Read-Ahead and Reference Document for

Loxahatchee River Watershed Restoration Project

Project Delivery Team Meeting #9
December 13, 2017

Array of Alternative Plans to be Evaluated

Dr Brad Foster

Refinements to Alternatives

BUILDING STRONG

- From Apr 2016 to Nov 2016.
  - Developed additional details for storage facilities, ASRs, canal, weir, seepage management methods…
  - Revised modeling assumptions; initial modeling.
- From Dec 2016 to Apr 2017.
  - Added new topo data for Flow-way 3.
  - Modified natural storage in Alternative 13.
- From May 2017 to Sep 2017.
  - Developed Alternative 12r2.
  - Refined details for measures/features/operations.
  - Refined model assumptions table.

Major Features of the Alternatives

BUILDING STRONG

Alternative	Deep Storage in L-8 Basin	Shallow Storage in L-8 Basin	C-18W Basin Storage	Aquifer Storage and Recovery (ASR)	Primary Delivery Route	Secondary Delivery Route	FW 3 Features
2	None	4,300 acre-feet	7,200 acre-foot reservoir	2 wells at C-18W storage	FW2	FW1	Full range
5	None	None	9,500 acre-foot reservoir	4 wells at C-18W storage	FW2	FW1	Full range
10	44,000 acre-feet	None	7,200 acre-foot reservoir	None	FW1/FW2		Limited
12	25,000 acre-feet	5,000 acre-feet	Increased wetland elevations to support natural storage	None	FW1/FW2		Full range
13	None	6,500 acre-feet	Increased wetland elevations to support natural storage	4 wells at L-8 storage	FW2	FW1	Full range
12r2	44,000 acre-feet	5,000 acre-feet	9,500 acre-foot reservoir & increased wetland elevations to support natural storage	None	FW1/FW2		Full range

ALTERNATIVE 2

1. **Kitching Creek (Hydration)**
   Spreader canal; weir/plug (Jenkins Ditch)

2. **Moonshine Creek (MC) & Gulfstream East (GE) (Restoration): Connect HSLCD ditch to MC; clear MC vegetation; weir in Hobe Grove Ditch; regrade adjacent area to historic topography**

3. **Cypress Creek Canal (CCC) (Reduce Over-drainage): Replace CCC weir to raise control elevation, raise berm at Ranch Colony; automate twin 84" culverts; regrade CC southern forks**

4. **Gulfstream West (Restoration & Reduce over-drainage): Partial backfill & relocate southern end of HSLCD canal; small pump, construct flow through marsh to attenuate flows**

5. **Palmar East (Restoration & Connectivity)**
   Plug ditches; remove pipes; improve northern berm; construct western berm; improve eastern berm; pumps at Thomas Farm to redirect drainage to GW flow- through marsh via north Nine Gems canal

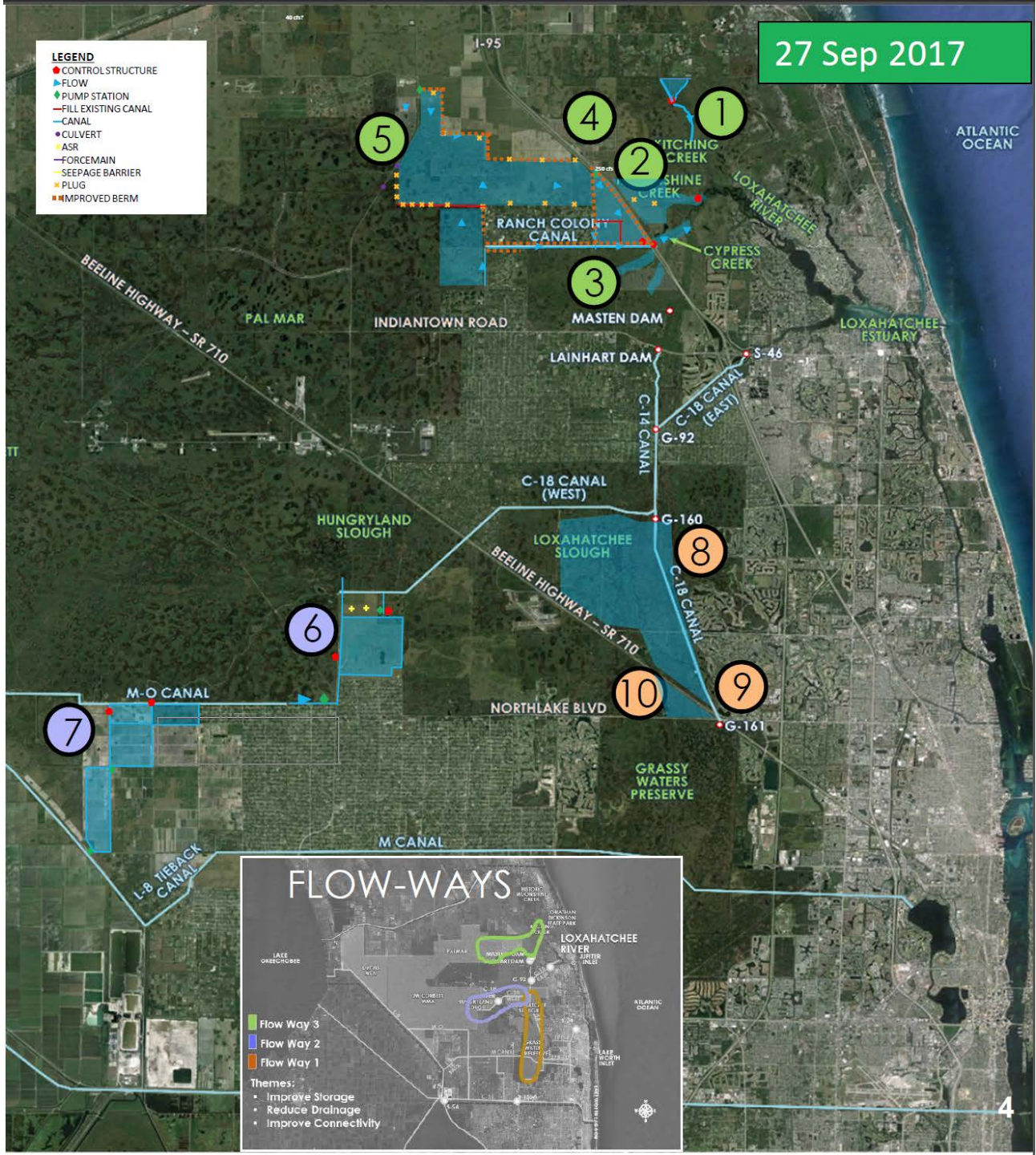
6. **C-18W Reservoir (7,200 acre/fee & 2 ASR wells): Above-ground reservoir; inflow pump; discharge structure; seepage control; M-O Canal connector and pump**

7. **L-8 Basin Shallow Storage (4,300 acre/feet; includes pumps & channels)**

8. **G-160 Structure (Reduce Over-drainage): improve Hydroperiod in Loxahatchee Slough**

9. **G-161 Structure (Connectivity): GWP water to Loxahatchee Slough**

10. **GWP Triangle (Connectivity)**



ALTERNATIVE 5

1. **Kitching Creek (Hydration):** Spreader canal; weir/plug (Jenkins Ditch)

2. **Moonshine Creek (MC) & Gulfstream East (GE) (Restoration):** Connect HSLCD ditch to MC; clear MC vegetation; weir Hobe Grove Ditch; regrade adjacent area to historic topography

3. **Cypress Creek Canal (CCC) (Reduce Over-drainage):** Replace CCC weir; raise berm at Ranch Colony; automate twin 84-inch culverts; pump and spreader swale

4. **Gulfstream West (Restoration & Reduce Over-drainage):** Partial backfill & relocate southern end of HSLCD canal; small pump; construct flow through marsh to attenuate flow

5. **Palmar East (Restoration & Connectivity)** Plug ditches; remove pipes; improve northern berm; construct western berm; improve eastern berm; pumps at Thomas Farm; redirect drainage to GW flow-through marsh via north Nine Gems canal

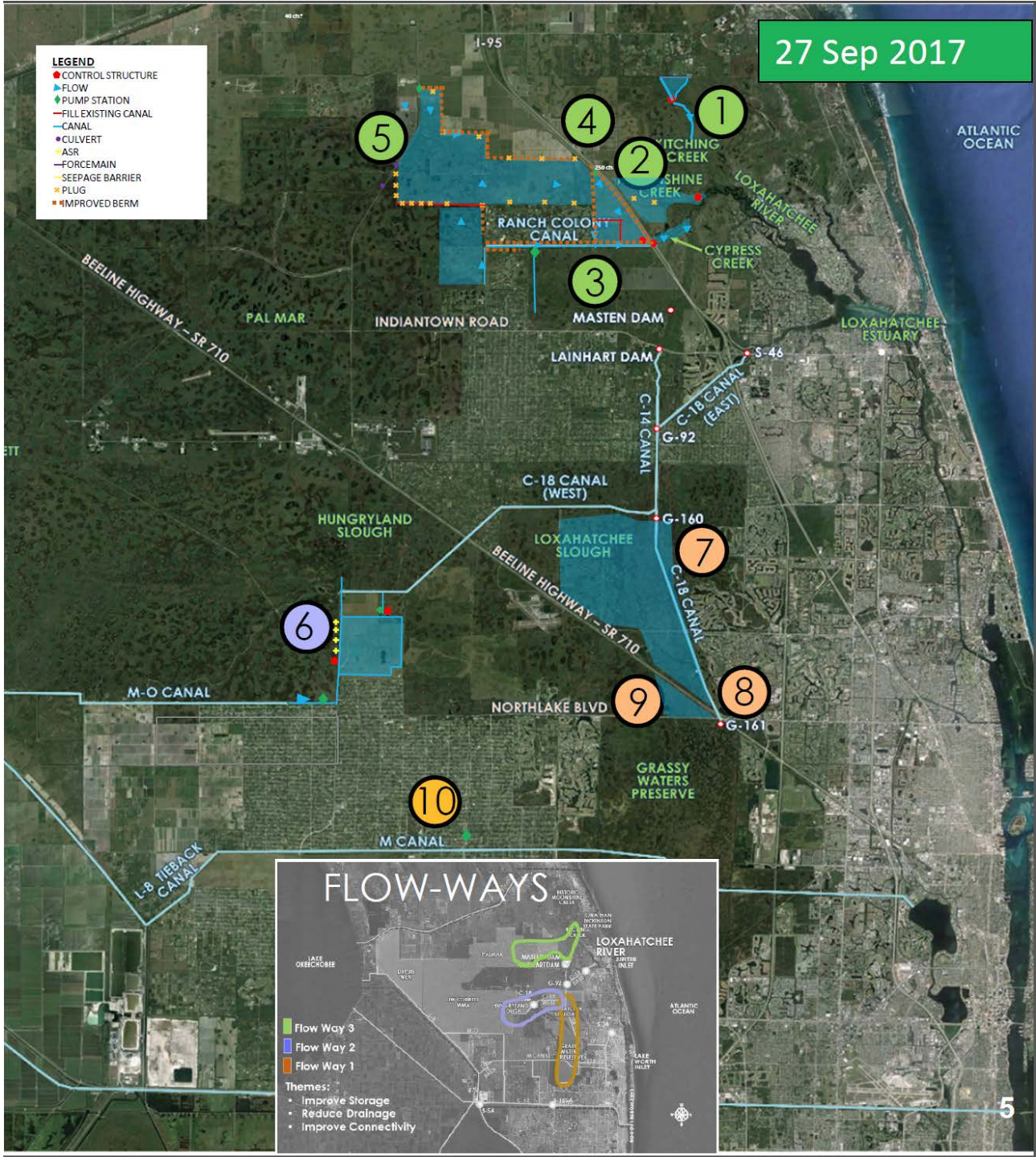
6. **C-18W Reservoir (9,500 acre-feet & 4 ASR Wells):** Above-ground reservoir; inflow pump; discharge structure; seepage control; M-O Canal Connector and pump

7. **G-160 Structure (Reduce Over-drainage):** Improve Hydroperiod in Loxahatchee Slough

8. **G-161 Structure (Connectivity):** GWP water to Loxahatchee Slough

9. **GWP Triangle (Connectivity)**

10. **M-1 Pump Station (Conveyance):** Deliver Lower M-1 Basin water to M-Canal, GWP, and G-161



ALTERNATIVE 10

1. **Kitching Creek (Hydration):** Spreader canal; weir/plug (Jenkins Ditch)

2. **Moonshine Creek (MC) & Gulfstream East (GE) (Restoration):** Connect HSLCD ditch to MC; clear MC vegetation; weir in Hobe Grove Ditch; regrade adjacent area to historic topography

3. **Cypress Creek Canal (CCC) (Reduce Over-drainage):** Replace CCC weir; raise berm at Ranch Colony; automate twin 84-inch Culverts

4. **C-18W Reservoir (7,200 acre-feet):** Above-ground reservoir; inflow pump; discharge structure; seepage control

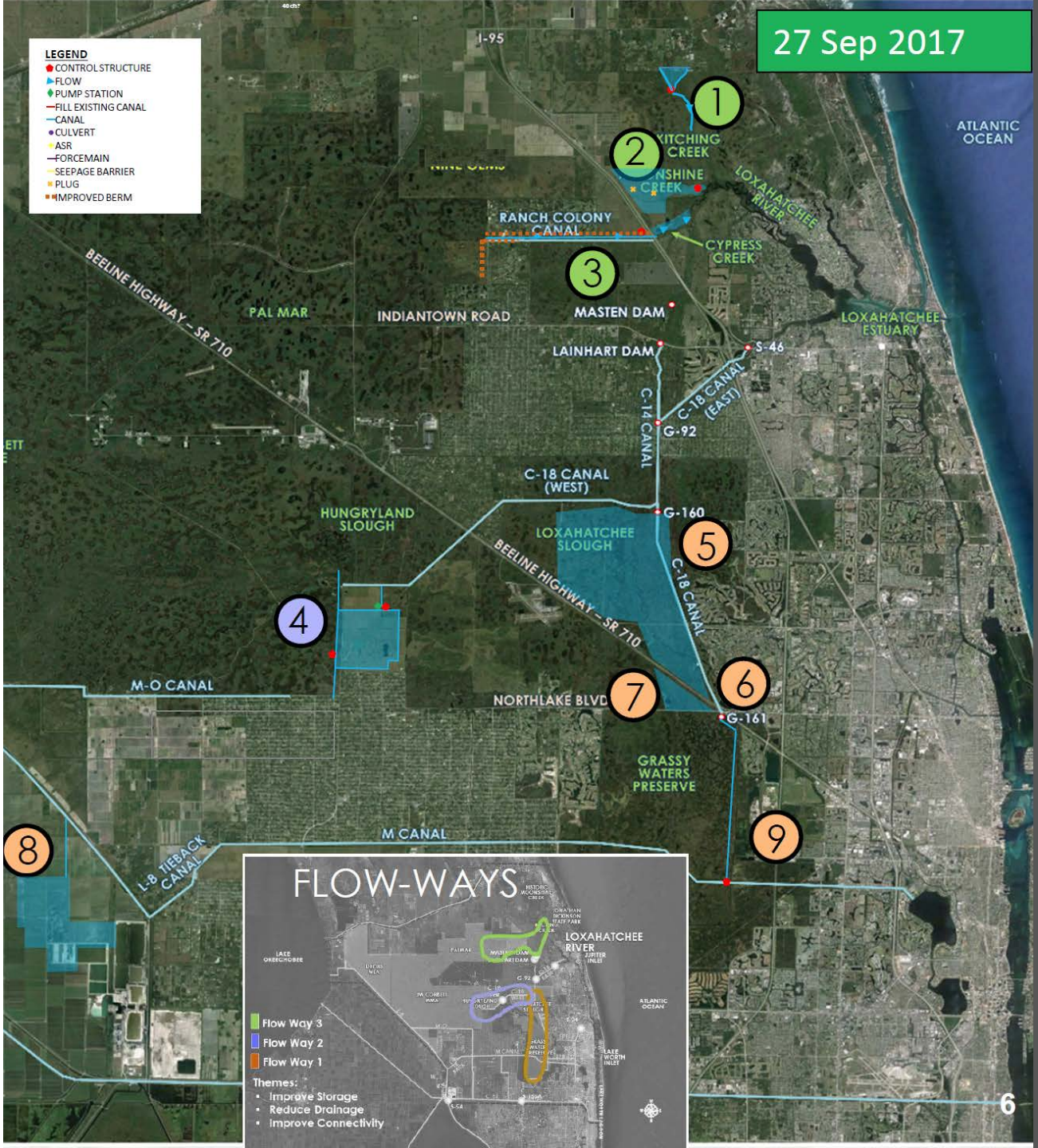
5. **G-160 Structure (Reduce Over-drainage):** improve Hydroperiod in Loxahatchee Slough

6. **G-161 Structure (Connectivity):** GWP water to Loxahatchee Slough

7. **GWP Triangle (Connectivity)**

8. **C-51 Deep Reservoir (Storage):** 44,000 acre-feet; includes pump & channels

9. **Force Main (Conveyance):** Pump and pipeline through Grassy Waters Preserve to connect M-Canal to G-161



ALTERNATIVE 12

1. **Kitching Creek (Hydration):** Spreader canal; weir/plug (Jenkins Ditch)

2. **Moonshine Creek (MC) & Gulfstream East (GE) (Restoration):** Connect HSLCD ditch to MC; clear MC vegetation; weir in Hobe Grove Ditch; regrade adjacent area to historic topography

3. **Cypress Creek Canal (CCC) (Reduce Over-drainage):** Replace CCC weir; raise berm at Ranch Colony; automate twin 84-inch Culverts; regrade CC southern forks

4. **Gulfstream West (Restoration & Reduce Over-drainage):** Partial backfill & relocate southern end of HSLCD canal; small pump; construct flow through marsh to attenuate flow

5. **Palmar East (Restoration & Connectivity):** Plug ditches; remove pipes; improve northern berm; construct western berm; improve eastern berm; pumps at Thomas Farm; redirect drainage to flow through marsh via north of Nine Gems canal

6. **Natural Storage (C-18W Basin):** Restore natural topography; seepage barriers; culverts for Beeline Hwy; backfill interior canals south of C-18W Canal; pump station at Mecca; flow-path through Mecca; M-O Canal connector & pump

7. **L-8 Basin Shallow Storage (Storage):** 5,000 acre-feet; includes pumps & channels to M-O and M Canals

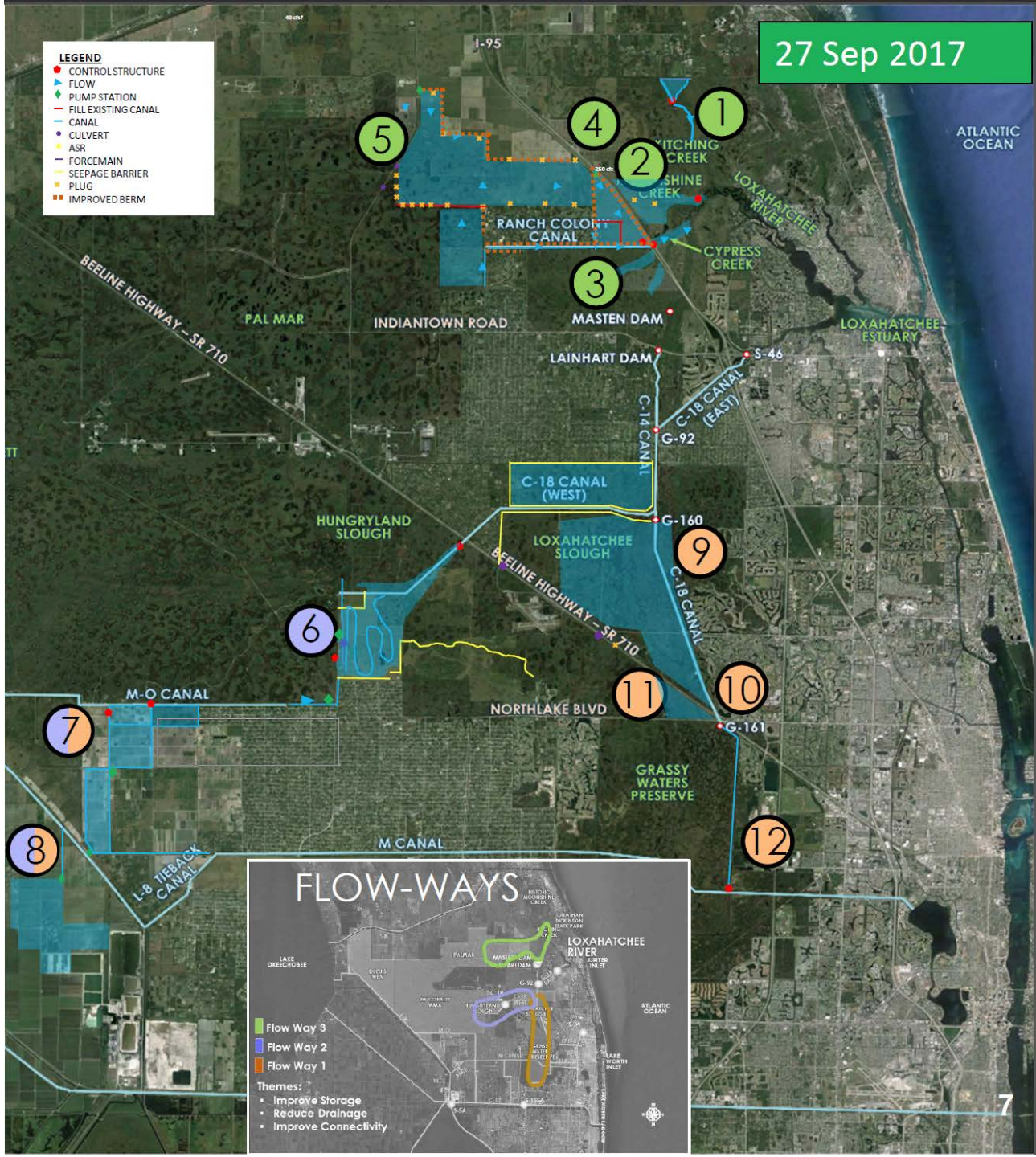
8. **C-51 Deep Reservoir (Storage):** 25,000 acre-feet, includes pump & channels

9. **G-160 Structure (Reduce Over-drainage):** improve Hydroperiod in Loxahatchee Slough

10. **G-161 Structure (Connectivity):** GWP water to Loxahatchee Slough

11. **GWP Triangle (Connectivity)**

12. **Force Main (Conveyance):** Pump and pipeline through Grassy Waters Preserve to connect M-Canal to G-161



ALTERNATIVE 13

1. **Kitching Creek (Hydration):** Spreader canal; weir/plug (Jenkins Ditch)

2. **Moonshine Creek (MC) & Gulfstream East (GE) (Restoration):** Connect HSLCD ditch to MC; clear MC vegetation; weir in Hobe Grove Ditch; regrade adjacent area to historic topography

3. **Cypress Creek Canal (CCC) (Reduce Over-drainage):** Replace CCC weir; raise berm at Ranch Colony; automate twin 84-inch culverts; pump and spreader swale

4. **Gulfstream West (Restoration & Reduce Over-drainage):** Partial backfill & relocate southern end of HSLCD canal; small pump; construct flow through marsh to attenuate flow

5. **Palmar East (Restoration & Connectivity):** Plug ditches; remove pipes; improve northern berm; construct western berm; improve eastern berm; pumps at Thomas Farm to redirect drainage to GW flow through marsh via north Nine Gems canal

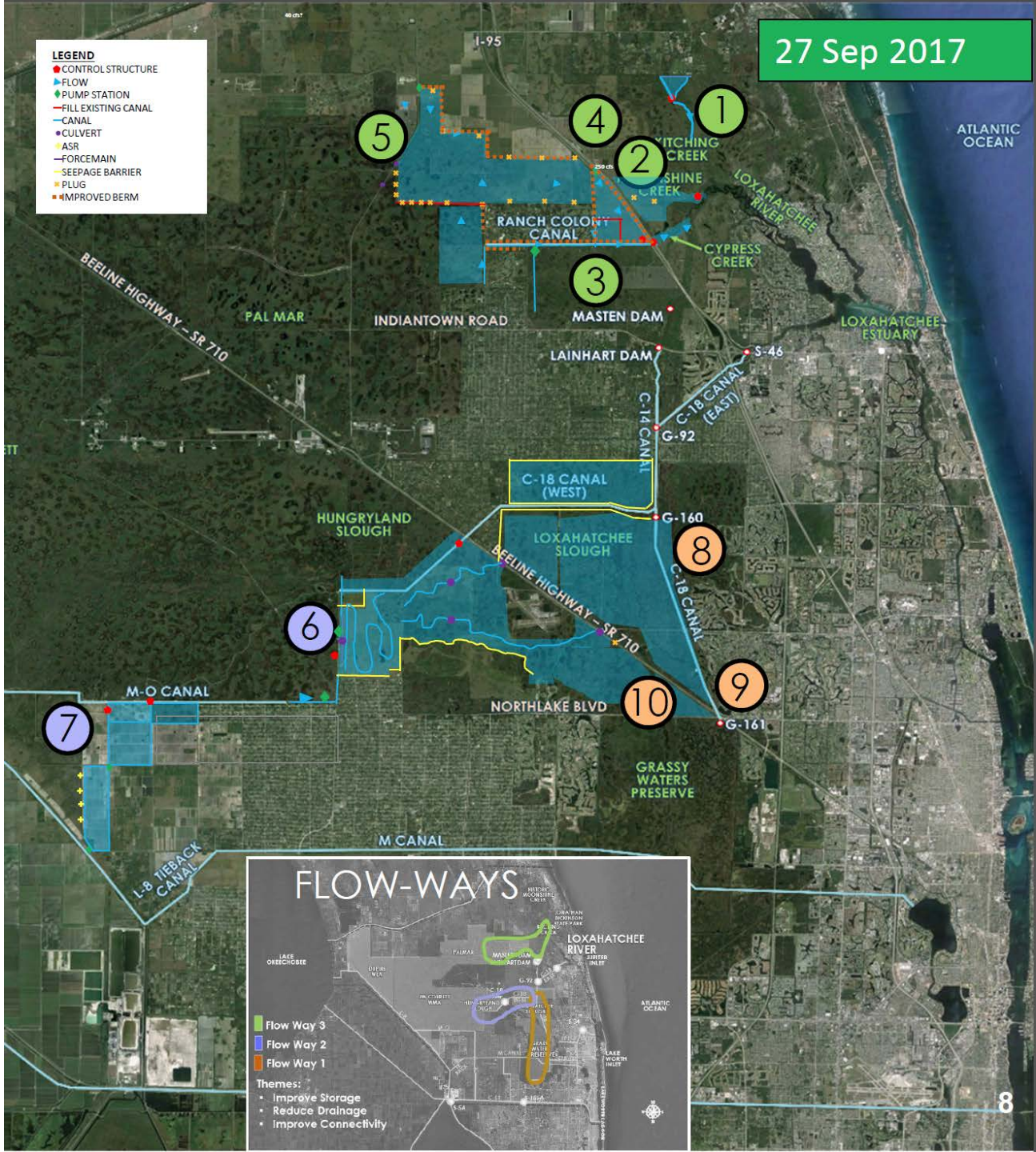
6. **Natural Storage C-18W (Basin Restoration):** Restore natural topography; seepage barriers; culverts for Beeline Hwy; backfill interior canals south of C-18W Canal; pump station at Mecca; flow-paths through Mecca & Avenir; M-O Canal connector & pump

7. **L-8 Basin Shallow Storage (6,500 acre-feet & 4 ASR wells);** includes pumps & channels

8. **G-160 Structure (Reduce Over-drainage):** improve Hydroperiod in Loxahatchee Slough

9. **G-161 Structure (Connectivity):** GWP water to Loxahatchee Slough

10. **GWP Triangle (Connectivity)**



ALTERNATIVE 12r2

1. **Kitching Creek (Hydration):** Spreader canal; weir/plug (Jenkins Ditch)

2. **Moonshine Creek (MC) & Gulfstream East (GE) (Restoration):** Connect HSLCD ditch to MC; clear MC vegetation; weir in Hobe Grove Ditch; regrade adjacent area to historic topography

3. **Cypress Creek Canal (CCC) (Reduce Over-drainage):** Replace CCC weir; raise berm at Ranch Colony; automate twin 84-inch Culverts; regrade CC southern forks

4. **Gulfstream West (Restoration & Reduce Over-drainage):** Partial backfill & relocate southern end of HSLCD canal; small pump; construct flow through marsh to attenuate flow

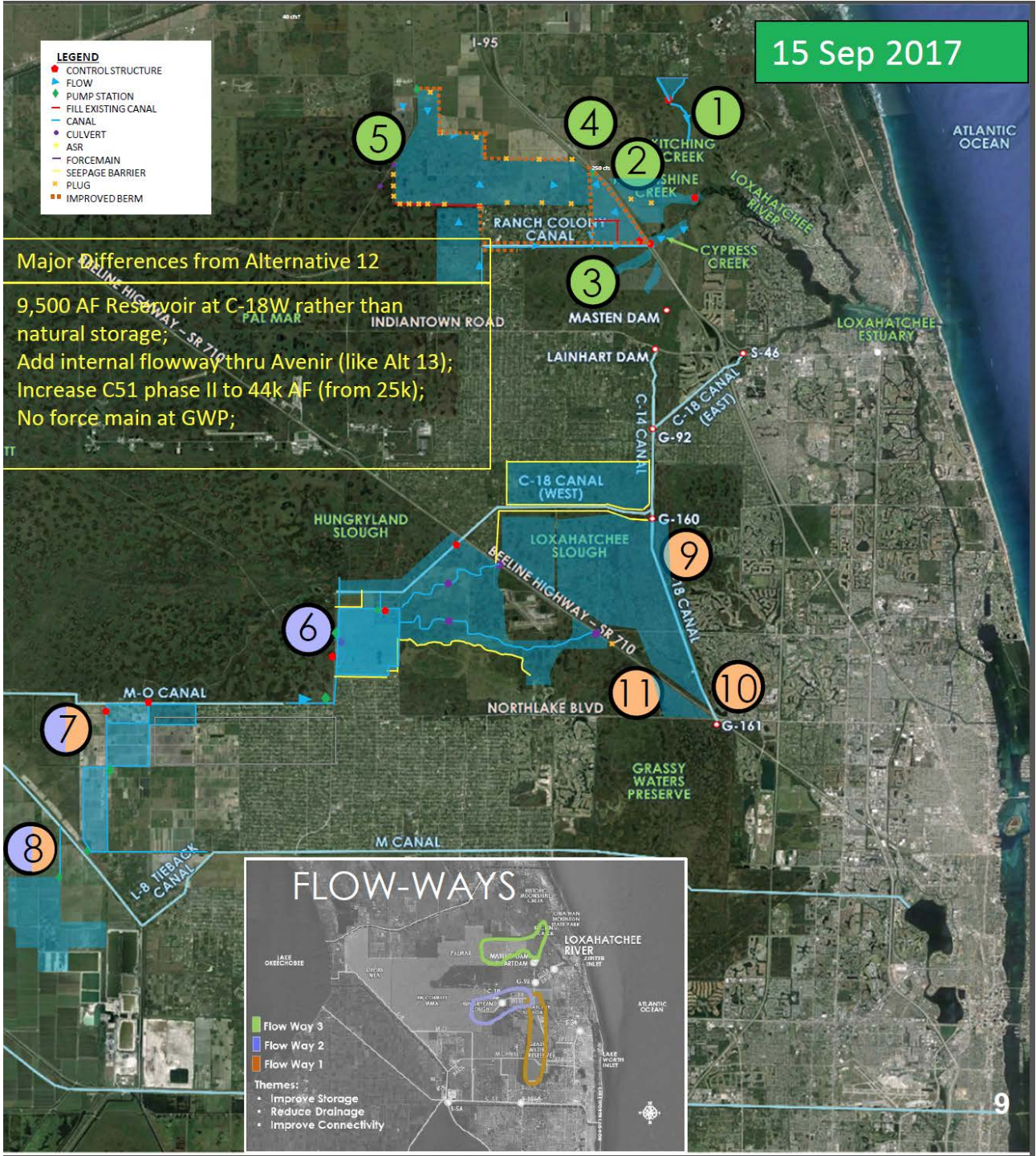
5. **Palmar East (Restoration & Connectivity):** Plug ditches; remove pipes; improve northern berm; construct western berm; improve eastern berm; pumps at Thomas Farm; redirect drainage to flow through marsh via north ~~of~~ Nine Gems canal

6. **C-18W Reservoir (Storage and Connectivity):** 9,500 acre-feet aboveground reservoir; inflow pump; discharge structure; seepage barriers; culverts for Beeline Hwy; flow-paths & culverts east of C-18W Reservoir (thru Avenir); M-O Canal connector & pump

7. **L-8 Basin Shallow Storage (Storage):** 5,000 acre-feet, includes pumps & channels to M-O and M Canals)

8. **C-51 Deep Reservoir (Storage):** 44,000 acre-feet, includes pump & channels

9. **G-160 Structure (Reduce Over-drainage): Improve Hydroperiod in Loxahatchee Slough)**

10. **G-161 Structure (Connectivity):** GWP water to Loxahatchee Slough

11. **GWP Triangle (Connectivity)**