

Attachment 4 Stormwater

1. Overview

1.1. Objective

The objective of this attachment is to set the minimum controls for planning and implementing flow isolation / flow management (FIFM) to ensure the safety of people exposed to the risk of engulfment by flow from Sydney Water stormwater assets.

1.2. Scope

This attachment applies to the following people who manage or work with Sydney Water stormwater assets where flow could engulf a person working in, on or near the asset:

- People requesting FIFM.
- FIFM plan coordinators.
- Stormwater Operations Manager: the responsible manager for Stormwater.
- Responsible person for FIFM: the person who will implement the FIFM schedule.
- Service providers who require FIFM to work on the asset without being engulfed.

1.3. Summary

The person requesting FIFM must decide if a FIFM plan is required by checking for the special conditions described in this attachment, or by doing a preliminary FIFM HIDRA to determine the risk of engulfment.

If a plan is required, the person requesting FIFM must nominate a FIFM plan coordinator and submit a Request for FIFM to the Stormwater Operations Manager or their nominated representative.

The Stormwater Operations Manager or their nominated representative must review the Request for FIFM and the preliminary FIFM HIDRA before handing over to the FIFM plan coordinator.

The FIFM plan coordinator must not let FIFM be implemented until:

- they:
 - have allocated roles and responsibilities for the FIFM
 - have facilitated FIFM HIDRA
 - are satisfied that key participants have reviewed and acknowledge the HIDRA
 - have prepared a FIFM plan, including a trial FIFM schedule (if required)
- the responsible manager has approved the FIFM plan (with a trial if required)
- the responsible person for FIFM has accepted the FIFM plan.

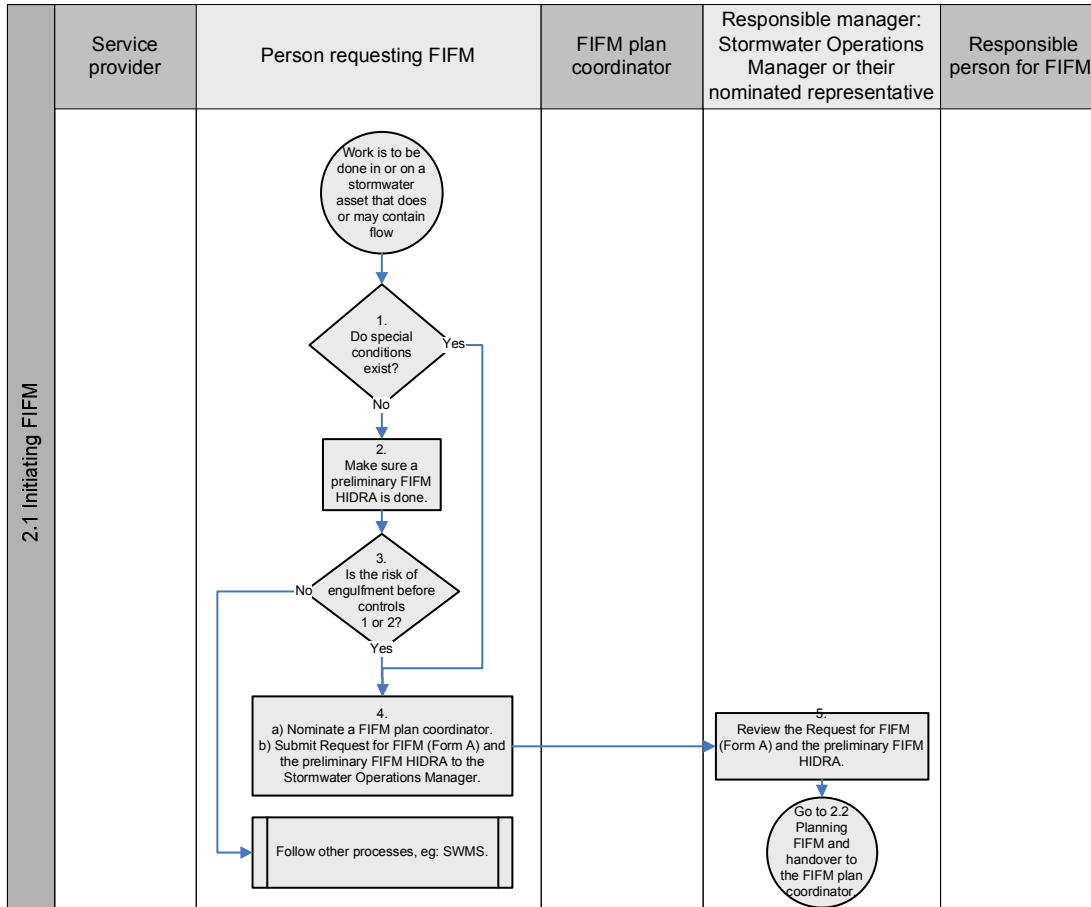
The FIFM plan coordinator must not let work commence on the asset until confirming that:

- people have accepted their responsibilities
- FIFM communication has been done
- the responsible person for FIFM has completed and proven the FIFM schedule
- controls are signed off, still applicable and that there are no new hazards.

The FIFM plan coordinator must not allow a responsible person for FIFM to recommission an asset until the service provider signs off that they have safely completed the work.

2. Procedure

2.1. Initiating FIFM



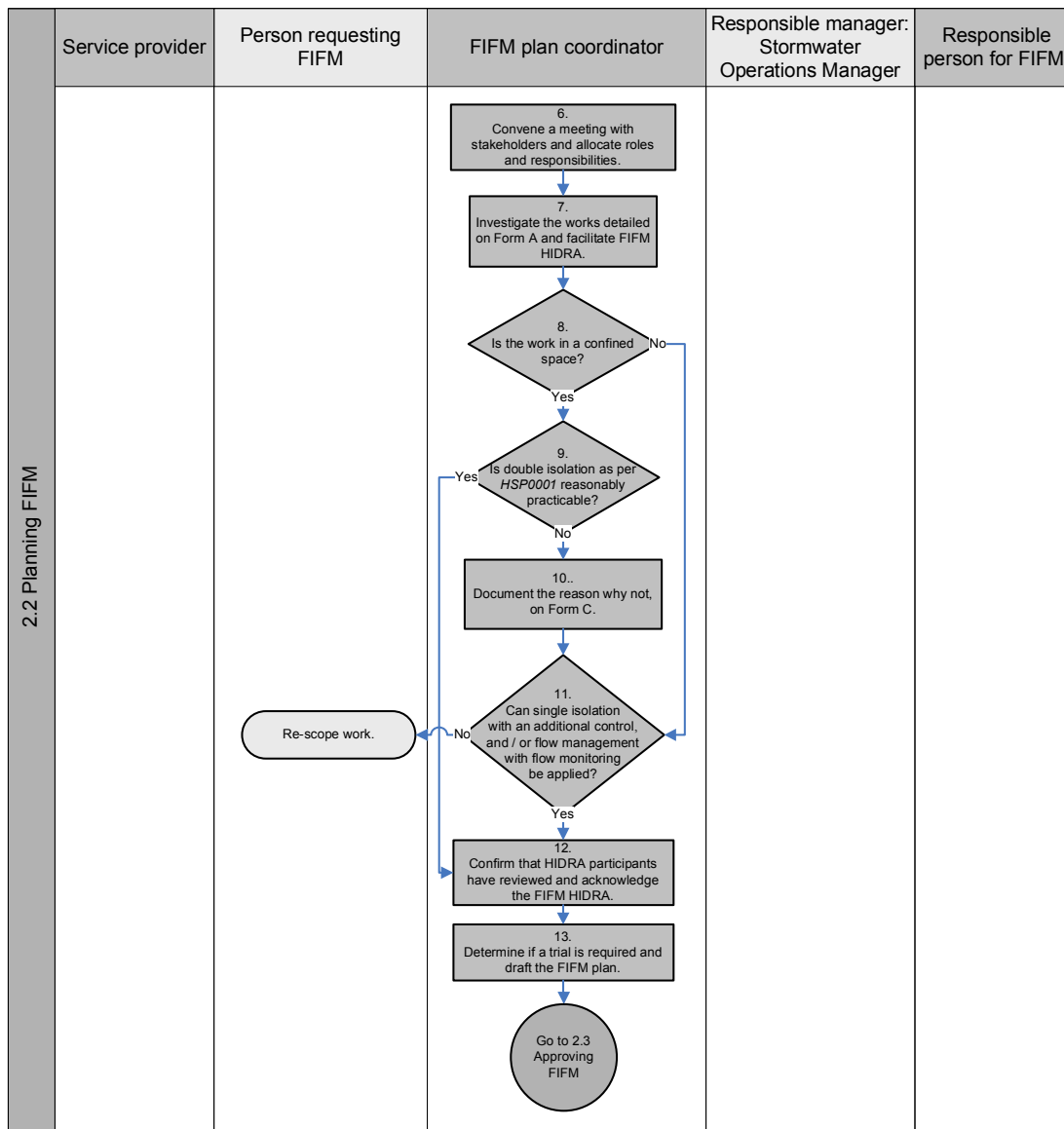
Box	Description	Who	Explanation	Forms
Work is to be done in or on a stormwater asset that does or may contain flow.				
1	Do special conditions exist?	Person requesting the FIFM.	Determine if any of the following exist: - Removal of a section of pipework greater than 300 mm in diameter. - Significant safety risks such as: - confined space entry with a risk of engulfment - work will take more than 14 hours straight - work will be located immediately downstream of known large water storages (eg onsite detention). If any of the above exists, go to Section 2.2 Planning FIFM. If no special conditions exist, go to box 2.	
2	Make sure a preliminary FIFM HIDRA is done.	Person requesting the FIFM.	The purpose of the preliminary FIFM HIDRA is to determine if there is a risk of engulfment when there are none of the special conditions described in box 1. A copy of the preliminary FIFM HIDRA must be kept for auditing purposes.	C
3	Is the risk of	Person	From the preliminary FIFM HIDRA in box 2, is	

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Box	Description	Who	Explanation	Forms
	engulfment before controls ranked 1 or 2?	requesting the FIFM.	the risk of engulfment before controls ranked 1 or 2? If yes, go to box 4. If the no, there is no requirement to follow this procedure. You must use other documented processes, such a SWMS, SOP, or similar.	
4	Nominate a FIFM plan coordinator and submit Request for FIFM (Form A), and the preliminary FIFM HIDRA to the Stormwater Operations Manager.	Person requesting the FIFM.	a) The person requesting FIFM must nominate a FIFM plan coordinator. b) Submit Form A and the preliminary FIFM HIDRA to the Stormwater Operations Manager at least six weeks prior to the scheduled FIFM date. Make sure Form A includes all hazards that could cause a risk of engulfment due to uncontrolled stormwater flow. The hazards identified will be used to determine the most appropriate FIFM.	A
5	Review the request for FIFM (Form A) and the preliminary FIFM HIDRA.	Responsible manager: Stormwater Operations Manager.	a) The Stormwater Operations Manager reviews the works on Form A, and the preliminary FIFM HIDRA. b) Once this is done, go to 2.2 Planning FIFM and handover to the FIFM plan coordinator.	

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2.2. Planning FIFM



Box	Description	Who	Explanation	Forms
6	Convene a meeting with stakeholders and allocate roles and responsibilities.	FIFM plan coordinator.	Convene a meeting (including the responsible manager) to: - review the scope of work - review initial hazards and risks - identify potential operational, environmental and customer impacts. Where relevant, information on Form A and the preliminary FIFM HIDRA should be considered. Allocate roles and responsibilities for the: - FIFM plan coordinator - responsible manager - responsible person for FIFM - service provider. People nominated for these roles must accept their responsibilities by signing Form B.	B

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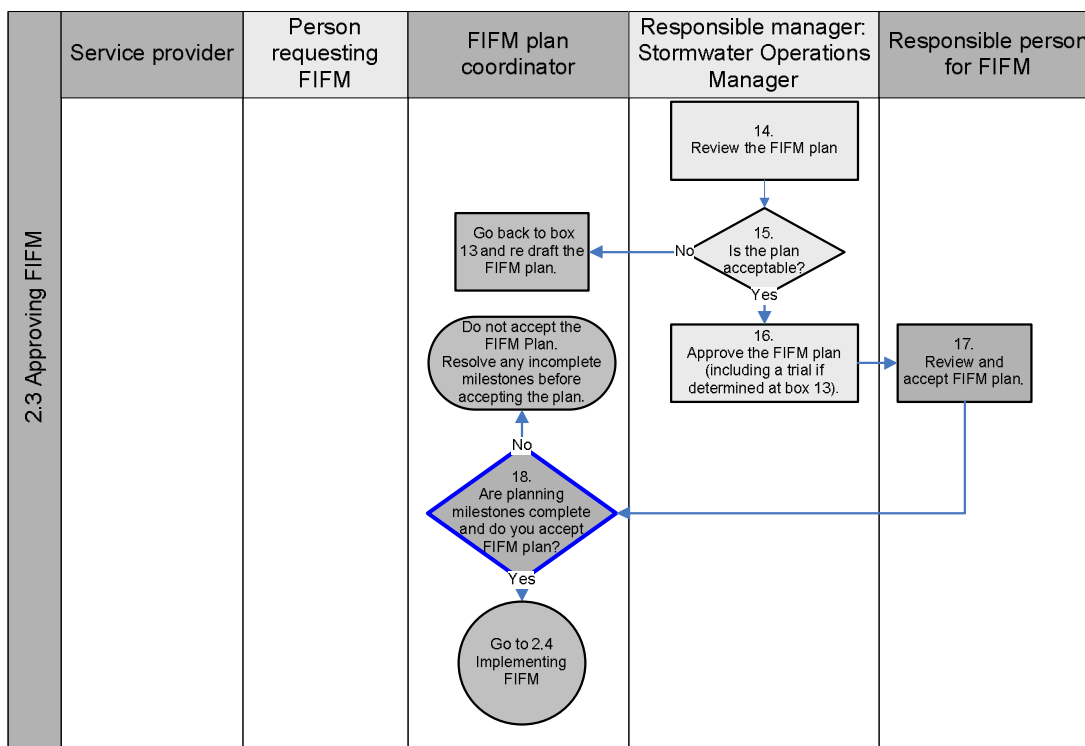
Box	Description	Who	Explanation	Forms
7	Investigate the works detailed on Form A and facilitate the FIFM HIDRA (Form C).	FIFM plan coordinator.	Consult the people nominated in box 6, and facilitate a FIFM HIDRA. The HIDRA must: - follow the instructions given in boxes, 8, 9, 10 and 11 below - considers all hazard(s) associated with the risk of engulfment as well as hazards and controls identified on Form A - includes impacts on the environment, customer, community and business, where relevant - includes a record of the FIFM HIDRA participants - refers to the emergency response, if the controls fail, eg evacuation procedure.	C
8	Is the work in a confined space?	FIFM plan coordinator.	Does the FIFM HIDRA (Form C), show that the engulfment hazard is associated with work in a confined space, such as a pipe, as shown in example 1 of Appendix 1. If yes, go to box 9. If no, go to box 11.	C
9	Is double barrier isolation as described in <i>HSP0001</i> reasonably practicable?	FIFM plan coordinator.	If the FIFM HIDRA (Form C) shows that the work is in a confined space, is it reasonably practicable to control the engulfment hazard with double barrier isolation as per <i>HSP0001 Confined Space Safety</i>. If yes, go to box 12 'Draft the FIFM plan'. If no, go to box 10.	C
10	Document the reason why not, on Form C.	FIFM plan coordinator.	Document on Form C, the reason why double barrier isolation for confined space work is not reasonably practicable. Appendix 1 has an example of why it may not be reasonably practicable. Once this is done, go to box 11.	C
11	Can single isolation with an additional control, and / or flow management with flow monitoring be applied?	FIFM plan coordinator.	Assess if single isolation with an additional control and / or flow management with flow monitoring can be applied if double isolation is not reasonably practicable and the FIFM HIDRA (Form C) shows that the work is: - in a confined space with a risk of engulfment - not in a confined space but there is still a risk of engulfment. ☐ If yes, and for example, flow management with flow monitoring is to be applied: - at line 1 of Form C, specify how the flow will be managed, as shown in Appendix 1 - at line 2 of Form C, specify how the flow will be monitored, as shown in Appendix 1 - go to box 12. If no, hand back to the person requesting FIFM to re-scope the work. It can't meet the requirements of this procedure and must not proceed under the current scope of work.	C

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Box	Description	Who	Explanation	Forms
12	Confirm that HIDRA participants have reviewed and acknowledge the FIFM HIDRA.	FIFM plan coordinator.	The FIFM plan coordinator signs off on Form K, line 4 when they are satisfied that all key HIDRA participants have reviewed and acknowledge the FIFM HIDRA (Form C).	K, line 4
13	Determine if a trial is required and draft the FIFM plan:	FIFM plan coordinator.	The draft FIFM plan can now be developed. It may need to be re-developed later depending on the outcome of a trial FIFM.	
	Determine if a trial FIFM and re-commissioning schedule is required.		A trial FIFM must be considered to prove the effectiveness of relevant controls in the FIFM plan. A trial should also be considered when there is significant uncertainty about the: safety, customer, environmental or political impacts that the FIFM may have, especially when system behavior can't be predicted. Experience shows that what has worked in the past, may not work on the day. A trial can be done separately or as the initial part of the FIFM plan implementation. If a trial FIFM is required, document the success factors for the trial on Form E, and circle Y (Yes) on Form K at line 7.	E
	Prepare communication for FIFM (if required).		A communication strategy should be considered depending on the risks and controls identified on Form C, for safety, environment, customer and business. Indicate on Form K (line 7) if a communication strategy is required, by circling Y or N.	D
	Prepare FIFM schedule.		It is mandatory that a FIFM schedule using Form H is completed when isolation, or bypassing flow as part of flow management, is used as a control.	H
	Prepare FIFM monitoring plan (if required).		If a FIFM monitoring plan is required, use Form I. If monitoring the operational status of a wet well is required, use Form G. Indicate on Form K (line 7) if either of these is required by circling Y or N.	I G K
	Prepare re-commissioning schedule.		It is mandatory that a re-commissioning schedule using Form J is completed when isolation, or bypassing flow as part of flow management, is used as a control.	J

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2.3. Approving FIFM



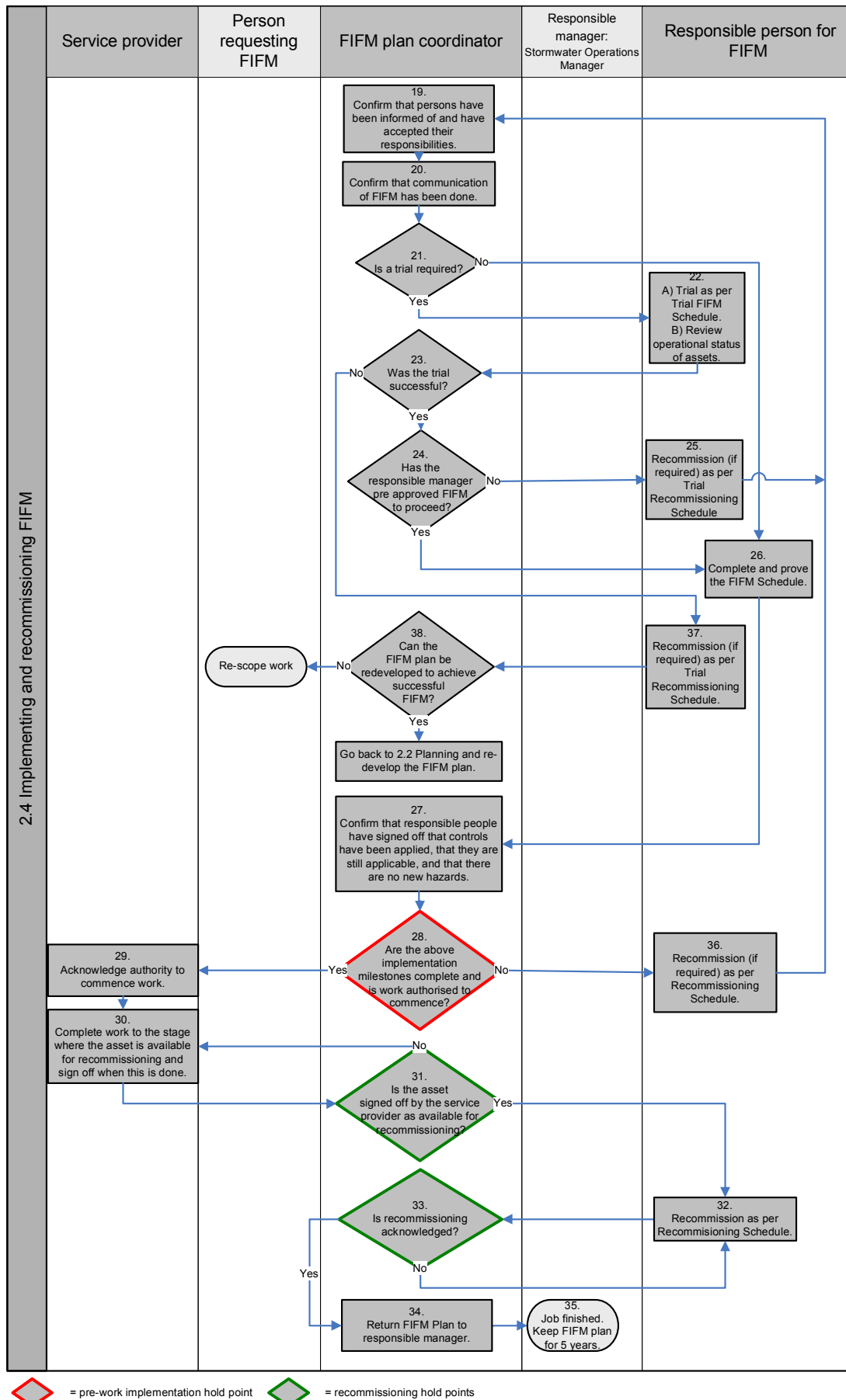
◆ = hold point

Box	Description	Who	Explanation	Forms
14	Review the FIFM plan.	Responsible manager or their nominated representative.	Review the plan including any requirements for a trial.	
15	Is the plan acceptable (including a trial if required at box 13)?	Responsible manager or their nominated representative.	If the plan is acceptable, go to box 16. If not, hand back to the FIFM plan coordinator to re draft the unacceptable parts of the plan.	
16	Approve FIFM plan.	Responsible manager or their nominated representative.	Approve Roles and Responsibilities (Form B) on Form K, line 2. Approve the FIFM HIDRA (Form C) on Form K, line 3. Approve the overall plan on Form K at line 7 as follows: Communication of FIFM (Form D). Trial FIFM and Recommissioning Schedule and checking the operational status of assets (Form E / F). If a trial is successful, can FIFM proceed to Form H without a trial recommissioning on Form E. FIFM Schedule, including method of proving successful FIFM (Form H). FIFM Monitoring Plan (Form I / G). Recommissioning Schedule (Form J).	K, line 2, line 3, line 7

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17	Review and accept the FIFM plan.	Responsible person for FIFM.	It is mandatory that a responsible person for FIFM from the area that will complete and prove the FIFM schedule on Form H, reviews and accepts the FIFM plan.	K, line 8
18	Are planning milestones complete and do you accept the FIFM plan?	FIFM plan coordinator.	This is a hold point. Confirm that milestones 2 – 8 on Form K have been completed. If a trial is required at milestone 7, confirm that this has been approved on Form E. If the planning milestones are complete, go to 2.4 Implementing FIFM. If any planning milestones are not complete, do not accept the plan. FIFM can't be implemented. Resolve any incomplete milestones before accepting the plan.	K line 9

2.4. Implementing and recommissioning FIFM



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Box	Description	Who	Explanation	Forms
19	Confirm that persons have been informed of and have accepted their responsibilities.	FIFM plan coordinator.	Confirm that Form B has been completed before signing Form K.	K, line10
20	Confirm that communication of FIFM has been done.	FIFM plan coordinator.	Confirm that Form D has been completed before signing Form K.	K, line11
21	Is a trial required?	FIFM plan coordinator.	Check Form K to see if the responsible manager has approved a trial FIFM. If a trial is required, go to box 22. If a trial is not required, go to box 26.	K, line 7
22	Trial as per Trial FIFM Schedule and review operational status of assets	Responsible person for FIFM.	Complete and prove the trial according to the sequence on Form E. Service providers are not permitted to do the work that requires FIFM, during trials. If the trial is not successful, record the reason why and any actions required, on Form E. Check the operational status of assets after the trial using Form F. Notify the FIFM coordinator when finished or if additional activities to complete the trial are required.	E F
23	Was the trial succesful?	FIFM plan coordinator.	Assess the trial against the pre-determined success factors on Form E. If the trial was successful, go to box 24. If the trial is not successful, go to box 38 (via box 37 if the asset needs to be recommissioned in the meantime).	E
24	Has the responsible manager pre approved the FIFM to proceed.	FIFM plan coordinator	If the trial FIFM is successful and the work is able to commence, there may not be a need to do a trial recommissioning. The actual FIFM schedule can proceed if the responsible manager has given pre approval on Form K, line 7. If so, go to box 26. If the trial was successful but the responsible manager has not approved FIFM to proceed, for instance, the work can't be completed within a certain time period, go to box 25.	K, line 7
25	Recommison (if required) as per Trial Recommissioning Schedule.	Responsible person for FIFM.	Recommission as per the sequence on Form E, and inform the FIFM plan coordinator when this is done.	E

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Box	Description	Who	Explanation	Forms
26	Complete and prove the FIFM schedule.	Responsible person for FIFM.	Complete and prove the actual FIFM schedule according to the sequence on Form H, and sign off on Form K when this is done. Identify any risks associated with operational assets, such as: pipes, valves or pumps, and confirm their operational status. If any of the activities are unable to be completed, consult the responsible manager to identify additional FIFM activities to enable FIFM. If they still can't be completed, notify the FIFM plan coordinator to cancel work.	H and K, line 12
27	Confirm that responsible people have signed off that controls have been applied, that they are still applicable, and that there are no new hazards.	FIFM plan coordinator	Confirm that Form C has been completed and signed off before signing Form K. Also, check that these controls are still relevant to when the FIFM HIDRA was done and that no new hazards are present.	K, line 12
28	Are the above implementation milestones complete and is work authorised to commence?	FIFM plan coordinator	This is a hold point. If it is confirmed that forms B,C and D have been signed off, and that the FIFM plan schedule (Form H) has been completed and proven, go to box 29. If any these forms are not signed off and / or Form H has not been completed and proven, work is not authorised to commence. In this case, go back to box 19 (via box 36 if the asset needs to be recommissioned in the meantime) and reconfirm any of the forms B, C, D and H as necessary.	K, line 14
29	Acknowledge authority to commence work.	Service provider.	The service provider signs off Form K line 15, only after the FIFM plan coordinator signs off Form K, line 14. The service provider must not commence work until these are signed.	K, line 15
30	Complete work to the stage where the asset is available for recommissioning.	Service provider.	The service provider completes the work up to the re-commissioning stage and signs off on Form K, line 17 when this is done.	K, line 17
31	Is the asset signed off by the service provider as available for recommissioning?	FIFM plan coordinator.	This is a hold point. If work is signed off as completed, go to box 32. If work is not signed off as completed, go back to box 30.	K, line 18
32	Recommission as per the Recommissioning Schedule.	Responsible person for FIFM.	Recommission the assets as per the sequence on Form J, and sign off on Form K when this is done. If recommissioning is not successful, give the reason why on Form J.	J and K, line 20

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Box	Description	Who	Explanation	Forms
33	Is recommissioning acknowledged?	FIFM plan coordinator.	This is a hold point. If recommissioning is acknowledged, go to box 34. If recommissioning is not acknowledged, go back to box 32.	K, line 21
34	Return the FIFM plan to the relevant responsible manager.	FIFM plan coordinator.	This includes details of the work performed as well as the completed forms in the FIFM plan. Document any isolation or recommissioning issues for future reference.	K, line 21
35	Job finished. Keep FIFM plan for 5 years.	Responsible manager.	Records must be available for auditing purposes.	
36	Recommison (if required) as per recommisioning schedule.	Responsible person for FIFM.	Recommission the assets as per the sequence on Form J.	J
37	Recommison (if required) as per trial recommissioning schedule.	Responsible person for FIFM.	Recommission the asset as per the sequence on Form E.	E
38	Can the FIFM plan be re-developed to achieve successful FIFM?	FIFM plan coordinator.	Review the FIFM plan to see if it can be re-developed. Amend the plan as necessary and re-trial until the trial is successful. Modify any forms as required and resubmit for approval. If the plan can be re-developed, go back to 2.2 Planning and re-develop the FIFM plan. If the plan can't be re-developed, the work can't meet the requirements of this procedure and needs to be re-scoped.	

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Appendix 1 Example of FIFM HIDRA for Stormwater

HIDRA FOR FLOW ISOLATION / FLOW MANAGEMENT

FORM C

PROJECT TITLE / NAME	Context Of Assessment			Person(s) Conducting Assessment		
Inspection of the Dumped shopping trolley and Graffiti covered stormwater mains.	Traversing the stormwater mains.			Travis Stormwatermain and Sid E. Entrypit		
				Date Of Assessment		

CAT.
SEVERE
MODERATE
MINOR
INSIGNIF.

Very Likely	Likely	Unlikely	Very Unlikely
1	2	3	4
1	2	3	4
2	3	4	5
3	4	5	6
4	5	6	6

Hazard	Impact		Risk Before Controls			CONTROLS (List all controls – current & required – intended to support the development of safe systems of work)	Risk After Controls			Group responsible to implement control	Sign off – controls applied	
What can harm you?	What can happen?	How it can happen?	Consequence	Likelihood	Risk Rating	Note: This example would comply with section 2.2.2 of HSP0070 FIFM.	Consequence	Likelihood	Risk Rating		Print Name	Signature
Engulfment by stormwater in confined space.	Drowning	Uncontrolled flow fills pipe while doing traverse.	Catastrophic	Unlikely	2	Flow management: Work will only be done under low flow conditions, i.e.: when there is no rainfall in the associated stormwater catchment over the previous 48 hours.	Catastrophic	Very Unlikely	3			
		Flow management fails while workers are in confined space.	Catastrophic	Unlikely	2	Flow monitoring: Stormwater flow will be visually monitored in real time, as will BOM rainfall forecasts for the associated stormwater catchment. Workers will evacuate the system by following the evacuation procedure, if flows become deeper than 150 mm.	Catastrophic	Very Unlikely	3			
Comments: It is not reasonably practicable to use two isolation controls on every source of flow to the work area as described in HSP0001. This is because the time and cost and risk to safety of isolating the numerous gravitational inflows along the path of the traverse outweigh the risk to safety of doing the traverse.												

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