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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2023 Navy **Date:** April 2022

<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy / BA 7: Operational Systems Development</i>					<b>R-1 Program Element (Number/Name)</b> PE 0206629M / <i>Amphibious Assault Vehicle</i>							
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
Total Program Element	243.237	5.188	7.551	8.246	-	8.246	6.921	0.296	0.281	0.252	Continuing	Continuing
2938: <i>Amphibious Assault Vehicle</i>	243.237	5.188	7.551	8.246	-	8.246	6.921	0.296	0.281	0.252	Continuing	Continuing

**Note**

Prior funding is reflected in PE 0206623M/Project 0021.

**A. Mission Description and Budget Item Justification**

The Assault Amphibious Vehicle (AAV) program provides life-cycle support to ensure cost-effective combat readiness for the AAV Family of Vehicles (FOV). This is accomplished through engineering changes resulting from continuous review of sub-systems to maintain system supportability, safety, reduce total ownership costs, improve fleet readiness, address obsolescence issues, and improve vehicle performance. The Recovery variant will provide recovery support and design tradeoffs for the ACV until an ACV Recovery variant is fielded. Improvements to the fleet reduce total ownership costs and improve sustainability. The AAV Modifications Line procures modernized components and subsystems that impact safe and reliable use of the AAV such as the Water Egress Capability (WEC), Tactical Communication Modernization (TCM) to meet NSA's cryptographic modernization mandates, quarterly technical refresh of servers and laptops for Command-variant (C-Variant), and associated production support for the AAV FOV. Funding for the AAV FOV is critical to maintaining the amphibious capability of the USMC until the Amphibious Combat Vehicle (ACV) is fully fielded and operational.

In accordance with CMC Force Design, the order and testing of preplanned product improvements for the AAV program has come to an end; the program will continue to support the fleet of AAVs for emerging issues pertaining to design/redesign of parts and components for obsolescence, supportability, and safety issues through system retirement in FY 2027.

**B. Program Change Summary (\$ in Millions)**

	<u><b>FY 2021</b></u>	<u><b>FY 2022</b></u>	<u><b>FY 2023 Base</b></u>	<u><b>FY 2023 OCO</b></u>	<u><b>FY 2023 Total</b></u>
Previous President's Budget	6.469	7.551	0.000	-	0.000
Current President's Budget	5.188	7.551	8.246	-	8.246
Total Adjustments	-1.281	0.000	8.246	-	8.246
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.200	0.000			
• SBIR/STTR Transfer	-0.081	0.000			
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2023 Navy	<b>Date:</b> April 2022
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<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy / BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0206629M / <i>Amphibious Assault Vehicle</i>
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• Adjustments to Budget Year	-	-	8.246	-	8.246
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**Change Summary Explanation**

The increase from FY 2022 to FY 2023 \$0.695M is primarily attributed increased In-house Technical Support to provide technical support for required quarterly software and firmware updates each year to maintain the AAV Command variant security certification and to address unplanned design efforts which may be required to address major dead lining issues, safety of use, and obsolescence.

Full funding in FY 2023 supports the programs ability to provide critical hardware and software technology refreshes to continue operating the Command variant, provide obsolescence support and engineering services needed to address performance and safety issues, provide lifecycle management to maintain fleet configuration.

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FY 2023 funding increase reflects the fact that the FY 2022 President's Budget request did not include out-year funding.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy										<b>Date:</b> April 2022		
<b>Appropriation/Budget Activity</b> 1319 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0206629M / Amphibious Assault Vehicle				<b>Project (Number/Name)</b> 2938 / Amphibious Assault Vehicle			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
2938: Amphibious Assault Vehicle	243.237	5.188	7.551	8.246	-	8.246	6.921	0.296	0.281	0.252	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Assault Amphibious Vehicle (AAV) program provides life-cycle support to ensure cost-effective combat readiness for the AAV Family of Vehicles (FOV). This is accomplished through engineering changes resulting from continuous review of sub-systems to maintain system supportability, safety, reduce total ownership costs, improve fleet readiness, address obsolescence issues, and improve vehicle performance. The Recovery variant will provide recovery support and design trade offs for the ACV until an ACV Recovery variant is fielded.

Based on CMC Force Design, the order and testing of preplanned modification improvements to the AAV system has come to an end; the program will continue to support the fleet of AAVs for emerging issues pertaining to design/redesign of parts and components for obsolescence, supportability, and safety of use issues through system retirement in FY 2027.

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
<b>Title:</b> Product Development	1.610	3.081	2.477	0.000	2.477
<b>Articles:</b>	-	-	-	-	-
<p><b>Description:</b> This cost element provides funding for design and development engineering for the AAV Modifications Line. The AAV Modifications Line provides Nonrecurring Engineering (NRE) and design for AAV safety, obsolescence, and performance improvement engineering for the AAV Family of Vehicles (FOV).</p> <p><b>FY 2022 Plans:</b></p> <ul style="list-style-type: none"> <li>-Continue legacy Platform Command and Control (C2) design and integration efforts to include C2 software/hardware tech refresh. The C2 design and integration effort continues due to the Command-variant requiring quarterly software releases each year to maintain the vehicles security certification.</li> <li>-Initiate order of hardware/software and system integration of battlefield situational awareness system (Joint Battle Command-Platform (JBC-P) system)].</li> <li>-Initiate reverse engineering efforts for critical parts and shortages.</li> </ul> <p><b>FY 2023 Base Plans:</b></p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy	<b>Date:</b> April 2022
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<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0206629M / <i>Amphibious Assault Vehicle</i>	<b>Project (Number/Name)</b> 2938 / <i>Amphibious Assault Vehicle</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
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-Continue legacy Platform Command and Control (C2) design and integration efforts to include AAV-C software production kits, Cyber Security initiatives, Intercom Integration, and firmware updates at reduced levels as the C2 requirement transitions from the AAV program to the ACV program as a result of AAVs retiring from the fleet.

**FY 2023 OCO Plans:**  
N/A

**FY 2022 to FY 2023 Increase/Decrease Statement:**  
The decrease in Product Development from FY 2022 to FY 2023 (\$0.604M) is attributed to reduced quantities of AAVs in the inventory, and supports the programs ability to provide critical hardware and software technology refreshes to continue operating the Command variant as AAVs are retired from the fleet.

**Title:** Support

**Articles:**

2.757	2.829	4.083	0.000	4.083
-	-	-	-	-

**Description:** Provide government engineering and technical support for AAV safety, obsolescence, and performance modifications.

**FY 2022 Plans:**

- Continue Assault Amphibious Vehicle (AAV) C7 Software updates using government engineering support subject matter experts (SMEs).
- Continue to provide technical and engineering services in support of AAV obsolescence and performance modifications.
- Continue utilizing the Enterprise Product Lifecycle Management Tool (ePLM) Integrated Decision Environment (IDE) to support analyses of the legacy AAV.
- Continue to provide material and travel associated with these efforts.

**FY 2023 Base Plans:**

- Continue Assault Amphibious Vehicle (AAV) C7 Software updates at reduced levels using government engineering support subject matter experts (SMEs).

**FY 2023 OCO Plans:**  
N/A

**FY 2022 to FY 2023 Increase/Decrease Statement:**  
The increase in Support from FY 2022 to FY 2023 (\$1.254M) is primarily attributed to technical support for required quarterly software and firmware updates each year to maintain the AAV Command variant security

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy	<b>Date:</b> April 2022
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<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0206629M / Amphibious Assault Vehicle	<b>Project (Number/Name)</b> 2938 / Amphibious Assault Vehicle
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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
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certification and to address unplanned design efforts which may be required to address major dead lining issues, safety of use, and obsolescence.					
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<p><b>Title:</b> Test and Evaluation</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> Developmental, Operational and Live Fire Test and Evaluation of safety improvements, upgrades, modifications and fact of life changes to ensure operational suitability and effectiveness of the AAV family of vehicles.</p> <p><b>FY 2022 Plans:</b> - Initiate Developmental Test &amp; Evaluation (DT&amp;E) of Additive Manufacturing (AM) efforts to test manufactured parts for form/fit/function replacement of legacy components which are obsolete and hard to replace.</p> <p><b>FY 2023 Base Plans:</b> -N/A</p> <p><b>FY 2023 OCO Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> The decrease in Developmental Testing &amp; Evaluation from FY 2022 to FY 2023 (\$0.506M) is attributed to completion of Additive Manufacturing testing in FY 2022.</p>	0.000 -	0.506 -	0.000 -	0.000 -	0.000 -
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<p><b>Title:</b> Management and Engineering Technical Services</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> Contract Management Support Services (MSS) and Engineering and Technical Services (ETS) for program office and field activities.</p> <p><b>FY 2022 Plans:</b> -Continue support of ECP development, trade studies and analyses, supply chain and government property management in support of AAV sustainment modification efforts. -Continue logistic support for systems integration efforts.</p> <p><b>FY 2023 Base Plans:</b> -Continue support of ECP development, trade studies and analyses, supply chain and government property management in support of AAV sustainment modification efforts.</p>	0.821 -	1.135 -	1.686 -	0.000 -	1.686 -
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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy	<b>Date:</b> April 2022
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<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0206629M / <i>Amphibious Assault Vehicle</i>	<b>Project (Number/Name)</b> 2938 / <i>Amphibious Assault Vehicle</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
-Continue logistic support for systems integration efforts.					
<b><i>FY 2023 OCO Plans:</i></b> N/A					
<b><i>FY 2022 to FY 2023 Increase/Decrease Statement:</i></b> The increase in Engineering and Technical Support from FY 2022 to FY 2023 (\$0.552M) is attributed to increased engineering support to identify which AAVs are transitioned out of the fleet first.					
<b>Accomplishments/Planned Programs Subtotals</b>	5.188	7.551	8.246	0.000	8.246

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023 Base</u>	<u>FY 2023 OCO</u>	<u>FY 2023 Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• PMC/2021: <i>AAV Product Improvement Program</i>	87.476	36.836	5.653	-	5.653	18.259	14.753	0.013	0.013	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

The AAV Modifications Line includes government and contractor life-cycle support to ensure cost-effective combat readiness for the AAV Family of Vehicles (FOV). This is accomplished through continuous review of sub-systems to maintain system supportability and safety, procurement of replacement systems for obsolescence, and fielding of Engineering Change Proposals (ECP). The improvements to the fleet reduce total ownership costs and improve sustainability. The AAV Modifications Line procures modernized components and subsystems that impact safe and reliable use of the AAV such as Tactical Communication Modernization (TCM) to meet NSA's cryptographic modernization mandates, quarterly technical refresh of servers and laptops for Command-variant (C-Variant), and associated production support for the AAV FOV. The AAV FOV is expected to continue to be in service until 2027 as it is replaced by ACV.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy** **Date:** April 2022

<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0206629M / Amphibious Assault Vehicle	<b>Project (Number/Name)</b> 2938 / Amphibious Assault Vehicle
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<b>Product Development (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Syst Design & Dev / EMD	C/FFP	MCSC/SAIC : Charleston, SC	138.072	0.000		0.000		0.000		-		0.000	0.000	138.072	-
Syst Design & Dev	C/FFP	Various : Various	11.398	1.610	Feb 2021	3.081	Feb 2022	2.477	Feb 2023	-		2.477	0.000	18.566	-
Other Product Development	C/BA	Various : Various	6.514	0.000		0.000		0.000		-		0.000	0.000	6.514	-
<b>Subtotal</b>			155.984	1.610		3.081		2.477		-		2.477	0.000	163.152	N/A

**Remarks**  
The decrease in Product Development from FY 2022 to FY 2023 (\$0.604M) is attributed to reduced quantities of AAVs in the inventory, and supports the programs ability to provide critical hardware and software technology refreshes to continue operating the Command variant as AAVs are retired from the fleet.

<b>Support (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
In-House Technical Support	Various	Various : Various	26.204	2.638	Feb 2021	2.792	Feb 2022	4.082	Feb 2023	-		4.082	Continuing	Continuing	Continuing
Program Management Support	Various	Various : Various	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Travel	Various	Various : Various	1.132	0.119	Oct 2020	0.037	Feb 2022	0.000		-		0.000	0.000	1.288	-
<b>Subtotal</b>			27.336	2.757		2.829		4.082		-		4.082	Continuing	Continuing	N/A

**Remarks**  
The increase in In-House Technical Support from FY 2022 to FY 2023 (\$1.290M) addresses technical support for required quarterly software and firmware updates each year to maintain the AAV Command variant security certification and to address unplanned design efforts which may be required to address major dead lining issues, safety of use, and obsolescence.  
The decrease in Travel from FY 2022 to FY 2023 (\$0.037M) results from reduced travel requirements as AAVs transition out of the fleet.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy** **Date:** April 2022

<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0206629M / Amphibious Assault Vehicle	<b>Project (Number/Name)</b> 2938 / Amphibious Assault Vehicle
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<b>Test and Evaluation (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Developmental Testing (DT)	Various	Various : Various	18.490	0.000		0.506	Apr 2022	0.000		-		0.000	0.000	18.996	-
Operational Testing (OT)	WR	MCOTEA : Quantico, VA	1.022	0.000		0.000		0.000		-		0.000	0.000	1.022	-
Live Fire Test and Evaluation (LFT&E)	Various	Various : Various	8.639	0.000		0.000		0.000		-		0.000	0.000	8.639	-
<b>Subtotal</b>			28.151	0.000		0.506		0.000		-		0.000	0.000	28.657	N/A

**Remarks**  
The decrease in Developmental Testing & Evaluation from FY 2022 to FY 2023 (\$0.506M) is attributed to completion of Additive Manufacturing testing in FY 2022.

<b>Management Services (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering and Technical Services	Various	Various : Various	17.794	0.821	Mar 2021	1.135	Mar 2022	1.687	Mar 2023	-		1.687	0.000	21.437	-
Management Support Svcs	C/FFP	MCSC : Quantico, VA	13.972	0.000		0.000		0.000		-		0.000	0.000	13.972	-
<b>Subtotal</b>			31.766	0.821		1.135		1.687		-		1.687	0.000	35.409	N/A

**Remarks**  
The increase in Engineering and Technical Support from FY 2022 to FY 2023 (\$0.552M) is attributed to increased engineering support to identify which AAVs are transitioned out of the fleet first.

	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	243.237	5.188	7.551	8.246	-	8.246	Continuing	Continuing	N/A

**Remarks**

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy

Date: April 2022

Appropriation/Budget Activity  
1319 / 7

R-1 Program Element (Number/Name)  
PE 0206629M / Amphibious Assault Vehicle

Project (Number/Name)  
2938 / Amphibious Assault Vehicle

		AAV MODIFICATIONS PB-23 SCHEDULE																																			
		1/20/2022																																			
FISCAL YEAR		FY 21				FY 22				FY 23				FY 24				FY 25				FY 26				FY 27											
Quarter		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4								
		O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
Remote Weapon Station (RWS)	Total	140																																			
	P	140																																			
	C	0																																			
	R	0																																			
AAV, Intercoms (ICS) Modernization	Total	451																																			
	P	376																																			
	C	40																																			
	R	35																																			
AAV, Radio Modernization (TCM)	Total	305																																			
	P	262																																			
	C	18																																			
	R	25																																			
Emergency Egress Lighting System (EELS) Vehicle Power Module	Total	389																																			
	P	354																																			
	C	35																																			
	R	0																																			
AAV, Assured Position, Navigation, and Timing (A-PNT)	Total	64																																			
	P	52																																			
	C	12																																			
	R	0																																			

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**Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy** **Date:** April 2022

<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0206629M / <i>Amphibious Assault Vehicle</i>	<b>Project (Number/Name)</b> 2938 / <i>Amphibious Assault Vehicle</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Proj 2938</i></b>				
TCM - ECP Approval	1	2021	1	2021