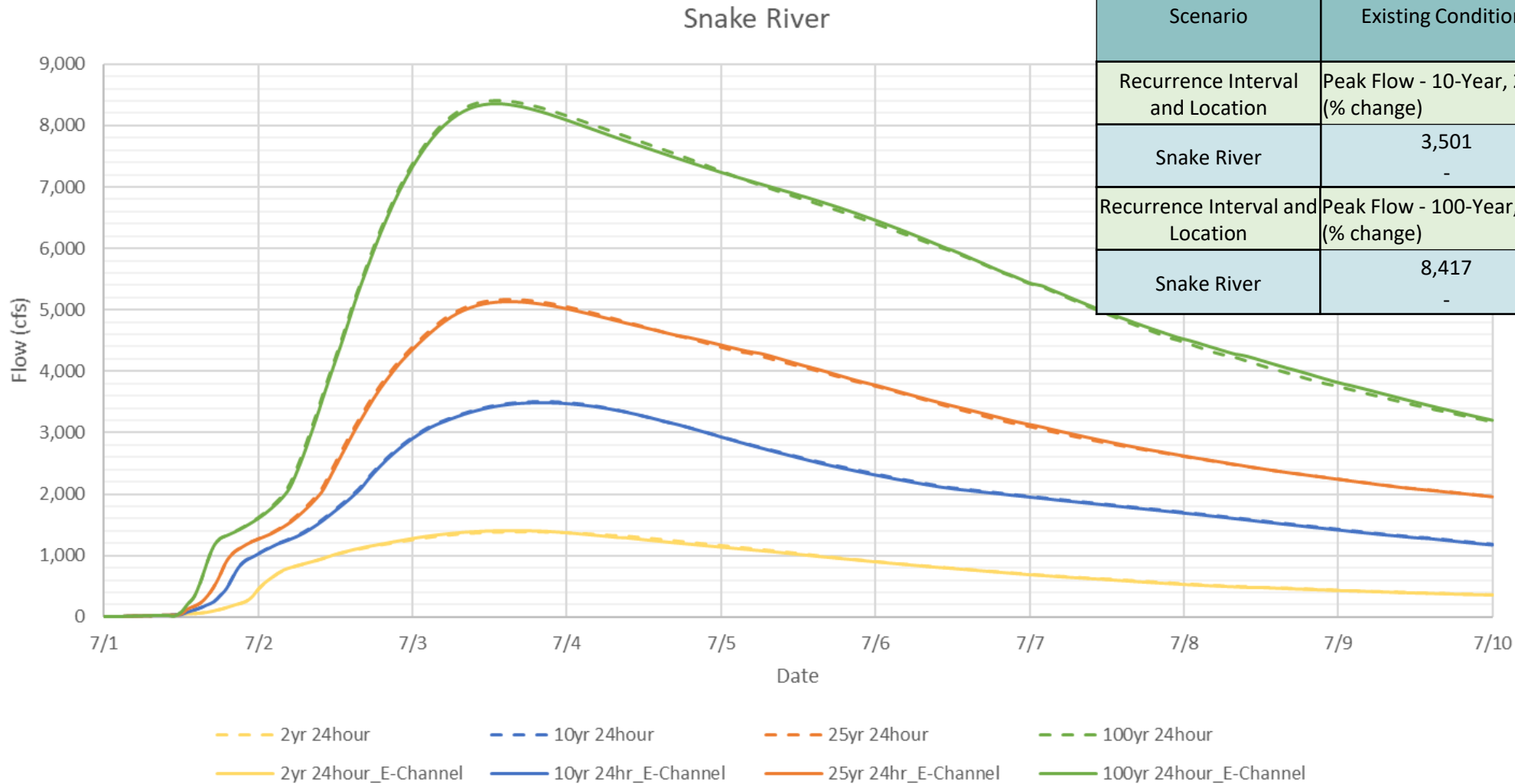
CR 10 (Full Transect)



--- 2yr 24hour --- 10yr 24hour --- 25yr 24hour --- 100yr 24hour
— 2yr 24hour_E-Channel — 10yr 24hr_E-Channel — 25yr 24hr_E-Channel — 100yr 24hour_E-Channel

Scenario	Existing Conditions	Alternative 13: E-Channel Restoration with Floodplain/Centerline Culvert Sizing
Recurrence Interval and Location	Peak Flow - 10-Year, 24-Hour cfs (% change)	
County Road 10	769 -	739 -3.9%
Recurrence Interval and Location	Peak Flow - 100-Year, 24-Hour cfs (% change)	
County Road 10	1305 -	1219 -6.6%

CHANNEL RESTORATION RESULTS – CONFLUENCE SNAKE RIVER

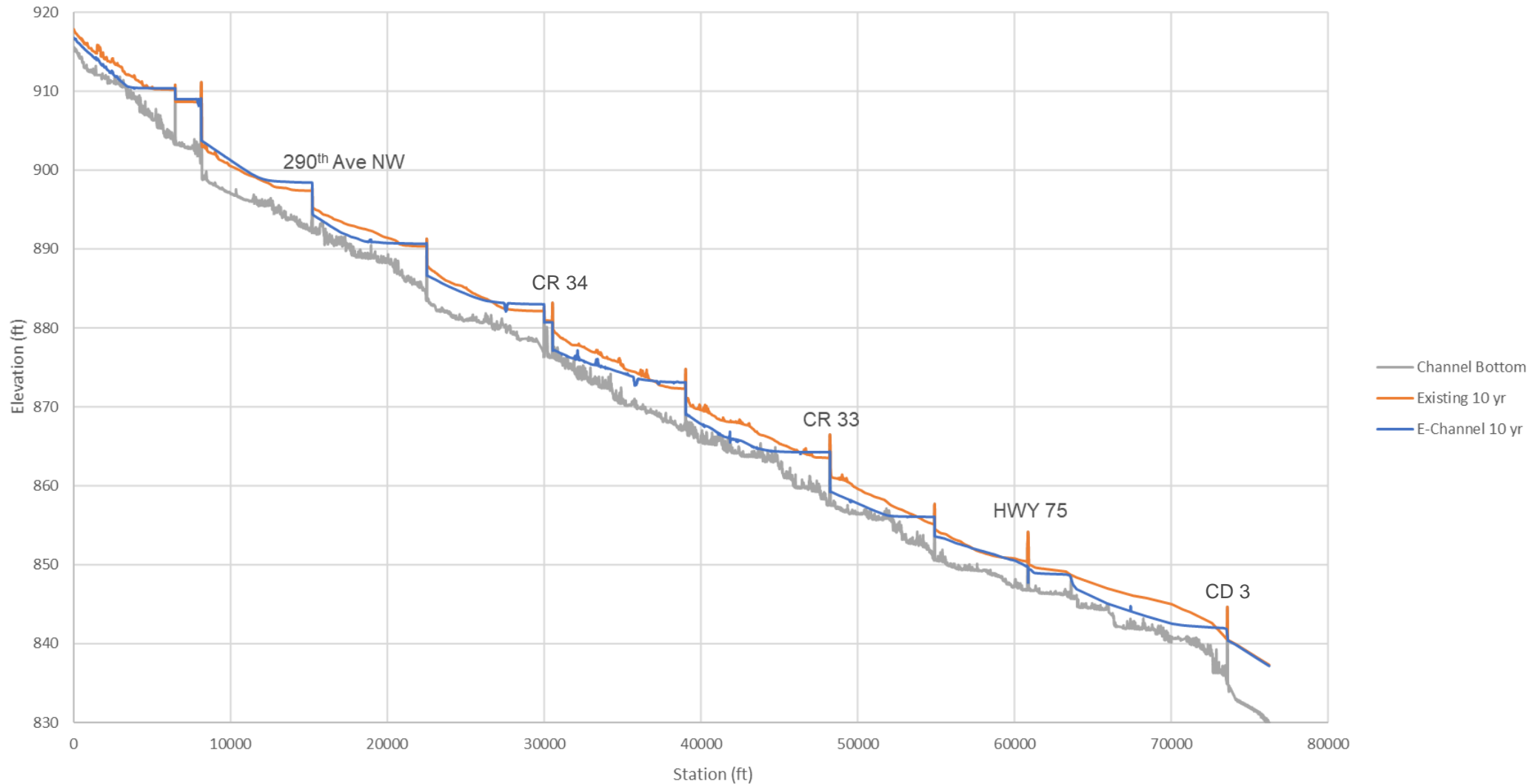


Scenario	Existing Conditions	Alternative 13: E-Channel Restoration with Floodplain/Centerline Culvert Sizing
Recurrence Interval and Location	Peak Flow - 10-Year, 24-Hour cfs (% change)	
Snake River	3,501 -	3,497 -0.1%
Recurrence Interval and Location	Peak Flow - 100-Year, 24-Hour cfs (% change)	
Snake River	8,417 -	8,358 -0.7%

CHANNEL RESTORATION 10-YEAR PROFILE COMPARISON RESULTS



Profile Comparison Existing vs Proposed



CHANNEL RESTORATION 10-YEAR DURATION RESULTS



Duration (Hours)	Existing Conditions		Alternative 13	
	Inundated Acres Upstream of County Ditch 3 10-Year, 24-Hour (% Change)			
	Cropland	Total	Cropland	Total
0-24	2350	2719	2449	2818
	-	-	4.2%	3.6%
24-48	813	998	690	885
	-	-	-15.0%	-11.4%
48-72	448	570	337	484
	-	-	-24.9%	-15.1%
72-96	157	226	140	198
	-	-	-10.8%	-12.4%
96-120	70	107	62	94
	-	-	-11.7%	-12.5%
>120	295	479	299	478
	-	-	1.6%	-0.1%
TOTAL	4133	5099	3978	4957
	-	-	-3.8%	-2.8%
Duration (Hours)	Cropland	Total	Cropland	
24-120 (sum of durations 24-120)	1488		1229	
	-		-17.4%	
>24 hours (sum of durations > 24 hrs)		2380		2139
		-		-10.1%

Duration (Hours)	Existing Conditions		Alternative 13	
	Inundated Acres County Ditch 3 to County Road 10 10-Year, 24-Hour (% Change)			
	Cropland	Total	Cropland	Total
0-24	1869	1923	1895	1951
	-	-	1.4%	1.4%
24-48	699	723	678	700
	-	-	-3.0%	-3.2%
48-72	473	503	422	457
	-	-	-10.7%	-9.0%
72-96	376	402	404	431
	-	-	7.5%	7.2%
96-120	85	96	89	99
	-	-	4.5%	3.5%
>120	146	191	143	185
	-	-	-2.3%	-3.0%
TOTAL	3648	3838	3631	3823
	-	-	-0.5%	-0.4%
Duration (Hours)	Cropland	Total	Cropland	
24-120 (sum of durations 24-120)	1633		1593	
	-		-2.4%	
>24 hours (sum of durations > 24 hrs)		1915		1873
		-		-2.2%

CHANNEL RESTORATION 25-YEAR DURATION RESULTS



Duration (Hours)	Existing Conditions		Alternative 13	
	Cropland	Total	Cropland	Total
Inundated Acres Upstream of County Ditch 3 25-Year, 24-Hour (% Change)				
0-24	3085	3575	3264	3759
	-	-	5.8%	5.2%
24-48	1003	1236	870	1089
	-	-	-13.3%	-11.9%
48-72	679	824	499	654
	-	-	-26.4%	-20.7%
72-96	243	327	231	339
	-	-	-5.0%	3.7%
96-120	83	126	109	146
	-	-	30.7%	16.4%
>120	309	502	334	523
	-	-	8.1%	4.3%
TOTAL	5403	6589	5309	6511
	-	-	-1.8%	-1.2%
Duration (Hours)	Cropland	Total	Cropland	Total
24-120 (sum of durations 24-120)	2009		1710	
	-		-14.9%	
>24 hours (sum of durations > 24 hrs)		3014		2751
		-		-8.7%

Duration (Hours)	Existing Conditions		Alternative 13	
	Cropland	Total	Cropland	Total
Inundated Acres County Ditch 3 to County Road 10 25-Year, 24-Hour (% Change)				
0-24	2285	2349	2322	2387
	-	-	1.6%	1.6%
24-48	797	819	801	824
	-	-	0.6%	0.5%
48-72	667	699	562	584
	-	-	-15.8%	-16.4%
72-96	668	704	525	564
	-	-	-21.4%	-19.8%
96-120	380	400	477	501
	-	-	25.6%	25.3%
>120	221	273	304	358
	-	-	37.1%	31.2%
TOTAL	5019	5245	4992	5218
	-	-	-0.5%	-0.5%
Duration (Hours)	Cropland	Total	Cropland	Total
24-120 (sum of durations 24-120)	2512		2366	
	-		-5.8%	
>24 hours (sum of durations > 24 hrs)		2895		2831
		-		-2.2%

- Present Channel Restoration/Setback Levee Results to Project Team (Today)
 - Recommendations from Project Team
 - Update Concurrence Point #3 Report with Alternative 13 (Restoration with Set-Back Levees) as Preferred Alternative
- Or
- Update Concurrence Point #3 Report with Alternative 11 (Restoration with Impoundment) as Preferred Alternative
-
- MSTRWD Board Decides Go/No Go (Pending Project Team Decision)
 - Move Forward – Submit CP #3 to USACE for Approval on Selected Alt.
 - Shelf Report/Project



Questions/Discussion