Project Management Plan (PMP)

Northwest Metro Denver Coordination Project

Prepared for
Federal Transit Administration (FTA)
U.S. Department of Transportation

Prepared by
Via Mobility Services

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1 PROJECT OVERVIEW

1.1 Background

This Mobility Services for All Americans planning effort is geared to support coordinated community transportation services through the implementation of ITS technologies which advance system and data interoperability within the industry. The goal is to facilitate the efficient and seamless operation of transportation services, the exchange of data and information of its consumers and operations between multiple stakeholders and service providers.

Via Mobility Services (Via) is the sponsor of the Northwest Metro Denver Coordination System (the TMCC) project, which will expand Via and RTD's successful coordination project in the city of Longmont, CO, to other urban and small urban communities within the northwest Denver Metro area: Louisville, Brighton, Northglenn, Federal Heights, Broomfield, and Thornton. Via's project will address both institutional and technological barriers to the seamless operation of multiple transportation services.

The TMCC project will also build on DRMAC's Veterans Transportation and Community Living Initiative (VTCLI) Trip Exchange project. The TMCC project partners include the Regional Transportation District (RTD) of Denver; the Denver Regional Mobility and Access Council (DRMAC); Easy Ride Transportation (Easy Ride) of Broomfield; the Seniors' Resource Center (SRC) located in Denver; and two software vendors—RouteMatch of Atlanta, Georgia (with a regional office in Denver), and DemandTrans Solutions of Wilmette, Illinois. Once completed, the TMCC project will allow partner demand-response human service transportation (HST) providers—and general public (and potentially ADA paratransit) DRT providers as well—in the target region to use a centralized and coordinated system to easily exchange information, book rides, and arrange transfers across service areas. This will improve both the customer experience and the providers' productivity.

1.2 Problem Statement and Opportunities

In the northwest Denver Metro area, government agencies and private HST nonprofits all work to provide on-demand specialized transportation to the same populations of older adults and people with disabilities. Using a centralized coordination system for scheduling trips among the providers would result in a more efficient use of the region's available resources by eliminating duplication and providing trips across service areas. One barrier to such coordination has been the use among the providers of different, proprietary scheduling software with no standard for exchanging information between systems. This technological barrier is not unique to the Denver Metro area; it's also found in metropolitan areas across the United States. By creating a standard for exchanging information between regional HST providers and a means to do so, the TMCC project team's goal is to create solutions that can be piloted in Colorado and then implemented across the country. Other barriers to coordination are institutional in nature, such as

different contractual requirements or different service requirements. The scope of work will also address these institutional issues.

1.3 Project Description

Via and RTD's Longmont Coordination Project proved that successful coordination efforts can increase efficient use of resources, ridership, productivity, and customer satisfaction. But during that initial effort, Via has identified institutional and technical sustainability issues as well as scaling problems that the TMCC project is designed to address as it expands a coordination system into the northwestern Denver Metro region. The TMCC project's overall goal is to allow HST providers to easily allow the general public Call-n-Ride and specialized HST services in the target region to exchange trips to maximize use of resources and minimize duplication of services. The concept is that if a vehicle from one service (e.g. a HST service) is in the area where a passenger who wants to ride on another service (e.g. Call-n-Ride) needs to be picked up, the HST vehicle can pick up the rider and take them to their destination or a transfer point. This would work in both directions and between multiple services.

1.4 Project Tasks and Deliverables

The grant application asked for a description of the project focused on project outcomes and that is illustrated in tasks 1 through 7 below. This provides a valuable way to look at the project. Our team also looked at the project from the perspective of how the activities will be accomplished; this is valuable in ensuring that there is a clear path to accomplish the project outcomes. While there is a clear relationship between the two perspectives, unfortunately, the Work Plan Supplement does not nest neatly within the FTA task descriptions.

Beginning in this section the reader will see both views: the FTA tasks and the Work Plan Supplement. The reader is asked to stretch to consider both perspectives, with the FTA tasks focused on process and the detailed work scope focused on content. Both are necessary for a successful project. To differentiate the two, the Work Plan Supplement tasks are labeled A through G.

FTA TASKS

Task 1: Project Management and Stakeholder Involvement Activities (18 months). Estimated funds needed for this task: $20,600 Total ($16,480 FTA)

Via, as the project sponsor, will be responsible for managing the project with assistance from the FTA project manager as well as a technical assistance team which will be under contract to the ITS Joint Program Office to support deployment planning activities. This task provides for the overall project's management and coordination and includes the activities and deliverables described below.

Project Manager and Management Team. Via will establish a Project Management Team with representatives of each participating stakeholder agency (Via, RTD, Broomfield Easy Ride, Seniors' Resource Center), RouteMatch, DemandTrans, and Denver Regional Mobility and Access Council (DRMAC), the VTCLI lead. They will meet monthly to work through each task and develop consensus on issues. Subgroups will be established with responsibilities for working through key items between monthly meetings. Under a subcontract with Via, Suzanne O'Neill of TransitPlus, Inc. will serve as Project Manager. The Project Manager will coordinate with the FTA and CDOT as required. Specifically, she will support the project and stakeholders by:

- Preparing agendas, meeting materials, and meeting notes
- Monitoring performance of all participants to keep the project on schedule
- Adjusting and refining the project plan and schedule for monthly reporting
- Preparing, with input from team members, all reports required under this agreement

Activities. The TMCC Project Manager and Project Management Team will participate in these activities:

- An initial Kickoff Meeting (present draft project plan and schedule)
- Preparation of a detailed Project Management Plan (PMP)
- Updated technical plan in relation to RFP submission
- Development and maintenance of a project schedule and budget
- Monthly project progress reporting to FTA via periodic meetings and quarterly reports
- Potential MSAA Deployment Planning cohort meeting at a location to be developed such as the Transportation Research Board Annual Meeting in Washington, DC in January 2016.
- Final Report

The recipient will conduct the project in accordance with the FTA Master Agreement as listed at the following URL: http://www.fta.dot.gov/documents/21-Master.pdf and FTA Circular 6100.1E.

Deliverables. Task 1 includes the following deliverables:

- Kickoff meeting, including meeting materials and notes
- Detailed Project schedule
- Updated technical plan
- Project budget
- Detail a draft and final Project Management Plan (PMP)
- Periodic meetings (e.g. conference calls, site visits)
- Quarterly progress reports

Task 2: Monthly Progress Reports (Months 1-18). Estimated funds needed for this task with breakdown: $4,800 Total ($3,840 Federal and $960 Local)

The local project teams shall provide monthly progress reports. The monthly reports shall include the following items:

- Total budget and remaining budget
- Expenditures for the month in focus
- Estimated % of work completed
- Brief list of activities/deliverables completed that month
- Brief list of activities anticipated in the next month
- Variances from the current work plan, including planned corrective actions
- Brief list of outstanding issues/comments requiring USDOT attention
- Status of each deliverable, including the outline, the draft (or items)(version, and the final version

Deliverable: This task includes the following deliverable:

- Monthly Progress Reports

Task 3: Strategic Partners Stakeholder Participation and Level of Coordination (Months 1-18) Please provide a breakdown estimate of funds this task: $26,750 Total ($21,400 Federal and $5,350 local)

The stakeholders identified in task 1 will work through the Project Management Team to identify the practical issues related to exchanging information between systems. Once the various issues have been defined they will identify differences in business rules, data, standards, or other factors that limit their ability to easily exchange information and develop a consensus on how to approach each item.

This will result in agreement on policies and procedures about how information will be defined and exchanged, the business rules that will be adopted to facilitate electronic exchange of information with a minimum of staff intervention, and any policies needed for facilitating the exchange, scheduling, and payment of trips that cross boundaries. These discussions will address the changes needed internally to the individual scheduling installations and, as the team moves into developing the Concept of Operations, for exchange of data through application programming interfaces. This is an iterative activity that will continue throughout the project.

Deliverable:

- Governance Policies and Protocols for Stakeholders and Partner Organizations

Task 4: Local Travel Management Coordination Center (TMCC) - Concept of Operations – (Months 1-18). Please provide a breakdown estimate of funds this task: $11,950 Total ($9,560 Federal and $2,390 Local)

A draft TMCC concept of operations will be delivered 30 weeks after project award. After receiving comments from the USDOT project management and technical

assistance team, the project sponsor will deliver the final TMCC concept of operations document.

The TMCC concept of operations will provide a high-level definition of "what" the TMCC should or should not do. It will describe the operational scenarios to illustrate the envisioned system and how the users will interact with it. The Via project begins with a Concept of Operations that has been developed for the Longmont Coordination Project. It will be refined to address the technical and institutional issues that have resulted in a significant amount of manual intervention in scheduling trips and addressing contractual issues.

The Concept of Operations document will clearly and concisely describe user needs, operational policies and constraints corresponding to local characteristics, and operational scenarios. It will explicitly document the specific shortcomings of the current human service transportation delivery in the local area that will be addressed by the proposed TMCC using ITS, from both an operator/program administration and a user point of view.

Deliverable:

- Draft Concept of Operations Draft

Task 5: **TMCC Phased Implementation Plan – (Months 1-18). Please provide a breakdown estimate of funds this task: $12,150 Total ($9,720 Federal and $2,430 Local)**

A draft TMCC phased implementation plan is due 48 weeks after project award. After receiving comments from the USDOT project management and technical assistance team, the grantee will deliver the final TMCC phased Implementation plan. The Phased Implementation Plan is intended to provide a clear path defining how the local project team may build up its TMCC system capability and/or functionality incrementally using various funding resources, either current or future projected.

Deliverable:

- Final TMCC phased Implementation Plan

Task 6: Common Fleet Information Platform –(Months 1-18). Please provide a breakdown estimate of funds this task: $205,220 Total ($164,176 Federal and $41,044 Local)

At 60 weeks from award, the project should demonstrate, and obtain approval from the USDOT, a common fleet information platform. The platform shall enable all participating transit providers to view each other's trip scheduling and vehicle location information in real time. It should be noted that this common platform should not require all providers to obtain the same Computer- Aided Dispatched /Automatic Vehicle CAD AVL software from multiple system suppliers.

Via's original application envisioned that the DRMAC's TMC Trip Exchange would provide a basic hub for scheduling trips that cross between service providers. DRMAC has selected the RouteMatch Coordination Module which functions more as a place for posting trips (a "whiteboard") from RouteMatch systems than a hub for exchanging data among a wide variety of scheduling software systems. So, rather than enhancing a basic hub, the MSAA project will need to define the basic functionality of the hub and develop the software for the scheduling/ data exchange hub to provide a basis for real-time information on trip scheduling and vehicle location.

There are three activities that are included in developing the common fleet information platform. One is to develop the scheduling and data exchange hub software. In order to do this there will need to be agreed-upon standards for data and message strings. Finally, it will be necessary to develop and enhance software application interfaces for RouteMatch and Mobility DR software to communicate fleet operations data to the hub.

In addition, as part of this task the coordination model will be extended to additional locations and providers, as defined in the Local Implementation Plan. The common fleet platform, as operationalized on a single tablet computer that shows manifests from multiple service providers, will be tested in the additional service locations.

Deliverables:

- Extension of coordination model to additional Call-and-Ride operations
- Common Fleet Information Platform

Task 7. Project Meetings and briefings (Months 1-18). Please provide a breakdown estimate of funds this task: $7,280 Total ($5,824 Federal and $1,456 Local)

The local project teams shall attend project meetings or teleconferences as requested by the USDOT project manager to report on progress, schedule, scope issues, budget, and results of tasks. The local project teams shall support USDOT with communicating the progress and results of this project to various stakeholders throughout the project.

Deliverables: As directed by the USDOT project manager, the local project teams shall develop and/or deliver presentations (not to exceed 2) on the project-related findings at various industry conferences (e.g. APTA Bus and paratransit Conferences, CTAA Expo, TRB Annual Meeting, etc.).

Task 8: Final Project Report–(Months 1-18). Please provide a breakdown estimate of funds this task: $8,380 Total ($6,704 Federal and $1,676 Local)

Final Report and Briefings – At the conclusion of the project a final report and briefings addressing project results, including lessons learned in planning and implementing the local TMCC system. In addition, the final report should provide recommendations for future update/revision to the TMCC implementation Guidebook. The development of the TMCC Implementation Guidebook is currently in progress and funded separately by the USDOT. The USDOT project manager will make the Guidebook available to the successful applicants at the time of the cooperative agreement award. The report will follow the FTA's final report format as posted at:
http://www.fta.dot.gov/documents/Preparation_Instructions_for_FTA_Final_Reports_June_2013.pdf

Deliverables:

- Final report and briefings. (See above descriptions.)

WORK PLAN SUPPLEMENT TASKS

As noted above, these tasks, A through G, focus on how the team will accomplish the tasks at hand. They begin with Project Management and end with a Common Fleet Information Platform, but the activities in-between are quite different. These are the activities from which the subcontractor scopes are primarily defined.

The basic deliverables have been grouped into a logical set of tasks that will enable the project team to work effectively toward a common goal. These tasks include not only deployment planning but also implementation activities. Via is able to build on previous and ongoing coordination efforts, so full deployment may be possible. The chart below shows how the FTA Tasks relate to the supplemental activities.

FTA Task and Deliverable	Comments
Kick-off meeting, detailed project plan, and schedule	• Part of Task A
Monthly progress reports	• Part of Task A
Local TMCC Concept of Operations	• Due 30 weeks after award; Via will provide at 12-16 weeks after award.
TMCC Phased Implementation Plan	• Due 48 weeks after award; Via will provide at 24-28 weeks as the remainder of funds will be to carry out the first phase.
Extend Existing Coordination System to Additional Locations	• Includes other services within Via service area, Broomfield, and SRC service area.
Scheduling and Data Exchange Hub	• An information exchange hub will be developed with agreement on the necessary definition of data and message sets. A functional data exchange hub will be operational by 44 weeks after award.

Common Fleet Information Platform: Single Tablet Application	• The common fleet information platform will be operationalized as a single tablet computer that shows manifests for two scheduling systems. This task includes the development of the single tablet computer and the enhancements to scheduling software to enable host systems to communicate trip data and to provide real-time and advance driver manifests for upcoming scheduled trips. The fleet information platform will be tested so it can be operational by 60 weeks after award.
Final Project Report and Briefings	• Included in Task A

Task A. Project Management and Stakeholder Involvement Activities

Approach and Scope: A stakeholder team with representatives of each participating agency (Via, RTD, Broomfield Easy Ride, Seniors' Resource Center), RouteMatch, DemandTrans, and DRMAC will be established to serve as the Project Management team. They will meet monthly to work through each task and develop consensus on issues. Subgroups will be established with responsibilities for working through key items between monthly meetings.

A project manager will support the stakeholder team, preparing agendas, meeting materials, and meeting notes, and monitoring performance of all participants to keep the project on schedule. She will be responsible for adjusting and refining the project plan and schedule and for monthly reporting. Selected participants will be responsible for representing the project at the kick-off and other project management meetings, providing a balance of agency and technical knowledge.

Deliverables: Kick-off meeting, refined project plan and schedule, monthly team meetings, monthly reports, and participation at all FTA meetings throughout the project and at the conclusion of the project.

Task B: Institutional Integration

Approach and Scope: The project management team will be responsible for identifying integration issues with extension of the current Longmont system that allows coordinated reservations and scheduling to other RTD Call-n-Ride, RTD Access-a-Ride, and various specialized transportation services operated by Via, SRC, and Broomfield Easy Ride. Via staff have already identified a range of issues that need to be addressed to minimize manual intervention. Based on the Longmont coordination implementation, other issues are anticipated that with the extension of

service to other providers with different versions of RouteMatch with each system fine-tuned for the particular transportation provider using it.

For each phase in the project (Task 5 - Extension of Concept of Operations, Task 6 – Develop Software Application Interfaces for Central Data Exchange, and Task 7 – Develop Common Fleet Information Platform) integration with all providers will be actively addressed.

In addition, this task provides for reports to each entity's board or Council to keep them abreast of the results of the project and the value of their commitment.

Deliverables: This task will result in dispatch systems that are functional from an operational perspective (with a minimal amount of manual intervention required), address the specific needs of each agency, and have the support of boards and elected officials. The dispatch instructions will be designed to be sent to the single tablet mobile data terminals.

Task C: Local TMCC Concept of Operations

Approach and Scope: The Via team will build on the existing Concept of Operations utilized in the successful Longmont coordination project, a network that coordinates across Via's specialized transportation services, RTD's general public Call-n-Ride service, and RTD's Access-a-Ride service within the City of Longmont. This Concept of Operations will be expanded to other communities served by Via, Broomfield Easy Ride, and SRC services. It will be integrated with the Concept of Operations that has been developed for the DRMAC Veterans and Community Living Initiative (VTCLI) project, focused on cross-jurisdictional trips between communities and that will utilize a neutral hub that can be used to exchange trip data among several providers.

With the foundation already created, the Project Team proposes to complete the description of the Concept of Operations by 12-16 weeks after award. The DRMAC VTCLI project is just getting underway so it is unknown how the projects will align. It is our intention to work in parallel to the extent possible.

This work will be accomplished by the stakeholder team and documented in a report.

Deliverables: A key objective of the proposed MSAA project is to create a model that can be used across the communities that have Call-n-Rides and other demand response services such as Access-a-Ride or various forms of specialized transportation. The refined TMCC Concept of Operations will detail this model and how it will be applied in the northern portion of the Denver Metropolitan Area.

Task D: Phased TMCC Implementation Plan

Approach and Scope: Stakeholder team members will refine the TMCC Concept of Operations, developing the detail necessary to understand specifically what needs to be accomplished to implement it with each participating agency and among the various types of services offered in the region. This work will identify the how long various activities will take and how activities can best be sequenced. The project management team will guide by this task, with work carried out by RouteMatch and DemandTrans Solutions.

The TMCC Implementation Plan will address institutional issues as well as technical issues. The region has successfully worked through many major issues related to willingness to work together across program, agency, and jurisdictional boundaries. The institutional issues to be addressed in the proposed project are defined as those functional issues related to the differences in either the organizational structures of participating agencies or the type of services offered by each participant. These differences lead to:

- Varying business rules for each scheduling system;
- Varying parameters that need to be included in the network;
- Differences in how the parameters are used among participants; and
- Varying reporting and monitoring requirements.

The participants are committed to developing a TMCC that adequately addresses the needs of all participants and a wide range of services. We, along with our partners, understand that this will require flexibility and willingness to make some changes in our normal order of business in order to create a refined system that can achieve the region's long-term objectives. We are committed to improving service to our customers and efficiency in how services are delivered.

Most of the technology that will be used in developing the TMCC is straightforward. Software must be developed to implement the centralized data exchange and the platform to allow participants to share useful information, but this is something that can be done using APIs, a well-developed means of accomplishing the objectives. There are, however, two issues: using standardized formats in the central data exchange and timing.

The Project Team expects to use standardized data formats in this system and ideally would be able to participate in the development of such formats and assure that the system that is developed uses such standards. However, because there is not an organized structure within which the Project Team can work to develop standardized data formats that consider the broader industry, it will be necessary to take small steps towards this. The Project Team will reach out to those in the industry who have been working on the issue, and understand that the selected formats for the Northwest Metro Denver Coordination Project will need to be revised after the fact so selected

data formats will comply with standardized data formats that are eventually adopted by the industry.

Deliverables: A phased TMCC Implementation Plan that covers institutional and technological issues. This implementation plan will guide the remainder of the proposed project and future network development.

Task E: Scheduling and Data Exchange Hub

Approach and Scope: This task includes two basic activities: developing an information exchange hub and agreeing upon the definition of data and message sets necessary to achieve this. The scheduling/data exchange hub is necessary in order for different paratransit/DRT software systems in the region to be able to inter-operate in a meaningful way in real-time (or near real-time).

The RouteMatch Coordination Module application obtained by DRMAC via the VTCLI grant will provide human service agencies in the region with the ability to post trip requests and to offer capacity on their transportation services to other agencies, but all transactions facilitated by this system must be completed in each agency's system of record. In essence, the Coordination Module application supports manual scheduling of trips involving 2 agencies, but does not provide fully automated scheduling and data exchange capabilities. (If both agencies involved in a transaction involving the Coordination Module are operating RouteMatch systems, there is a higher degree of automation involved in the process, but the demand-capacity matching function remains a manual process.)

Automated inter-operability among software systems managing separate fleets of vehicles is the ultimate objective of the region's coordination system. If this can be achieved, the separate fleets of vehicles controlled by different service providers will be able to perform as if they are a common fleet whose capacity may be available to any participating organization for its customer/client transportation needs. In order to achieve this objective, it is necessary for the software systems used by the organizations involved in the coordination system to be able to exchange data and to complete transactions that cross systems, most notably scheduling trips onto vehicles operated and controlled by another organization.

<u>The data exchange/scheduling hub</u> will need to incorporate the following functionality:

- Ability to receive requests for scheduling that are directed to either a specific fleet system or to any fleet system that may be interested
- Ability to route scheduling requests to any participating software system that manages a fleet of vehicles
- Ability to store scheduling requests within the hub
- Ability to inform the originating system of the status of its scheduling request

- Ability to route responses (acceptance, rejection) to scheduling requests to the originating system, and if the request has been accepted and scheduled onto a vehicle at a specific time, to provide the originating system with all relevant details on how the trip will be executed (e.g., vehicle assigned, estimated pickup time and delivery time, etc.)
- Ability of one system to send its trip manifest data to the hub, where another system can view/access that data and transfer it to its own system
- Ability to restrict access to trip manifest data to a specific set of other systems (or a single system)
- Ability to record and store all actions and transactions involving data flowing through the hub

The functionalities, as agreed upon by the project team, will be implemented via a standard message set that incorporates specific data elements. The hub will provide the computing infrastructure that will support the transactions made feasible by the message set, including providing standard interfaces to access the hub, persistent storage of messages sent to and via the hub, and audit trails for all actions handled via the hub. All of the information needed to use the hub will be published in a specification document that will describe how paratransit/DRT software systems will interact with the hub, and provide all necessary message and data specifications.

The project team will also need to agree on the data communication approach whereby paratransit/DRT reservations/scheduling systems interact with the hub. For example, will older style FTP file communication approaches be used, or more contemporary approaches such as JSON-based RESTful services? The API requirements for the external software systems must also be specified.

Data standards are essential to the development of a hub to achieve inter-operability among multiple reservations and scheduling systems. Such standards include two components. First, there must be a standard way of describing the key data elements of paratransit/DRT reservations and scheduling systems, such as passengers, trips, and vehicles. Second, there must be a common "message set", which encompass all of the transactional requests that are supported by the coordination system's hub software. Messages are used to both make requests and to provide responses to requests, and the content of the messages is comprised in large part of the standardized data elements. An example of a message is a request to schedule a trip; another message type may be designed to provide information about a trip that has been scheduled by system A but will be delivered by a vehicle whose mobile application is using software from system B. In either case, both systems must understand how to process the common set of message types and how to interpret the data encapsulated within the message in order for inter-operability to successfully occur.

The specific work tasks that must be accomplished in this aspect of the project are the following:

- Specify message set
- Design structure of messages
- Specify common data elements
- Design structure (such as XML) of standard data elements
- Determine preferred API approach

Deliverables: A connected network that allows scheduling across services and jurisdictional lines, with both the various RouteMatch and Mobility DR systems having the necessary data interfaces and APIs for smooth electronic sharing of data.

Task F: Implement Expanded Concept of Operations in Other Locations

Approach and Scope: The Concept of Operations for integrating operations by Via and RTD is well-tested in the City of Longmont. In this task it will be extended to SRC and City of Broomfield operations. The remaining RTD Call-n-Ride services in the North Metro Denver area can then be coordinated with these services.

This expansion is feasible as SRC uses the RouteMatch software system and Broomfield is in the process of purchasing software. In the RouteMatch system enhancements have already been developed to enable the data exchange processes with the MobilityDR software application used by the RTD for Call-n-Ride. Those automated data exchange mechanisms are the key technical elements of the Longmont coordination system. Thus with little or no additional technology development, it is possible to expand the concept of operations to other geographic areas and providers. The primary tasks will involve SRC and Broomfield working collaboratively with Via and RTD to determine the policies that will guide the possible shared use of resources and the operational management approaches that will be used on a daily basis to accomplish this. This is likely to be relatively straightforward for coordination of Call-N-Ride services with SRC and Broomfield-operated services. It will be more challenging to extend the coordination to the RTD's Access-A-Ride services (ADA paratransit services), as the ADA PT RouteMatch system does not currently utilize the software enhancements that RouteMatch developed for the application used by Via in the Longmont coordination system. It would be necessary for RTD to obtain a portal for electronically sharing Access-a-Ride trips

Deliverables: A deployment plan and the necessary software interfaces that allow specialized transportation and general public demand response systems to schedule riders between RouteMatch and MobilityDR scheduling software systems as is presently done in one RTD Call-n-Ride service area.

Task G: Common Fleet Information Platform: Single Tablet Operation

Approach and Scope:
It is proposed that **the initial use of the hub data exchange be to facilitate the ability of each Via vehicle to be managed by a single mobile application running on a tablet computer in that vehicle**. This single tablet computer will be the foundation of the common fleet information platform, built upon the centralized data exchange hub and the inter-operability it provides. This task includes the development necessary for a single tablet to show manifests from RouteMatch and Mobility DR, and the enhancements to the RouteMatch and Mobility DR software necessary to meet this objective.

Via would prefer to have all of its vehicles use the RouteMatch tablet computers. This will require that RouteMatch be able to display Call-N-Ride trips managed by MobilityDR via its tablet computer interface, and to be able to handle same day—including real-time—changes to these trips that are initiated in the MobilityDR system. This will require development in both the MobilityDR and RouteMatch systems to support this new approach.

After the initial implementation of the hub system, it would clearly be desirable to also use that system to handle data flow from RouteMatch to MobilityDR rather than the current FTP process. (This would involve trips booked and managed by Via using RouteMatch that will be delivered on a Call-N-Ride vehicle managed by MobilityDR.) Not only would this enable MobilityDR to execute Call-N-Ride trips that originated within the RouteMatch system, it would also enable such trips to be transmitted to and viewed on the MobilityDR mobile application that is deployed on the RTD's tablet computers in the Call-N-Ride vehicles. For this to occur, RouteMatch will need to enhance its current capabilities for system to system data exchange so they will support the new hub-based data exchange approach and the specific software implementation of that approach.

As with tasks E and F, this task also includes both the technical programming activities and the functional problem solving that will guide the technical solutions. The project management team will continue to both identify functional issues and work to resolve them using a systems engineering approach.

Both the RouteMatch and MobilityDR systems include the capabilities for obtaining real-time and same day operations data from service providers, as both software platforms extend their reach into mobile devices in the vehicles and the central server is frequently being updated with the location of vehicles using the GPS capabilities in the mobile devices and the wireless data communication transmissions. It will be necessary to determine the preferred approach to obtaining real-time/same day operational data from software applications that manage separate fleets—push or pull approach, frequency of data refresh, data structure design, etc.

The centralized data hub can be enhanced to include additional services and one or more APIs that enable vehicle location data and same day schedule information to be obtained from the software applications that interface with the data hub. The specific enhancements, approach and protocols will be determined once the objectives of operating with a single tablet and expanding to additional areas have been achieved.

As with the core data exchange functionality, RouteMatch and MobilityDR would need to be enhanced to be able to inter-operate with the central data hub for purposes of transmitting real time and same day operational data. Merely having the fleet information platform capabilities in the central data hub will not by itself insure that the software applications of the service providers can generate this data for the central hub. The extent of the enhancements that can be accomplished within the project budget will be determined once the initial objectives are completed.

Deliverables: Design and testing of the single tablet computer demonstrating a common fleet information platform as described above.

1.5 Schedule of Tasks, Milestones, and Deliverables

Two schedules are attached, one for FTA tasks and one for the Work Plan Supplement tasks. These will be updated, as necessary, whenever the technical plan is updated. Major tasks and associated deliverables for each of the tasks will be documented throughout the life of the project. The tasks and subtasks, and the deliverable associated with them, are listed in the schedules in Figures 1.1 and 1.2.

In both schedules, the initial site visit is shown as being held in November of 2015, but actual project work is scheduled to begin in January of 2016 once contracts are in place.

At the initial site visit, it was agreed that we would focus on getting some deliverables, such as providing a single tablet solution for vehicles using both Route Match and Mobility DR software. However, as having agreed-upon standards and development of APIs for transmitting information is a necessary part of the single tablet solution, this decision focuses some activities but does not change the schedule for deliverables in a measureable manner. Table 1-1 summarizes the duration of the tasks.

Table 1-1. Task Duration

Kick-off meeting, plan, schedule	1 month
Monthly progress reports	18 months
Local TMCC Concept of Ops	3-4 months
TMCC Phased Implementation Plan	5-6 months
Extend System to Other Locations	15 months
Schedule and Data Hub Development	10 months
Common Fleet Platform: Single Tablet	14 months
Final Project Report and Briefings	3 months

Figure 1-1. Project Schedule – FTA Grant Tasks

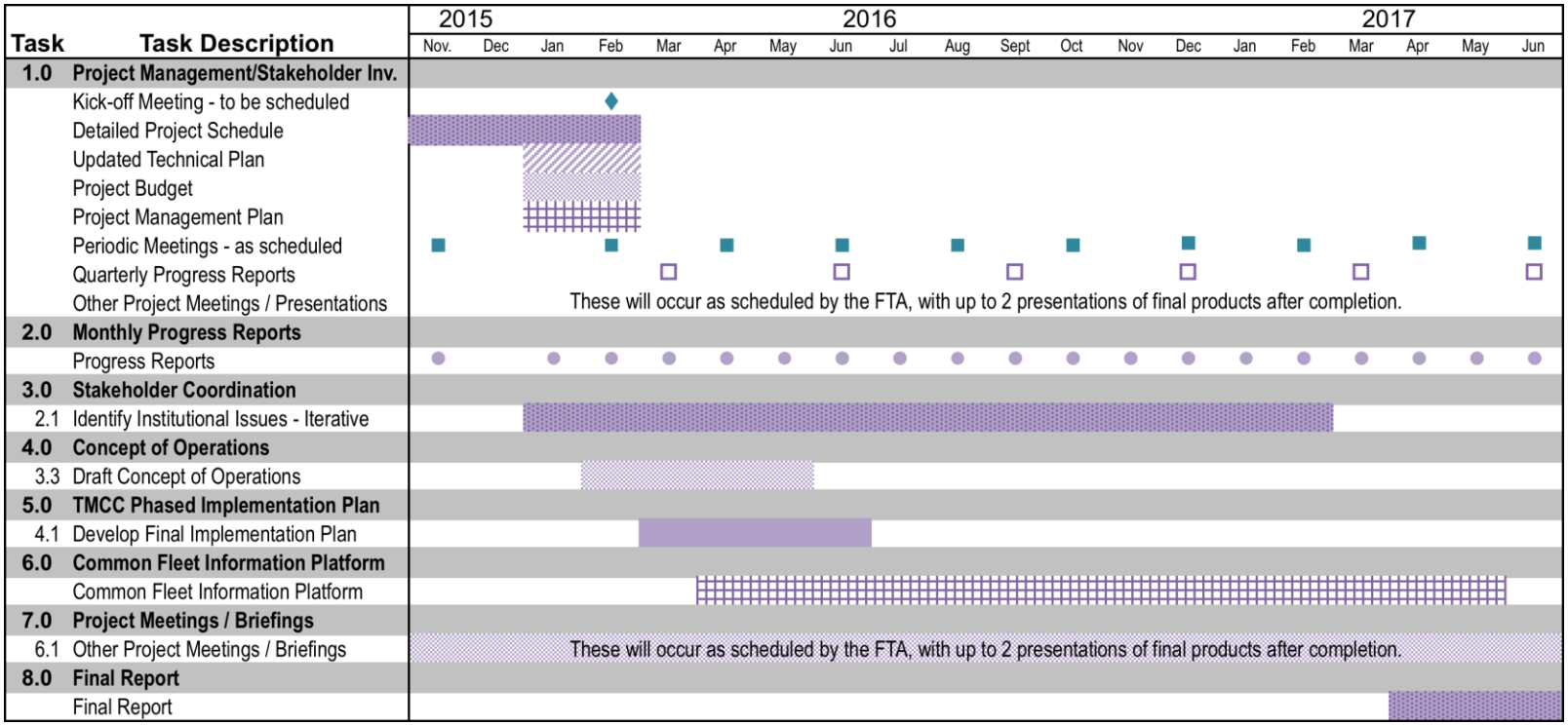


Figure 1-2. Project Schedule – Work Activity Tasks

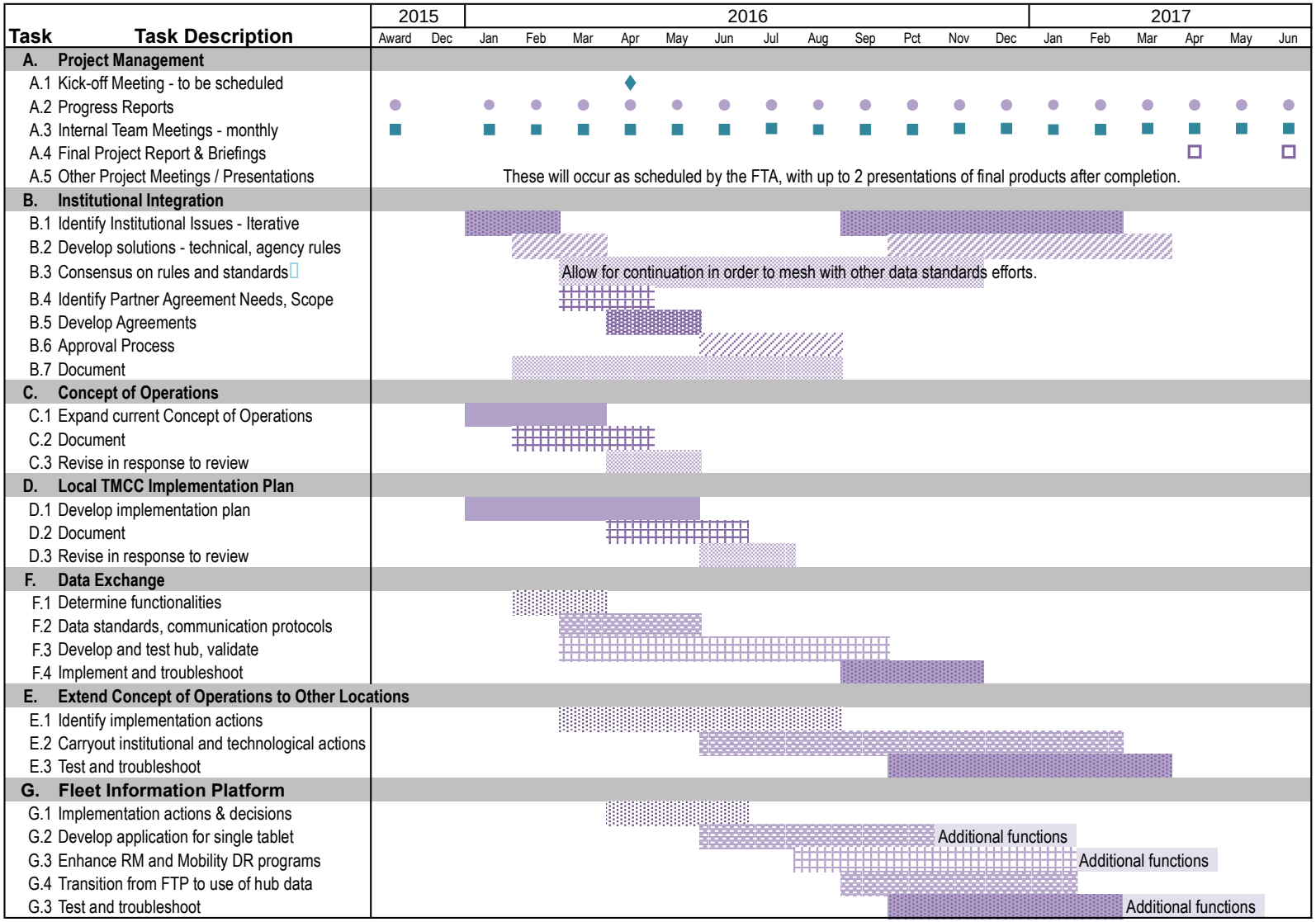


Table 1-2. Deliverables Schedule

1.	Project Management Deliverables	Dates
	- Kickoff meeting	Nov. 10
	- Project Schedule	Contained in PMP
	- Updated technical plan	Will be developed as part of Concept of Operations (April 30, 2016)
	- Project budget	Contained in PMP
	- Project Management Plan	Draft Nov. 30, 2015 Final Dec. 15, 2015
	- Periodic meetings (e.g. conference calls, site visits)	As scheduled
	- Quarterly progress reports	Quarterly, beginning April 15, 2016 for prior quarter
2	Monthly Progress Reports	Monthly, beginning Feb. 15, 2016 for prior month.
3	Stakeholder Participation	Nov. 30 Kickoff Meeting; Monthly meetings to begin in January, 2016.
4.	Concept of Operations	Draft: April 30, 2016
		Final: May 31, 2016
5.	Local Implementation Plan	Draft: June 30, 2016 Final: July 31, 2016
6.	Scheduling and Data Hub: - Define functionalities, communication process & standards - Develop hub, test, and validate	 August 31, 2016 November 30, 2016
7	Common Fleet Platform: Single Tablet Operation Additional Enhancements	Basic tablet functionalities: Feb. 28, 2017 May 31, 2017

1.6 Budget

The budget is described in this section, with an estimate of the funding anticipated to be spent in each fiscal year, the budget categories, and the budget broken down into tasks. There is some uncertainty about the pace of the work but this provides the best estimate at the present. The budget reflects the original budget submitted and approved with one exception. As the team developed subcontracts based on the decisions made at the November 10, 2016 kickoff meeting it was found that a budget adjustment will be needed to transfer funding from provider stakeholders to Via, TransitPlus, and travel accounts. Table 1-4 now shows the proposed change that Via will request FTA to consider.

1.6.1 Budget by Fiscal Year

The total budget of the project is **$300,000**. Estimated budget breakdown by Federal fiscal year is as follows:

FY 2015 **$ -0-**
FY 2016 **$ 230,000**
FY 2017 **$ 70,000**

1.6.2 Budget by Category

Breakdown by budget category, as presently in the grant contract is contained in Table 1-3 below. Based on the expectations provided by the FTA on the documentation required for the project, and its complexity, as well as decisions made at the kick-off meeting, Via will request a budget change to reflect a $7,500 decrease in the Managerial, Technical, and Professional category, an increase of $6,500 in the Consultant category, and a $1,000 increase in the Travel category (all reflecting total expenses).

Table 1-3. Project Budget by Category

Budget Category	FTA Amount ($)	Total Amount ($)
Managerial, Technical, and Professional	$70,400	$88,000
Consultant	$167,304	$209,130
Reproduction	$96	$120
Travel	$800	$1,000
Materials / Equipment	$1,400	$1,750
Total		**$300,000**

Table 1-4. Proposed Project Budget by Category

Budget Category	FTA Amount ($)	Total Amount ($)
Managerial, Technical, and Professional	$70,400	$88,000
Consultant	$167,304	$209,130
Reproduction	$96	$120
Travel	$800	$1,000
Materials / Equipment	$1,400	$1,750
Total		**$300,000**

1.6.3 Budget by Task

Budget breakdown by task is contained in Table 1-5 below. The only proposed change that will impact the budget by task is reducing the labor tasks by $1,000 and increasing the direct expenses by an equal amount.

Table 1-5. Project Budget by Task

Budget Category	FTA Amount ($)	Cost Share ($)	Total Amount ($)
1. Project Management and Stakeholder Involvement	$16,480	$4,120	$20,600
2. Monthly Progress Reports	$3,840	$960	$4,800
3. Strategic Partners Institutional Coordination	$21,400	$5,350	$26,750
4. Local TMCC Concept of Operations	$9,560	$2,390	$11,950
5. Phased TMCC Implementation Plan	$9,720	$2,430	$12,150
6. Common Fleet - Scheduling Platform	$164,176	$41,044	$205,220
7. Project Meetings and Briefings	$5,824	$1,456	$7,280
8. Final Project Report	$6,704	$1,676	$8,380
Direct Expenses	$2,296	$574	$2,870
Total	**$240,000**	$60,000	**$300,000**

1.7 Evolution of the Project Management Plan

To be an effective management and communication tool, the plan will be a living document that is updated as conditions change. At a minimum, the project manager will review the PMP quarterly, and as major milestones are achieved. It is anticipated that the first update will be when the concept of operations for extending the Longmont

Coordination project is developed, approximately April of 2016. The version changes for the PMP are recorded in Appendix A.

At the MSAA Kick-off meeting on November 10, 2015, several items were identified that will affect the scope of the project. These items are reflected in Section 1.4 Project Tasks and Deliverables, above, and are summarized in this section.

1.7.1 Refined Scope of Work

The Northwest Metro Denver stakeholder team agreed at their November 10, 2015 initial site visit meeting that they would strive to improve the efficiency of the current coordination efforts by reducing the need for manual intervention on trip scheduling and by enabling all trips on the manifest to be provided to the driver on a single tablet computer.

These objectives provide a focus for the stakeholder team, with clearly defined outcomes. Accomplishing these objectives requires that the fundamental issues regarding electronic transfer of information between software systems be addressed. This is a challenge for many reasons, including:

- There is not at present a standardized way of defining data and message sets and the current MSAA project is not suited to building this through either a consensus based or standards based process. We are working with only two software vendors, four transportation providers, and three types of services – a small sample by any measure – so our focus will be narrow by definition.
- This is new ground for all concerned and will require creative and flexible thinking, the patience to understand different perspectives, and willingness to compromise in areas where compromises are an option.

This suggests a strategic approach, grounded in real-world practicalities, is appropriate. This will both help the industry move towards data standards and message sets and address primary problems at hand: having a single tablet and having more electronic movement of information / less manual intervention. It is important to note that there are other technical and institutional issues surrounding each of these items, and they will be explored further in the work to create an expanded Concept of Operations. Examples are:

- The RouteMatch tablet is internet-based (using cellular communications) and uses an Androide operating system. The RouteMatch tablet contains a minimal client application, relying on the server for the remaining functionality. The Mobility DR tablet, while also internet-based, uses a Windows operating system, The Mobility DR tablen contains a comprehensive mobile application for the driver—including a copy of the scheduling engine that runs on the server.
- Enabling electronic transmission of data for the Access-A-Ride trips would require that RTD, as the home system, procure and install a RouteMatch portal.

These other issues are critical *but are in addition to the fact that a means to exchange data between different scheduling systems is necessary*. The Concept of Operations will need to address the means to exchange trip data and the ancillary issues.

1.7.1.1 Exchanging Trip Data

In an ideal world the definitions of data and message sets would emerge from an industry wide consensus process. In the case of this project, the necessary definitions, protocols, and message sets will be determined based on both research and existing systems, notably the SUTI Standards[1]. As practical, advice and input will be sought from other industry participants. The means of exchanging data will be developed far enough to prove the concept and make it operational for the Northwest Metro Denver Coordination Project. Information on the definitions, application programming interfaces (APIs), and message sets will be documented and made available as part of the broader national discussion on developing a standardized process. As this national discussion unfolds, the Northwest Metro Denver Coordination Project can update their code to reflect agreed upon standards.

To exchange trip data, the following will be needed:

- A scheduling/data exchange hub with the ability to receive, send, and store data.
- Data standards with two basic components:
    - A standard way of describing the key data elements of paratransit/DRT reservations and scheduling systems
    - A common "message set", which encompass all of the transactional requests that are supported by the coordination system's hub software.
- Adaptation of current software and hardware to the new hub-based data exchange approach.

1.7.1.2 Role of Stakeholders

The role of the *stakeholder agencies* remains essentially as identified in the initial scope of work. The agencies will identify operational, institutional, and technical issues that exist today and that will be a part of the expansion of the coordination module. They will work as a group to develop a Concept of Operations and Local Implementation Plan that addresses the identified issues and provides both a reasonable scope for the project and some leeway to address unexpected items.

The role of the *software vendors* has been both modified and clarified based on two factors. One is the approach described above. The other is that the initial application anticipated the possibility of the DRMAC project serving as a foundation for the

1. "Standardisorat Utbyte av Trafikinformation" or SUTI Standards is a set of standards developed in Sweden and in use in the Scandinavian countries for the "Dynamic Resource Allocation" of many transport providers.

necessary exchange of information. It will not, so the information exchange will be built as part of the MSAA project. The MSAA and DRMAC projects will proceed in a coordinated manner, as both will address similar issues, but they will not be dependent upon each other.

In addition to active participation in all aspects of the project, RouteMatch will be responsible for adapting the RouteMatch tablet computers to be able to display Call-N-Ride trips managed by MobilityDR via its tablet computer interface, and to be able to handle same day—including real-time—changes to these trips that are initiated in the MobilityDR system. To support this new functionality, the design and testing will include terminating the current RouteMatch-MobilityDR data interchange approach and use the capabilities of the new hub system to implement the new coordination approach. This will require development in the RouteMatch and Mobility DR systems to support this new approach.

After the initial implementation of the hub system, it would be desirable to also use that system to handle data flow from RouteMatch to MobilityDR rather than the current FTP process. Not only would this enable MobilityDR to execute Call-N-Ride trips that originated within the RouteMatch system, it would also enable such trips to be transmitted to and viewed on the MobilityDR mobile application that is deployed on the RTD's tablet computers in the Call-N-Ride vehicles. For this to occur, RouteMatch will need to enhance its current capabilities for system to system data exchange so they will support the new hub-based data exchange approach and the specific software implementation of that approach.

RouteMatch Software responsibilities will be refined and modified as the project moves forward. The primary responsibility of RouteMatch Software will be to ensure the following;

1. Enhance the current data interchange processes with MobiltyDR to operate in a more real time basis. (e.g. every two-to-five minutes) This includes the batch loading process that occurs nightly to import trips from Mobility DR.
2. Provide the Via Mobility vehicles operating the RouteMatch Tablet with the ability to populate a MobilityDR Trip on the electronic manifest using the RM Mobile Application on the tablet device. This will require receiving the trip from Mobility DR into the RM database on close to real-time basis.
3. RouteMatch will collaborate with the project team and partners in determining the most efficient and practical means of exchanging data across platforms. (This includes exchanging data institutionally from server to server as agencies currently using RM have their databases hosted locally at each dispatch office.)
4. RouteMatch will collaborate with the project team in support of determining a standard reusable data set for the exchange of demand response trip information for the provision of service and billing.

DemandTrans Solutions' responsibilities will be refined and modified as well. The primary responsibility of DemandTrans Solutions is to develop the scheduling and data exchange hub, to support automated inter-operability among software systems managing separate fleets of vehicles. This will include working with the project team to:

- Determine functionalities necessary for a single tablet and others that may be defined in the Concept of Operations work;
- Determine the data communication approach whereby paratransit/DRT reservations and scheduling systems interact with the hub.
- Determine the preferred communication approach and protocols.

DemandTrans Solutions will then be responsible for carrying out the following activities, working with partners in the project as necessary:

- Specify message set
- Design structure of messages
- Specify common data elements
- Design structure (XML) of standard data elements
- Specify the API requirements for the external software systems.
- Develop the actual software and performing system integration testing of the hub software with that of the external software systems.
- Adapt Mobility DR software to utilize the new hub approach.

Finally, DemandTrans Solutions will document in a report the agreed-upon requirements and specifications.

1.7.1.3 Expansion of the Coordination Approach to Other Systems

A key element of the project is to expand the coordination approach to other systems (Seniors' Resource Center and Broomfield Easy Ride) and other services, most notably the RTD Access-a-Ride service operating throughout the region. The monthly project team meetings and the development of the expanded Concept of Operations and Local Implementation Plan will continue to serve as the arena in which the institutional, operational, and technical issues associated with this expansion will be identified, worked through, and integrated. This essentially represents the other half of the project, and is key to having the results of the Northwest Metro Denver Coordination Project result in improved coordination, efficiencies, and ultimately providing more trips for riders.

The institutional and operational issues include a range of issues, and some may not be solved in this project. It is anticipated they will cover items such as:

- How similar do the business rules in one agency need to be to other agencies (and the converse, how much flexibility each entity can retain) and still effectively coordinate?

- What are the responsibilities and communication protocols for the agency that "owns" a trip and the agency that operates the trip?
- Accommodating different fare structures and contract rates
- Issues related to jurisdiction, budget, and agency mission.

In addition, it is noted that while Via and RTD have robust IT capacity, other providers are much more limited. Broomfield Easy Ride has yet to purchase scheduling software. The development of the expanded Concept of Operations is the process in which the known issues are identified will be defined and the development of the Local Implementation Plan is the process in which they will be addressed within the scope work. In the back-and-forth process of translating decisions regarding institutional issues to a functional single tablet, the solutions will be tested and refined so the common vehicle platform will work successfully from both a technical and business perspective.

1.8 Reference Materials

1. Transit Cooperative Research Program Web Document 62: Data Standards for Mobility Management, 2014. http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_w62.pdf

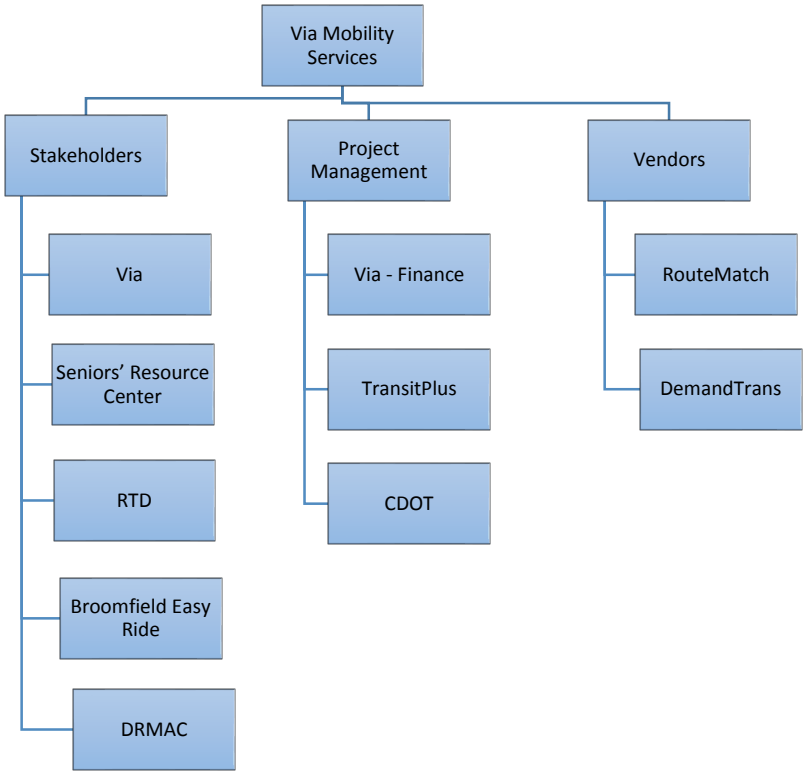
2. The SUTI Standards, or "Standardisorat Utbyte av Trafikinformation". This is a set of standards developed in Sweden and in use in the Scandinavian countries for the "Dynamic Resource Allocation" of many transport providers. The SUTI Standards are published in English, and the documents "SUTI Messages", "SUTI Message Flow", and "SUTI Case Studies" will all serve as reference material in this project.

2 PROJECT ORGANIZATION

2.1 Organizational Structure

Figure 2-1 illustrates the internal organization of the Northwest Metro Denver Coordination Project team. Via Mobility Services, as the sub-recipient, will work closely with the FTA at the national and regional levels, as well as with the FTA's support team.

Figure 2-1. Project Management Organization Chart



2.2 Team Roles and Responsibilities

The roles and responsibilities of the Northwest Metro Denver Coordination Project team are as follows:

Via is leading the project and has overall responsibility for accomplishing the project objectives. Via will maintain communication flows up to the FTA and throughout the internal team. There are three categories of team members:

- Stakeholders: these are the other provider agencies (RTD, Seniors' Resource Center, and Broomfield Easy Ride) that will be implementing the extended coordination model as well as Denver Regional Mobility and Access Council.

- Project Management: three organizations participate in this activity: Via, TransitPlus, and CDOT.
- Vendors: RouteMatch and DemandTrans Solutions will be responsible for developing the software and for adapting their programs to accommodate the new software.

TransitPlus is responsible for overall project management. Suzanne O'Neill of TransitPlus, the project manager, will work with Via and CDOT in assuring the project remains on track and prepare the routine FTA reports.

CDOT is the grantee of record and is responsible for entering all information into TrAMS, assuring compliance, processing and paying invoices.

RTD, Seniors' Resource Center, and Broomfield Easy Ride are all providers in areas where the coordination model will be extended. Their responsibilities are to identify and address institutional issues, work with the vendors to update their software, and implement the extended coordination model in other call-and-ride service areas and with Access-a-Ride. The other stakeholder is Denver Regional Access and Mobility Council (DRMAC). DRMAC is not a provider but rather has a call center for providers in the greater Metro Denver – a larger service area than the Northeast Metro Denver Coordination Project covers. DRMAC plans on installing the RouteMatch Coordination module to support exchanging regional trips among providers. DRMAC is responsible for working with the project team in developing standards so that both all systems will have the potential to exchange electronic information.

The software vendors, RouteMatch and DemandTrans Solutions have multiple responsibilities. They will assist in determining how approach the various institutional issues from a design standpoint as well as developing software to achieve the project objectives and adapting their own software in response to the new software.

2.3 Staffing Plan

The staffing plan for the Northwest Metro Denver Coordination Project is outlined below in Table 2-1, which identifies the tasks in which the key staff will be involved and the key staff's general functions.

Table 2-1. Project Key Staff and Functions

Organization	Name	Position	Project Tasks	Role/Function
Via Mobility Services	Lenna Kottke	Executive Director	1-8	Guide project, lead communications
	Lisa Curtis	Grants Mgr.	1, 3, 8	Support communications, Meeting facilitation
	Rich Burns	Operations Mgr.	3, 4, 5, 6, 7	Identifying operational and institutional issues, working with team to resolve, implementing IT and business solutions.
	J Hastain	Scheduling	3, 4, 5, 6	
	Alex Salvos	IT Director	3, 4, 5, 6	
	Bill Patterson	Finance Director	1, 2	Invoicing, financial mgt.
TransitPlus	Suzanne O'Neill	Principal	1, 2, 3, 8; assist in others as needed	Project Management; support for Via Exec. Dir.
Seniors' Resource Center	Hank Braaksma	Transportation Dir.	3, 4, 5, 6	Identifying operational and institutional issues, working with team to resolve, implementing IT and business solutions.
Broomfield Easy Ride	Erica Hamilton	Transportation Dir.	3, 4, 5, 6	
RTD	Jeff Becker	Mgr. Svc. Planning	3, 4, 5, 6, 7	
	Larry Beuter	PT Manager	3, 4, 5, 6,	
	Brian Matthews	CNR Manager	3, 4, 5, 6	
DRMAC	Brian Allem	Executive Director	3, 4, 5, 6	Integrate reg. activities; identify issues, resolution.
DemandTrans Solutions	Roger Teal	President	3, 4, 5, 6,	Develop data exchange and adapt Mobility DR software
	Todd Voirol	Senior SW Engineer	3, 4, 5, 6,	
RouteMatch	Tom Coogan	Regional Manager	3, 4, 5, 6,	Adaptation of tablet system and RouteMatch software.
	D. Churchill	Software Engineer	3, 4, 5, 6,	
	B. Fowler	Software Engineer	3, 4, 5, 6,	
CDOT	Brodie Ayers	Project Manager	1, 2	Grant management
	Shane Gendron	Accountant	1, 2	Invoicing

3 PROJECT MONITORING AND CONTROL

3.1 Coordination and Communications

Performance Measures: Via's performance of each task in this SOW will be measured by the completion and/or delivery of the following items in accordance with the agreed upon schedule.

Table 3-1. Deliverables (Condensed)

1.	Project Management Deliverables	Dates
	- Kickoff meeting	Nov. 10
	- Project Management Plan with updated schedule and budget	Draft Nov. 30, 2015 Final Dec. 15, 2015
	- Periodic meetings (e.g. conference calls, site visits)	As scheduled
	- Quarterly progress reports	Quarterly, beginning April 15, 2016 for prior quarter
2	Monthly Progress Reports	Monthly, beginning Feb. 15, 2016 for prior month.
3	Stakeholder Participation	Nov. 30 Kickoff Meeting; Monthly meetings to begin in January, 2016.
4.	Concept of Operations, including updated technical plan	Draft: April 30, 2016
		Final: May 31, 2016
5.	Local Implementation Plan	Draft: June 30, 2016 Final: July 31, 2016
6.	Scheduling and Data Hub: - Define functionalities, communication process & standards - Develop hub, test, and validate	 August 31, 2016 November 30, 2016
7	Common Fleet Platform: Single Tablet Operation Additional Enhancements	 Basic tablet functionalities: Feb. 28, 2017 May 31, 2017

This project includes project managers and key staff for the Via team, the FTA, and the Battelle technical support team. These project managers and key staff will communicate frequently regarding all aspects of the project via email, phone calls and meetings. While monthly meetings will be scheduled, additional impromptu communication among all partners is welcome.

The following sections describe the proposed mechanisms for communicating and coordinating at the various management layers of the project. Meetings may be conducted in person or via conference call or webinar.

3.1.1 Internal Communications and Meeting Plan

- Kick-off meeting to discuss the project goals and expectations, specifically the project approach, tasks and deliverables, partner roles and responsibilities, staffing plan, schedule, budget, and travel requirements.
- Monthly project meetings will be held for the Via team stakeholders to develop work products. These meetings will address institutional, operational, and technical issues and outcomes will provide the basis for the Concept of Operations and Local Implementation Plan. Agendas will be prepared for each meeting along with summary meeting notes to document decisions. At some points there may be both general and technical meetings. These meetings will primarily be in person, although there will be the capability for participants to call in if they cannot attend in person. National FTA and Battelle Technical Assistance team are welcome to participate by telephone in order to maintain a good flow of information.

3.1.2 External Communication

- As noted above, the National FTA staff and Technical Assistance team are invited to participate in monthly Northwest Metro Denver Coordination Project team meetings.
- Monthly and quarterly reports will provide a steady stream of updates on the project and provide the FTA and Technical Assistance team with an opportunity to clarify, ask questions, or raise concerns.
- The Northwest Metro Denver Coordination Project manager will maintain regular communication with the Technical Assistance team.
- The Northwest Metro Denver Coordination Project team has included a commitment to participate in up to two meetings regarding the project at a conference or other venue, and these are anticipated to at the end of the project.

3.2 Scope, Schedule and Budget Management

The following sections outline the approach for managing the project scope, schedule, and budget.

3.2.1 Scope Management

While the scope is clearly defined, this work is being carried out in the manner of research, with allowances for unexpected findings and the commensurate need for adjustments in activities, schedule, or products delivered. This requires close attention to all aspects to assure the project remains on track, and noting when any changes may be outside the defined scope.

Much of the work done in this project will be through contractors, and each will have a subcontract that defines their responsibilities. These subcontracts will be monitored on a monthly basis.

If any scope changes are necessary, the request for the scope change will be first discussed within the project management team and then elevated to FTA project manager

for approval. A cooperative agreement revision/amendment is required by FTA for material changes in the work scope, in accordance with FTA Circular C 6100.1E (IV.6).

3.2.2 Schedule Management

The schedule chart and deliverables table will be used to monitor the schedule. During project meetings, team members will review the schedule status, and discuss actions/directions required to resolve schedule issues, if any. It is not uncommon to need to adjust for unanticipated work or information that has been delayed. As with the scope, the deliverables provided by subcontractors will be reviewed monthly for adherence.

Minor schedule adjustments – those that do not affect the overall project schedule/timeframe – may be approved by the project manager in consultation with the FTA project manager. Significant schedule changes will be decided by the project management team and then elevated to FTA for review and approval. A significant schedule change may be accomplished via an administrative amendment as outlined in FTA Circular C 6100.1E (IV.6).

3.2.3 Cost/Budget Management

Cost/budget will be managed by the project manager following Federal regulations/rules and internal contract rules. Invoices will be submitted after the project manager reviews the project progress, schedule, and expenditures. Payments will be based on progress (costs incurred for a period of time) or milestone completion. Requests for payments will be conducted in accordance with FTA Circular C 6100.1E (V.8).

It is not anticipated that the budget for this project will change. Budget revisions, if any, will be conducted in accordance with FTA Circular C 6100.1E (IV.6). The request for a budget increase has to be approved by the FTA.

3.3 Change Management

The change management process is rooted in the program management activities and team approach to the project. The project manager will identify and monitor necessary changes through two means. First is the routine review of progress completed each month, asking the question, “Are milestones achieved on time and within budget?” Second is through participation in the meetings and identification of whether the direction of decisions remains in line with the original plan or will result in modifications. Any changes in direction will be agreed upon by the stakeholders in the process. Any changes will be documented in quarterly reports and updates to the Program Management Plan.

3.4 Quality Management

There are three types of deliverables, each with somewhat different measures of quality: (1) meetings, communication, and stakeholder involvement; (2) reports and documentation of activities (Project Management Plan; Concept of Operations; Local Implementation Plan, meeting notes, and documentation of standards); and (3) software

development products – the data exchange hub, single tablet computer applications, and interfaces with RouteMatch and Mobility DR.

The quality of meetings, communication, and stakeholder involvement is measured by timeliness, level of participation, and quality of participation. The end quality of these products will be impacted by how effectively we work as a team: are we able to raise and resolve difficult issues? Is there effective consensus decision-making? The tools we will use to assure good quality at meetings are:

- to have face-to-face meetings with only limited call-in participation;
- to provide clear agendas ahead of the meetings to guide discussion and assure that participants time is used wisely,
- to break out into technical or working group meetings as appropriate, and
- to document meetings with notes to provide a track record of our progress and decisions.

Suzanne O'Neill as project manager and Lisa Curtis, Via grants and contracts manager are specifically assigned the responsibility of meeting preparation. Suzanne O'Neill and Bill Patterson of Via have been assigned the responsibility of preparing project and financial reports, respectively. Suzanne, Lisa, and Bill will provide back-up for each other in assuring tasks are completed on time.

The quality of reports and documentation of activities will largely be determined by the FTA's reporting requirements, as noted elsewhere in this Project Management Plan and the grant scope. Overall quality, timeliness and responsiveness to comments are other measures. The key strategies for quality control is assigning a project manager responsibility for this task and having a team (Lenna Kottke, Executive Director and Lisa Curtis, Grants Manager) with excellent communication skills. These staff will review and revise the reports to assure they communicate an accurately and clearly. Via as an organization and Suzanne O'Neill, the project manager, have a long history of producing high quality products.

The quality of product deliverables will be primarily determined by how well they work: Do they effectively address the needs of the participating agencies? Are they reliable and easy to use? A verification and testing process has been included in the project to assure that the wrinkles are smoothed out and the products can be fine-tuned so they are effective for the transportation providers.

3.5 Risk Management

Potential risks and possible mitigation measures are identified in Table 3-1. These risks will be closely monitored and evaluated monthly. The table will be updated when status changes or new risks are identified.

Table 3-2. Potential Project Risks

Potential Risks	Impact	Mitigation Measures/Controls
Project staff unavailable to work on project	Project delays	1. Project team is extremely committed to the project; there is a deep bench and history of working together on similar endeavors. 2. The project team has several individuals that could cover multiple areas. 3. Monthly status updates will be reported against the baseline schedule. 4. The PM will report on any changes to the staff assigned to the project, and approval of any staff changes is a requirement of sub-recipient contracts. 5. Liquidated damages have been included in vendor sub-contracts ($200 per day) to provide an incentive for timeliness.
Project is complex	Inadequate attention to parts of project or not effectively linking all parts of project.	1. Progress on institutional, operational, and technical aspects will be included at each monthly meeting. 2. Fostering teamwork within organizations and between organizations.
Project forges new ground	While issues are identified, most participants do not have a context for resolving issues.	1. Ongoing learning will be part of this project for *all* participants, and we will try to weave it into the monthly meetings. 2. This project requires creative, flexible, and "outside the box" thinking so these will be encouraged whenever possible. 3. If the most advantageous solutions to some issues require new types of agreements or a new technological approach, the project team will need to determine if the benefit is worth the challenge and identify how to mitigate the challenges. 4. Having a broad group of stakeholders actively involved is a key mitigation strategy: it is less likely that one person will be able to keep an idea or approach out of consideration. 5. Another strategy is to bring in other interested parties, particularly vendors or people engaged in the effort to create inter-operability, to weigh in on selected strategies.

4 PROJECT TRACKING AND REPORTING

4.1 Project Tracking

Project tracking will center around monthly and quarterly processes. The activities that will occur monthly are:

- Prepare agenda for monthly stakeholder meetings, building it based on scope and schedule and what was achieved in the prior period.
- Send out invite for meeting with any materials for participants, including notes from the previous meeting.
- At monthly meetings, review progress on institutional, operational, and technological aspects of project. Refresh participants on where we are in relationship to scope and milestones.
- Review invoices from subcontractors, comparing to scope, milestones, and budget. Follow standard process for approval and payment. Track total payments and local match for project.
- File invoices with CDOT; meet as needed to clarify any questions and monitor payment.
- Prepare monthly reports.

At end of each quarter the quarterly reports noted in Section 4.2 below will be prepared, providing a three-month view of progress.

4.2 Project Reporting

The following reports will be produced to provide information on the project progress:

- Monthly Report – The Northwest Metro Denver Coordination Project manager will provide a brief summary of the project progress for each month. This is anticipated to include documentation of the project team's monthly meetings, key activities, and financial
- Quarterly Progress Report – The report shall be submitted to CDOT, serving as the FTA project manager, via e-mail by the end of the month following the federal fiscal quarter, namely April 30, July 31, October 31, and January 31. The report shall include the significant accomplishments for the quarter; anticipated work for the following quarter; issues, if any, and recommended solutions; expenditures of the quarter and to date (cumulative) by task, and submittal status of deliverables (see also FTA Circular C 6100.1E [IV.4.d]). These reports will be posted in TEAM by the CDOT project manager for the FTA grant.
- Milestone Progress Report – The Northwest Metro Denver Coordination Project manager will provide a brief summary of the project progress, including milestone status, for the quarter in TEAM as outlined in FTA Circular C 6100.1E (IV.4.d). The report will be completed by the end of the month following the federal fiscal quarter.
- Federal Financial Report – The Northwest Metro Denver Coordination Project manager will submit a financial status report for the quarter in TEAM as outlined in

FTA Circular C 6100.1E (IV.4.c). The report will be completed by the end of the month following the federal fiscal quarter.

4.3 Document Review/Revision/Acceptance Process

For reports, the deliverable review flow is as follows:

Draft for internal team review and comment → revision (if required) →

Draft for FTA review and comment → revision/final draft →

Team review → submit to FTA for final review and comment →

Approval or another revision if required.

The document review schedule will be closely monitored and tracked.

For software products, the deliverable flow is as follows:

Initial testing:

a. How well does it address the operational and institutional issues?

b. Are all data flows validated?

→ work with operational staff to refine, documenting changes →

Limited installation

a. Can all data flows continue to be validated?

b. Does it function effectively, with limited manual interventions, in a wide rate of circumstances?

→ work with operational staff to refine, documenting changes to specifications →

Full installation

→ continue to fine tune as needed until working smoothly, documenting any further changes.

Appendix A Document Version Changes

Version No.	Date	Description of Changes	Status
1.0	12/4/2015	Adjusts original grant scope to that agreed upon at project kick-off meeting Nov. 10, 2015	Awaiting approval. Comments received 12/23. Revision submitted 1/9/2016.