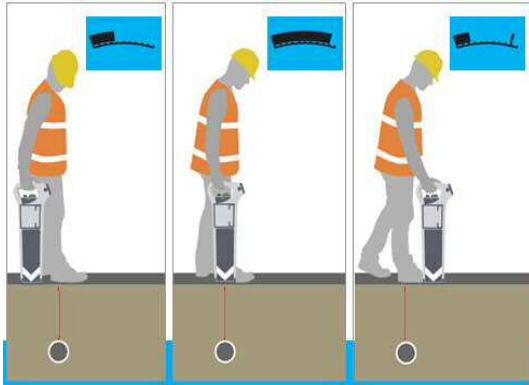


別冊資料 CD 1.11

**Equipment Usage Manual (Simplified Version
for Technicians) – Arabic Version**



سكة المياه كوكي سطة
مشروع تحسين إدارة خدمات المياه في بلدية كوكي



دليل استخدام أجهزة كشف عن التسرب

(النسخة المختصرة)

كوكي سان 2021

الوكالة اليابانية للتعاون كوكي (JICA)

TEC INTERNATIONAL CO., LTD

PADECO CO., LTD

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2.1 وصلات أول . مقدم



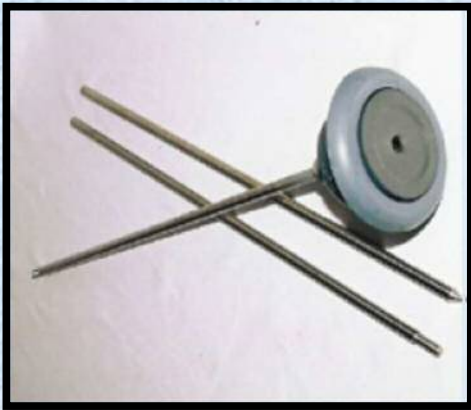
تستخدم أدوات مسددة سمعي لتحديد تسربات الأرضيات. وتتبع في بساطتها وتعقد هياكلها، مثل الأدوات المسددة سمعي كما في مثل عصا الاستماع للاستماع إلى تسرب المياه في الجدران والأجهزة الكهربائية مثل مسددة سمعي صوتية.

2.1 وصلات ي: عصا سمع

هذه الأدوات مفيدة، فمن تسرب وأبسطها عصا سمع

2.1 عصا سمع

2.1.1 كيفية الاستخدام

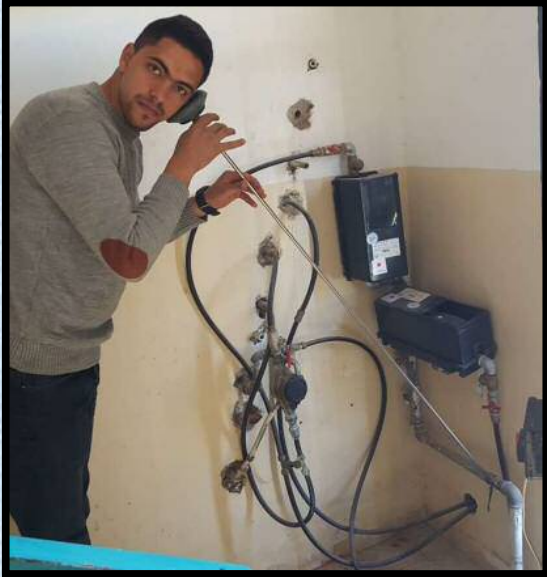


عصا سمع ميكانيكية يمكن تفكيكها لسهولة الحمل

(أ) قم بوضع الجزء العلوي من العصا سمع في مكان التسرب برفق على أن تكون في تماسك مع الأرضيات ببطء.

(ب) لا تضع يدك على الجزء العلوي من العصا سمع لأن ذلك سيزداد من صعوبة الاستماع إلى صوت التسرب. يجب أن تكون في اتصال مباشر مع الجزء العلوي من العصا سمع.

(ج) جرب ظروف الاستماع المختلفة حسب سمعك ثم قم بتسجيل النتائج في ملف تسرب برفوس أصابعك.



لاستمارا الى صوتا تسرب ع ك ر ا ق ع صلا سمع امي ك ي ك

2.2 عصا سمعنا إلكترونية

أشابه عصا السمع الإلكترونية نظيراً الميكانيكية في بعض مكوناتها: (١) كاشف صوتي (٢) مكبر صوتي (٣) سماعة أذن (٤) وحدة تحكم إلكترونية تعمل على تضخيم مستوى صوت السرب؛ فضلاً عن فائده الأصوات غير المرغوب فيها.



عصا سمعنا إلكترونية (٢) و (٤)



عصا سمعنا إلكترونية (١) و (٤)



أمثلة على استخدامات عصا سمعنا إلكترونية

توصيل ميكروفون أرضي (كا، ف) لتسرب

3.1 مقدمة وأجزاء ميكروفون أرضي.

تُعرف أيضًا "ب كا، ف" لتسرب" أو "تذبذب" صادرة عن تسرب عبر جهاز ميكروفون أرضي

مكونات جهاز ميكروفون أرضي (Aquaphon A 100) :

- 1) جهاز ميكروفون أرضي مع عصا لاستمارة (Ground microphone with carrying rod)
- 2) ميكروفون أرضي (Ground microphone)
- 3) عصا لاستمارة (Test rod)
- 4) سماعات رأس (Stereo headphones)
- 5) حاوية جهاز ميكروفون أرضي مع قاعدة شحن (Charging station).
- 6) إلكتروني (Aquaphon)
- 7) حزام حمل جهاز إلكتروني (Triangle carrying system)
- 8) جهاز ميكروفون (Microphone)



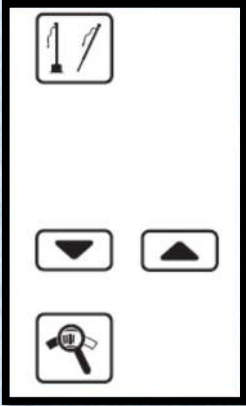
اكسسوارات وكاميرا ميكروفون أرضي (ب) و (ف) مستخدم في (ف و ر)

3.2 كإف تتأكد مع جهاز WIR لأجهزة لاستخدامها في مواقع

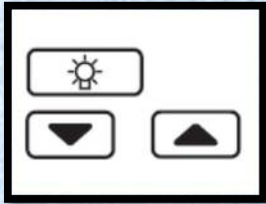
تشغيل وإيقاف جهاز



- قم بإدخال وصلة المجس و المقياس في الأرضي في المكان المراد قياسه؛ لجهاز الأكوافون. وصلة المجس في مكان رقم 1.
- كما يمكن إجراء صويّة خفيفة على وصلة كابل المجس في مكان الأكوافون.
- 60 أو نحو المجس و المقياس " تم Y وصيّه على Y ية 60 از الأكوافون .
- 60 أو نحو نسبة Y N إلى -ارات الهلينة Y N على Y ية 60 از الأكوافون.
- KKY نو المجس و المقياس الموصول في مكان الأكوافون بشكل Y و Y يكي.
- عر ° نو المجس و المقياس الموصول على Y ية 60 از الأكوافون بشكل مخصص Y لم تم KKY نو المقياس و المجس بشكل Y كاي من قبل 60 از الأكوافون -مكن KKY بشكل K و " .
- Y وصيل المايكروفون بجهاز الأكوافون Y وم Y ية الأخير بعر ° مقياس Y الصوت المسموع بالمايكروفون .
- K بيانات Y ية عر ° 60 از الأكوافون على نو المجس و المقياس K K . و إذا يكون 60 از الأكوافون K K I عر ° بيانات الهيا ° @ بات الصوت Y تم K ما 60 من قبل المقياس الأرضي).
- لإيقاف تشغيل الجهاز قم بضغط زر إيقاف تشغيل الجهاز الأرضي مع مدخل جهاز الأكوافون .

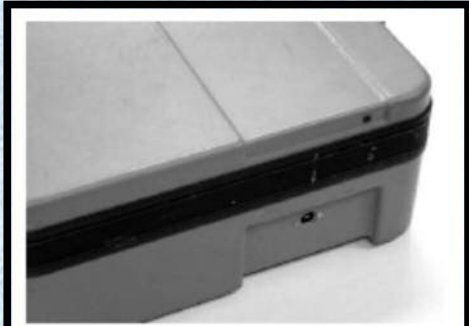
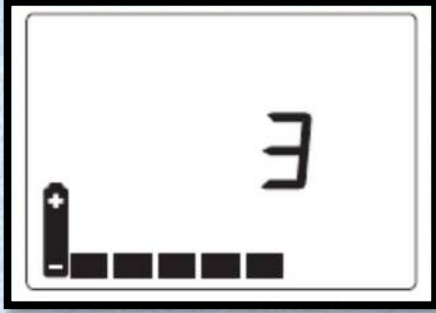
	<ul style="list-style-type: none"> • وضع K على شكل متواصل على زر W الذي تحمل W،ارة جهاز W مايكروفون W لأرضي W موجود على وحدة جهاز W لأكون فون W. • قم بادخال كابل W لمس أو مستشعر W لأرضي بمدخل جهاز W لأكون فون W (تظهر رمز «a» على W، a، و K تظهر قدام باسم مجسات W أو مستشعر W ممكن اختيارها في G تصف W، a، على سبيل مثال (M01). • وضع K على زر W أو زر W - K على أو K - S نقل E نقل E أسماء مجسات W معروض وقم باختيار W اسب G لها. • وضع K على زر تضخيم W صوت لعر R و W لمس أو مستشعر W لأرضي الذي تم اختياره.
---	--

أ. تعديل W مع W، a،

	<p>تمتع تعديل W مع W، a، كما يلي:</p> <ul style="list-style-type: none"> • وضع K بشكل متواصل على زر W لضاءة أو W ك و f. • وضع K على زر W نقل إلى أسد ك نقل س ك و f، a، W. • وضع K على زر W نقل إلى أعلى ك زيادة س ك و f، a، K.
---	---

ب. K، W، جهاز

	<ul style="list-style-type: none"> • G، جهاز W مايكروفون W لأرضي بشكل كامل G. • تمتع تشغيل الجهاز K لمدة 12 ساعة متواصل كحد أقصى. • K، W، W، محتاج إلى مك، G، HS1.2A، W، نظر إلى W صوت W مرفق W (W التي تم استخدامها في W، بات W تدرج W و حملها في W مركب). • تحتوي مك W، على مقبس W ومدخل، G في كل G ب: <ol style="list-style-type: none"> 1. محول ~AC/DC M4، 100 x 240 V 2. كابل W مركب M4 for 12 V
---	---



- قم بإيقاف تشغيل الجهاز لأكثر من 30 يوم ثم قم بتوصيله مع محمّلت، حيث سيظهر على الشاشة، عدد وحملات المتبقية. لاستكمال، جهاز به، كل كامل.
- يعتمد وقت التشغيل الفعلي على عدة عوامل مثل عمر البطارية، درجة الحرارة (أو الإضاءة)؛ وأيضاً تحتاج الجهاز لأكثر من 4 ساعات كحد أقصى لتتم، بشكل كامل (8 وحملات).
- عند اكتمال، جهاز لأكثر من 100% تظهر على الشاشة، 8 وحملات وتأخذ رقم.
- بإمكانك ترك الجهاز لأكثر من 30 يوماً بمحمّلت، حيث سيحاجت استخدام مرة أخرى.
- لا تضع الجهاز في حقيبك أو حقيبتك (A100)؛ تأكد من حمايته.
- قم بتوصيل كابل أو سلك صوتي للجهاز لأكثر من 30 يوماً مع محمّلت، حيث سيحاجت استخدام مرة أخرى.
- قم بتوصيل محول AC/DC M4 أو كابل مدمج M4 بمقبس أو مداخل الجهاز كالمحمّلت، حيث سيحاجت استخدام مرة أخرى.
- التعليمات:
 1. في حالة عدم وضع الجهاز لأكثر من 30 يوماً على قاعدة محمّلت، حيث سيحاجت استخدام 1.2A HS ووقت تشغيل الجهاز تقوم بإيقاف تشغيله (NIMH) 1.2A HS.
 2. عند توصيل الجهاز، حيث سيحاجت استخدام أكثر من 30 يوماً؛ حيث سيحاجت استخدام 0= حيث سيحاجت استخدام مرة أخرى.

ج. توصيل سماعة رأس مع جهاز الأيفون (A100)



● تحتوي جهاز الأيفون (A100) على مدخل خاص كوصلة مضخم صوت (speaker) (1).

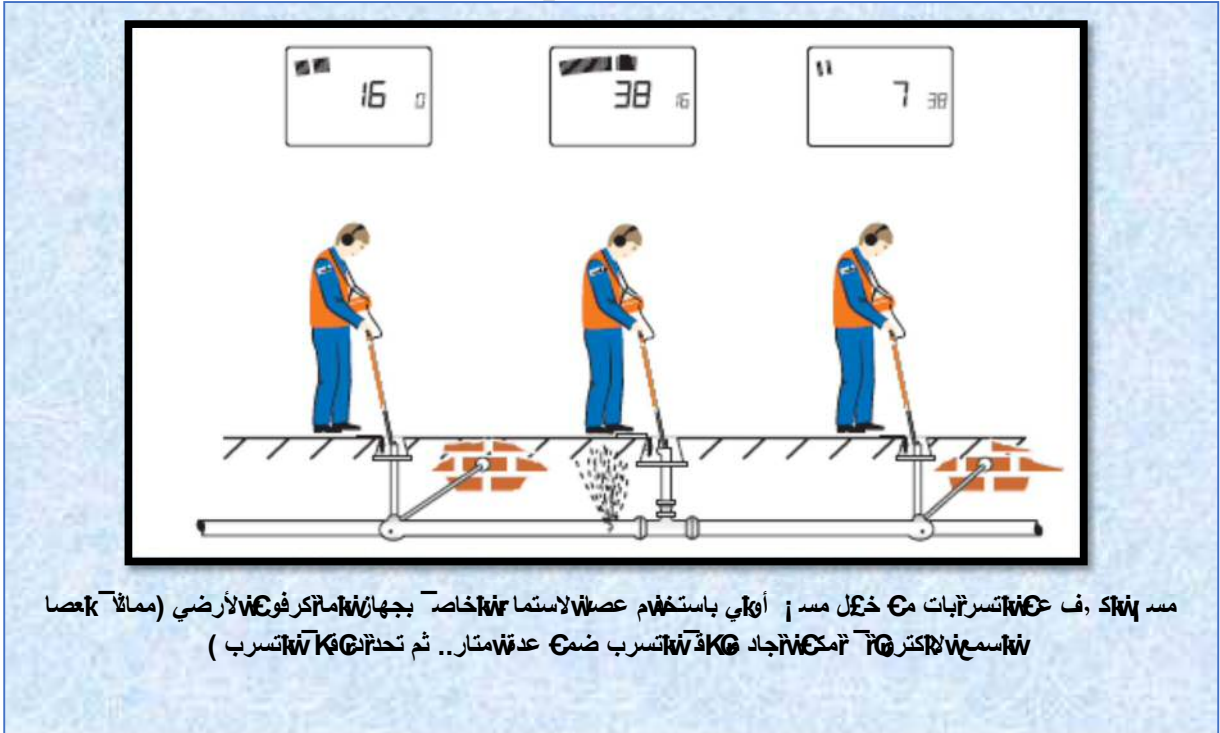
● لكي يعمل على تأخذ أصوات وتسرب صوت، يجب أن يكون المسد في مكانه، ف عند تسرب الصوت يعمل speaker على تضخيم الصوت لكي لا يدعى استخدام سماعات رأس كسماعات أصوات وتسرب صوت بشكل أوضح.

تحويل مضخم صوت (Speaker) إلى سماعات رأس (headphones):

تدخل وصلة سماعات رأس في المدخل الذي هو جهاز الأيفون A100 ولأمر لكي ستؤدي إلى فصل مضخم صوت بشكل لاقطي و تحويل صوت إلى سماعات رأس. عند فصل وصلة سماعة رأس تحويل صوت إلى وحدة تضخيم صوت (Speaker).

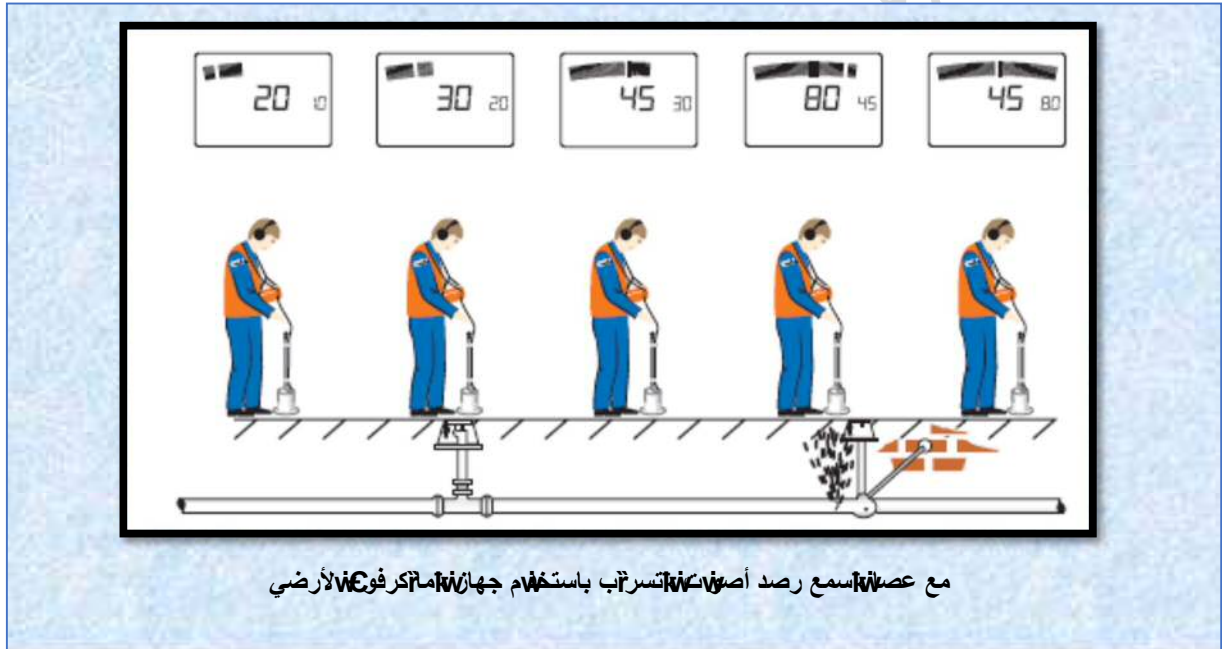
3.3 توصيل سماعة رأس مع جهاز الأيفون (Aquaphon A 100) لكشف عن تسربات المياه

أ. مسد الأيفون لإيجاد تسرب



مسد في مكانه، ف عند تسرب صوت من خلال مسد أو باستخدام عصا لاستماع خاص بجهاز الأيفون الأرضي (مما لا يعصا) مسد الأيفون أكثر من 70 سم كإيجاد تسرب في 100 متر... ثم تحدث في تسرب (

ب. تحدية كة تسرب عة راق كة مسد ز على كة وكالينكوّة
كافة ضع جهاز كة كرفوع لارضي على لار ٨



3.4 أنواع الأصوات الخارجة :

(أصوات م, ابهـ ك صوت تسرب آب Pseudo Sound)

- صوت جري في أنابيب داخلية.
- صوت اهتزاز كهربائي مثل صوت اهتزاز 2 ع كواكب كهرباء.
- صوت تعجب خرق الماء, تركب الماء.
- صوت تدفق من أنابيب صرف صحي
- صوت مركبات غاز وكربون.
- صوت اهتزاز 3.
- ضوضاء من.

آلة كشف خطوط المياه المعدنية (Metallic Pipe Locator)

4.1 مقدمة

في الآونة الأخيرة، تعد أجهزة كشف خطوط المياه المعدنية (C. Scope MXL4) في كندا هي الأكثر استخدامًا في الكشف عن خطوط المياه المعدنية تحت الأرض. هذه الأجهزة تستخدم تقنية الكشف عن التيار الكهربائي (CIT) للكشف عن خطوط المياه المعدنية.

في الآونة الأخيرة، تعد أجهزة كشف خطوط المياه المعدنية (C. Scope MXL4) هي الأكثر استخدامًا في الكشف عن خطوط المياه المعدنية تحت الأرض.



جهاز كشف خطوط المياه المعدنية (الرسول)

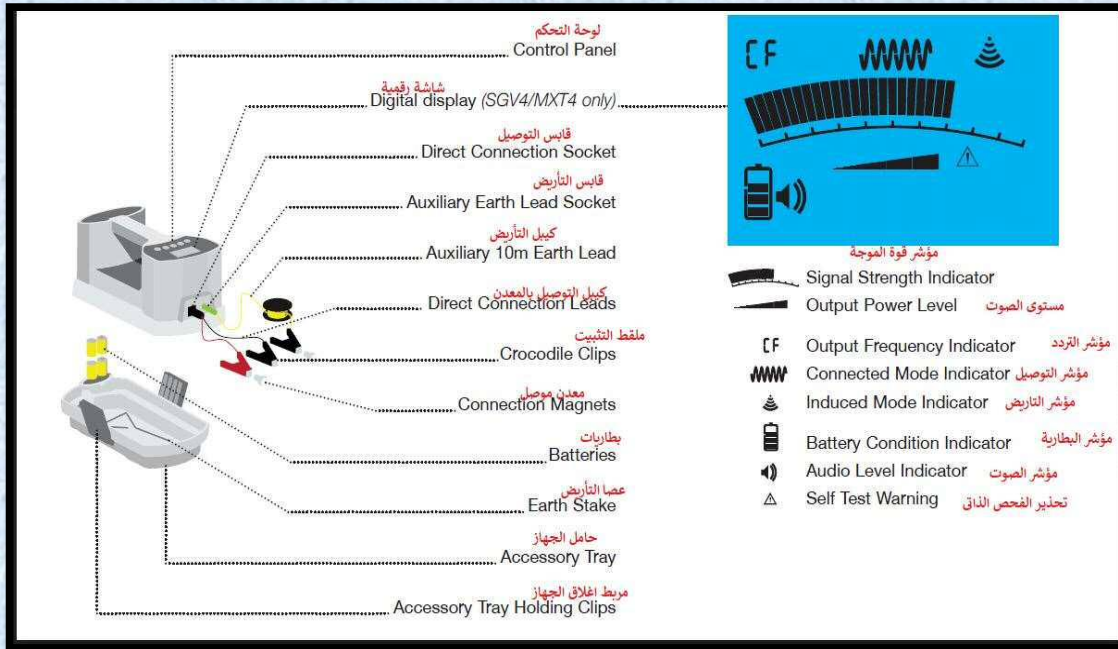


أداة كشف خطوط المياه المعدنية (الرسول)

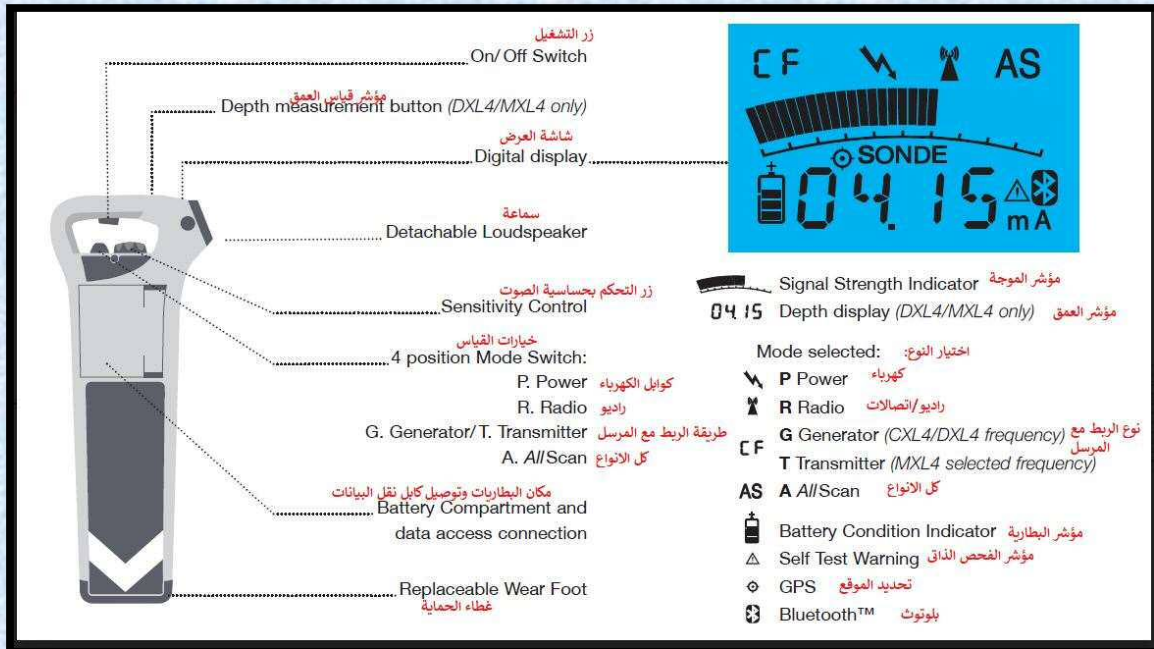
هذه الأجهزة تستخدم تقنية الكشف عن التيار الكهربائي (CIT) للكشف عن خطوط المياه المعدنية.

4.2 مكونات جهاز تدفق Wi-Fi

تتضمن المكونات الشكل الأساسي من جهاز، من: **مؤشر** (رسول الإشارة) **W** تدفق **Wi-Fi** (شكل الإشارة).



مكونات جهاز إرسال الإشارة (C. Scope MXL4)



أداة تدفق Wi-Fi (C. Scope MXL4)

د. وليم ولد الإكس (T).

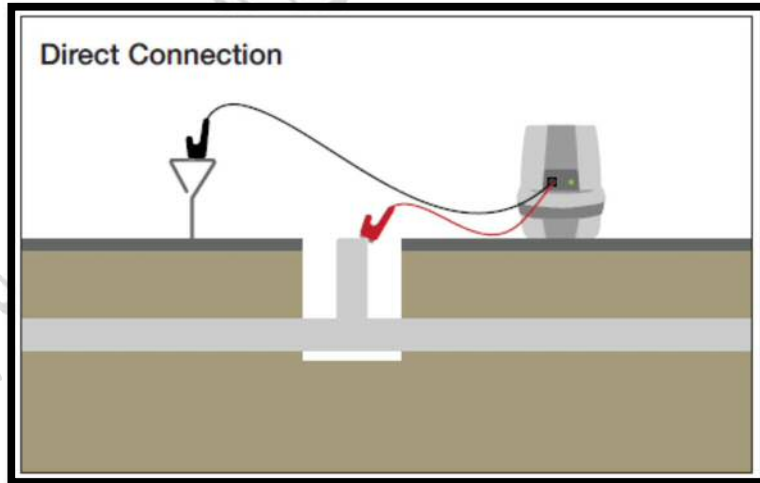
هو أسلوب بحثي يستخدم حديد موليبدوم (خطوط معدنية مدبونة) عند تقاطع موضع الإشارة (T) وم أداة تحديد موضع الإشارة (k) ليسهلها موضع الإشارة التي يلاحظها مجا أداة تحديد موضع.



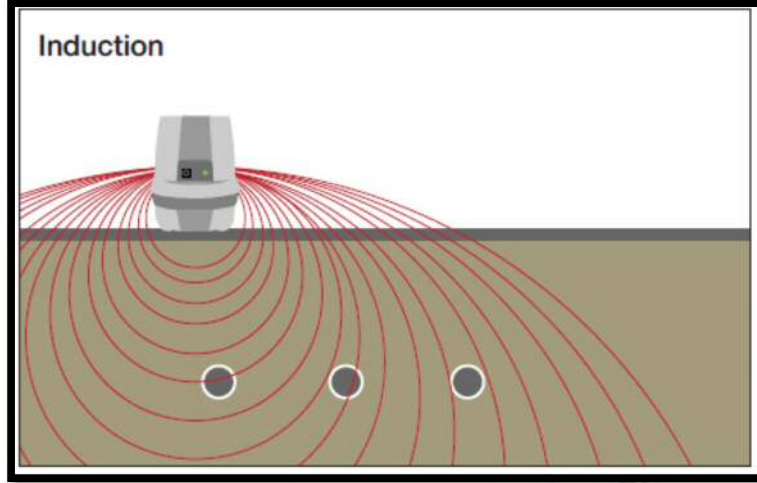
التي تستخدم (Signal Generator) في تحديد مواقع الكابلات تحت الأرضية. غالباً ما تستخدم أجهزة تحديد المواقع (GPS) في تحديد المواقع الجغرافية.

هناك طريقتان رئيسيتان لاستخدام أجهزة الإشارة (Signal Generator) في تحديد مواقع الكابلات تحت الأرضية:

- الطريقة المباشرة: خلال العمل، يتم استخدام جهاز الإشارة (Signal generator) بشكل مباشر، وعادةً ما يتم اكتشاف الكابلات تحت الأرضية عن طريق أجهزة الكشف عن الكابلات (Cable Locators) التي يمكنها اكتشاف الإشارات المنبعثة من الكابلات.



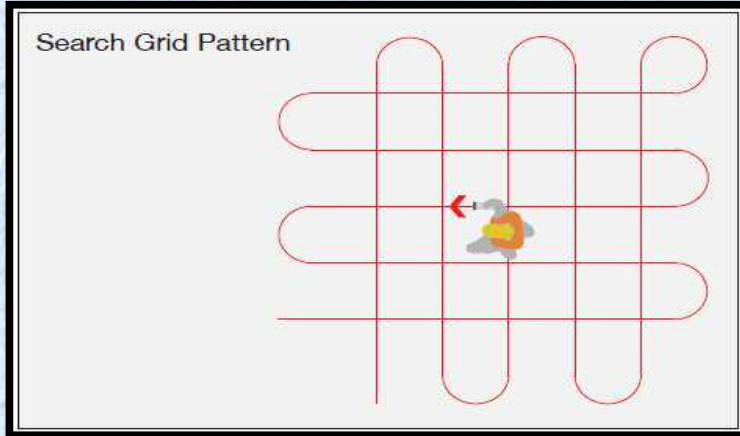
- **التحسس (Induction):** يعمل على اكتشاف الأسلاك الكهربائية (Signal Generator) على سطح الأرض باستخدام أجهزة الاستشعار. يتم دفن الأسلاك تحت الأرض في شكل لاسلكي من أجل تجنب التلف الناتج عن الحفر غير المصرح به.



مشارف
مركز وكيرتة خدمات المياه في بلدية جنين

4.4 استخدام أداة تحديد الموقع (locator)

*نفذ عملية البحث عن الكابلات بتتابع النمط الشبكي الموضح في الرسم البياني. ولازم بالمشي بشكل جيء مع الحرص على حمل أداة تحديد الموقع بشكل عمودي.



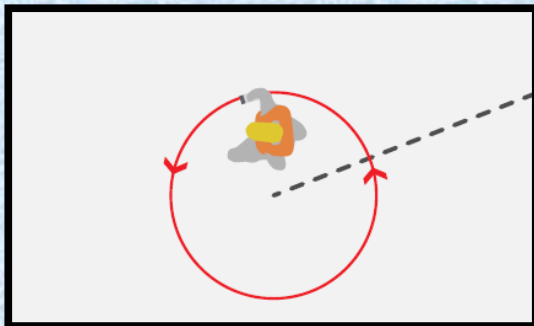
*المازب ريبون المفسود في توجد ب: الكابلات ترددت و سوا أداة تحديد الموقع لا تدرت صوت سموع و في الكابلات رنك على الشاكة.

فقط- ترددت الكابلات عند بيع ساسا ط:

لا يحصل 90 درجة وجود نحني في ساسا فط المياه و يبر في عم - فط المياه و وجود ط ك و ك على ط و ن: ك ط .

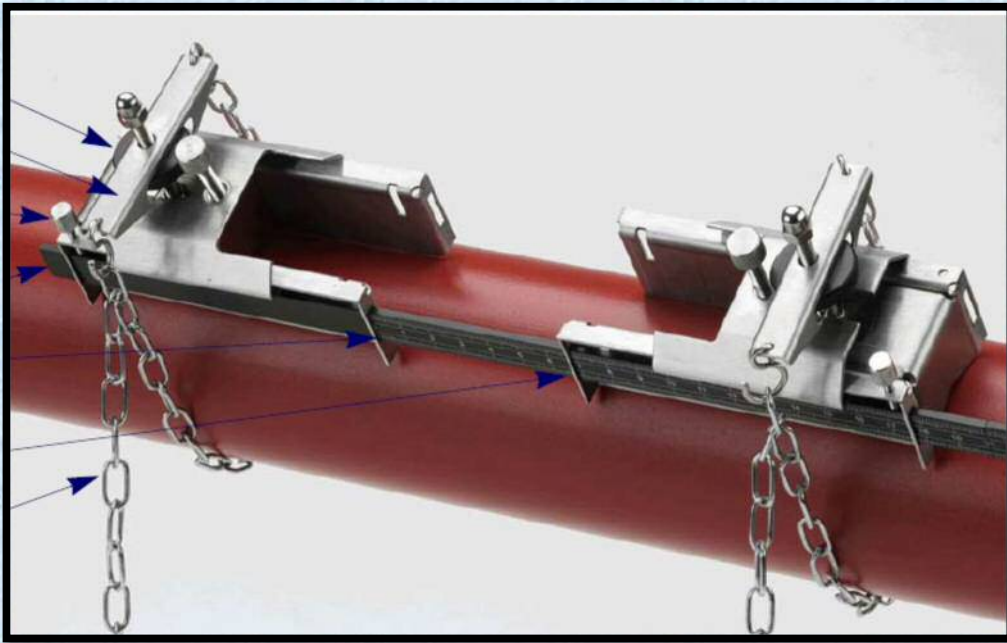
تبادلت المفسودة :

- فشي في حيط دائرة 10 ر حو 2 المكا- الذي تم فيه فقط- الكابلات. فب: هذه ط وة الكابلات تحديد ساسا ط في حا 2 وجود نحنا في ط و وجود ط ك ت ر ب ط 3 ر.
- فف لم تد و ي ك م بزيادة كدة الكابلات تردد و كمر) المسح Y من حيط دائرة 10 ر حو 2 مكا- فقط- الكابلات رنك - هذه ط وة فف تباد ط ر 3 ا دفو- على عم - ابر.



وضع تركيز الحساسات فوق الصوتية

ب. تركيز الحساسات
تنظر في الصورة دناه

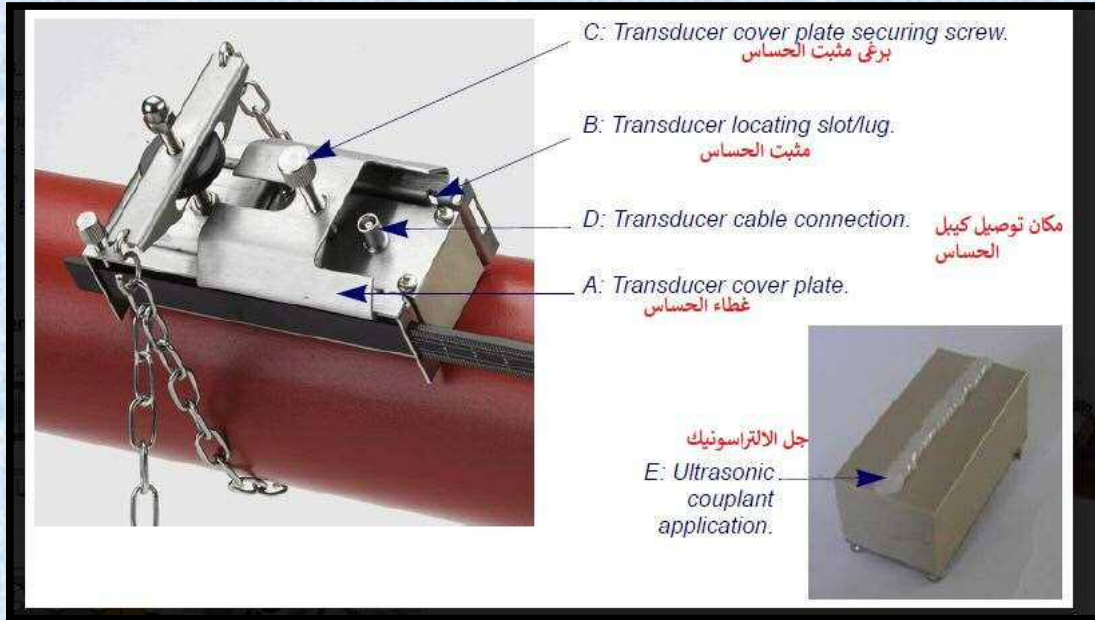


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وضع وتركيب الحساسات فوق الصوتية

أجزاء الحساسات:



الخطوات للعمل:



تركيب الحساسات



التأكد من قراءة

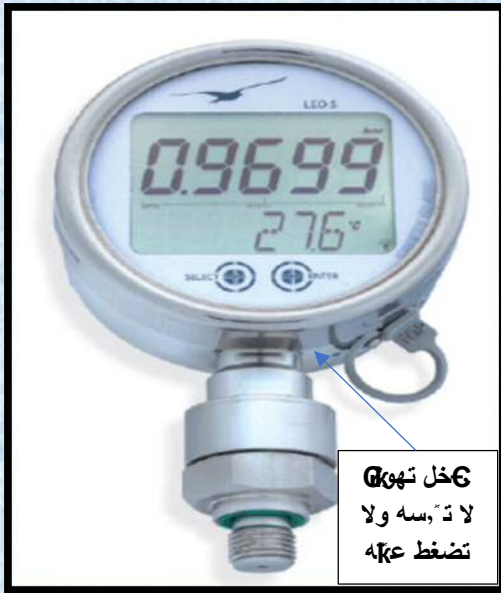
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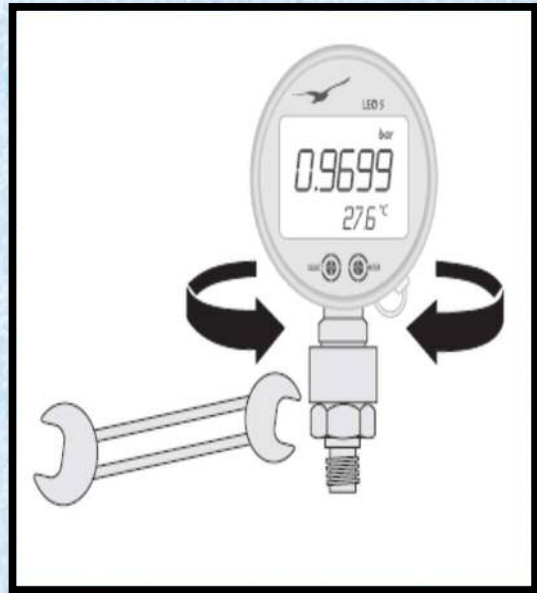
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4.0	مَعْرُوفٌ وَأَعْرَابٌ مَعْرُوفَةٌ خَمَامَةٌ مَعْرُوفَةٌ فِي بِلَادِ جَنِينِ	3.96	3
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6.0	مَعْرُوفٌ وَأَعْرَابٌ مَعْرُوفَةٌ خَمَامَةٌ مَعْرُوفَةٌ فِي بِلَادِ جَنِينِ	3.96	10
8.0	مَعْرُوفٌ وَأَعْرَابٌ مَعْرُوفَةٌ خَمَامَةٌ مَعْرُوفَةٌ فِي بِلَادِ جَنِينِ	3.96	12
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تركيب سجل الضغط الرقمي في الموقع كرجي أخذ الأجزاء K1 و K2



دخل تهوية
لا تدهسه ولا
تضغط عليه



لا تدهس أو تهوية أو تضغط عليه

كاجب استتمام الجزء الذي يصرف لK1 والجهاز (K2) هو
وضع اعلاه) وتجنب لف الجهاز، من الممكن الكاظمي
أث سوي هذا الشيء إلى تف الأسلاك في أخذ
واللالي تعطل الجهاز

نقل عي تركيب سجل الضغط رقمي عي و K1 كالأد، شتركان في GIG جنان:



اسم الجهاز أو الآلة	صورة الجهاز أو الآلة	متى نستخدم الجهاز أو الآلة	آلة جزة وآلة كيرتة التي ك، كن آستة، هاشكل، شترك
جهاز قياس التردد في (الترانسوميتك) آلة، ول		<ul style="list-style-type: none"> • يخدم لانفيذ فحص stop step test • لتدري لمنطقة كوك لآي قة كاي آلى • كيب مياة أو وصلا ع غير قانونية وهه برون قبل كتحكم أة، و • كرف تر كلاب آلأدى. 	<p>آصلة ك مع المياحة المائية و ك آلة لآ ك ونك (UFM)</p>
سجلا الضغط، آلة		<ul style="list-style-type: none"> • قياس ضد وطاع • لمياة في مناطق مكلفة ومفآلية وقا، و في • لمياة في ك لمنطقة • مفآة في مآة وان لمنطقة • بآة لآكين • وآ بالمياة. 	<p>آصلة ك مع المياحة المائية و ك آلة لآ ك ونك (UFM)</p>

كن آلرجو آلى كيرتة آلف ك لآستةم آجزة آلكشف عن الآلة

別冊資料 CD 1.12

**Study on Existing Meter System and Prepaid
Water Meter System and Feasibility and
Strategy for Introduction of Prepaid Water
Meter System) – English Version**

Palestinian Water Authority (PWA)
Jenin Municipality

Study on
Existing Meter System and Prepaid Water Meter
System and Feasibility and Strategy for Introduction
of Prepaid Water Meter System

Under
the Project for Strengthening the Capacity of
Water Service Management in Jenin Municipality

April 2018

Japan International Cooperation Agency (JICA)

TEC International Co., Ltd.

PADECO CO., Ltd.

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Abbreviation:

JSC-JWV: Joint Service Council Jenin Western Villages

JM: Jenin Municipality

MoLG: Ministry of Local Government

PA: Pilot Area

PPWM: Prepaid water meter

PSI: Palestine Standards Institution

Technical Specification of PPWM (PWA, MoLG, PSI): Technical Requirements and Specifications for Supply and / or Installation of Prepaid Potable Water Meters System, Version 3, June 2017.

1. Prepaid water meter (PPWM) system

(1) Technical Specification of Prepaid Water Meter (PPWM)

The official technical specification for PPWM was prepared by an official and authorized technical committee formed by the Minister of Public Works and Housing according to the recommendations of the Permanent Ministerial Infrastructure Committee. These technical requirements and specifications shall be followed as a reference for the procurement of the PPWM system.

“Technical Requirements and Specifications for Supply and / or Installation of Prepaid Potable Water Meters System, Version 3, June 2017” (Technical Specification of PPWM (PWA, MoLG, PSI))

(2) PPWM system overview

The prepayment environment will be made up of the following equipment and components:

- **The metering device**, this includes the user interface for the loading of credit and other data. The metering device must be securely mounted to prevent tamper.
- The credit and data transfer device: **token**
- **The vending station**, specifically the hardware, software and interface to the token
- **Flexible and user defined reports from the software** to allow reporting on all aspects of the system and the consumer consumption and spend. Trend analysis must form part of the reporting options.

The PPWM system consists of metering, dispensing (vending), and credit-loading components. The customer purchases a specific amount of water at the vending station by charging their PPWM cards. This purchased (credited) water is registered into media (token), and the payment for credited water will be automatically transmitted to the customer database in the center of billing system. Vending stations (sale points) are established at the most accessible points with flexible hours for customer to conveniently charge their cards.



P-1: PPWM installed at household



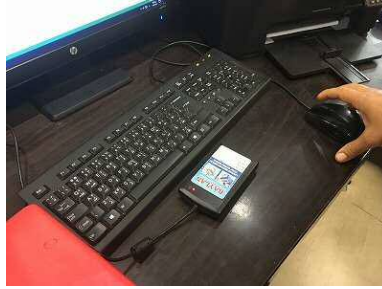
P-1: PPWM installed at household



P-3 Inter a card (token)



P-4 Database computer



P-5: Dispensing equipment at Vending station



P-6: Server (Data transmission equipment to existing financial system)

PPWM is divided into two parts: 1) attachment of prepaid system (electrical part) and 2) measurement part (regular meter) as shown in following photos.



P-7: Top view of PPWM



P-8: Side view of PPWM



P-9: Bottom view of PPWM

The prepaid water meter software can be integrated with the service provider's accounting and financial software. The system also supports the use of hand held units to program and interrogate the metering devices in the field. The hand held unit is able to perform the same functionality as the software provided that is used for the metering device data up/down loads.

(3) Functions

The followings are typical functions of the PPWM. For description of these functions, refer to Technical Specification of PPWM (PWA, MoLG, PSI).

- Reserve (spare credit)
- Low credit alarm, messageor warning
- Friendly credit
- Tariff setting
- Consumption limit
- Tampering alarm or lock

(4) Reporting and Information

The database is accessible via standard SQL-based report writing tools like Crystal Reports for the management. The system provides the respective data to generate automatically monthly reports

separated for the predefined supply areas.

- Quantities consumed per tariff step.
- Quantities consumed per month per (a) village, (b) vending station, (c) customer
- Credit purchased (NIS/month) per (a) village, (b) vending station, (c) customer
- Credit consumed (NIS/month) per (a) village, (b) vending station, (c) customer
- New customer connected per (a) village, (b) vending station
- Cancelled contracts from customer
- No credit purchased within the month, customers per (a) village, (b) vending station
- Abnormal user behavior (low or high consumption)

Source: Technical Specification of PPWM (PWA, MoLG, PSI)

(5) Prepaid electricity meter

In electricity supply sector, prepaid electricity meter has been quite popular in Palestine and Jenin also adopted prepaid electricity meter. The customer is familiar with its system, and is not reluctant to purchase electricity credit. The suppliers of PPWM system started electricity and has participated in the water supply sector. Therefore, they are familiar with installation and commissioning, maintenance of prepaid system.

2. Comparison between the existing meter system and the PPWM system

2.1. Improvement of the current issues and challenges of the existing billing and collection system without introduction of PPWM

The main issues and challenges of the existing billing and collection system in Jenin Municipality are categorized as below. Issues and challenges related to the existing billing and collection are listed in Table-1.

- (1) Meter reading
- (2) Billing and collection
- (3) Illegal connection
- (4) Debt increase and repayment
- (5) Owner
- (6) Human resources
- (7) Collection from refugee camp
- (8) Water supply condition
- (9) Response by municipality
- (10) Interference by other parties/departments

The countermeasures to improve the existing system in order to solve the issues and challenges are given

in the same table. For this purpose, many measures are required to be taken to solve the issues such as development of capacity of human resources and its related training, strengthening of human resource management and enforcement of regulations, transportation means (vehicle), introduction of additional section/unit, protection for readers and collectors from customers, awareness activity for customers, etc.

Table 1: Issues and challenges related to Existing Billing and Collection and improved conditions and improvement potential by introduction of PPWM

Category of issues	Issues	Challenges	Countermeasures in existing system	Improved conditions by introduction of PPWM	Improvement potential by introduction of PPWM
1. Meter reading	Careless customers: water meter is dirty, hidden between grass	There are some risks like insects and snakes especially in the summer, it's not easy to read	Send an alert to the customer to change the location of meter, if he does not responding send to him a penalty.	No reading activity on site (set in right location to periodical check of PPWM)	Yes, because no reading is required.
	Water meters inside home	Difficult to read it sometimes, easy to steal water and difficult to technical person to check	Transfer meters from inside to outside, any new customer should be the meters outside of home		
	Location of water meter is in a high level.	Difficult to read and some risks.	Modifying the procedures and request from customer to install the water meter at a suitable location.		
	Put a dog around water meter to prevent reader of read.	Can't read water meter, and in this case customer can steal water by illegal connection.	Put a penalty and punishment for those whom use this way.		
	Location of meters and some meters closed.	Readers can't read meter.	Using the penalty for any customer hides water meter, and install meter in clear location from the beginning		
	Without car especially when they back to the municipality.	More time and efforts, and paying transportation cost from their pocket when they back.	Availability car or more by municipality.	No reading and collecting activity.	
	No supervision or check on readers in the field	Estimation current reading by reader without going to water meters locations. They copy past readings and write new reads in estimation, they read water meters sometimes with error.	Assign Field Supervisor	No reading activity on site.		Yes, because of no reading activity on site, no supervisor for readers is required.
2. Billing and collection	No protection for readers and collectors from municipality	They do not care about getting the results or not. They protected themselves through non-collide with customers	Take a design for that and using punishment and penalty to whom harm municipality employees.	No billing activity on site.	Yes, because no collection on site is required and no billing data is input manually. Billing has no or fewer mistakes. No protection from customers.

Category of issues	Issues	Challenges	Countermeasures in existing system	Improved conditions by introduction of PPWM	Improvement potential by introduction of PPWM
	Late submission of list of the read water meter by readers	To delay updating the customer database with the month's read water meter and this could delay the billing printing and delivery	Customer Service Section (C.S) clarifies the work schedule of the readers and workflow and implement firmly.	No billing activity. No input data or less bill printing is required.	
	Need for print machine	They have to go to other place in the municipality to copy any paper, it takes too much time	Buy print machine		
	Collectors don't have enough will to collect water tariff, there is no punish policy in the municipality and no efficiency	Lack of collection	Give rewards and motivations to collectors and at the same time use punishment.	No collecting activity on site.	
	No clear policy for collection from municipality.	Confusion in work and random work.	Clear policy from municipality and should be applicable.		
	Collectors under pressure from J.M to collect more money	There is no motivations to collectors to collect more money, collection rate still the same each month	Give them percentage on collection or bonus		
	Objection to invoice value from customers when collector deliver to customers	Non-continuity in distributing the invoice to the person who objected	Water availability, make sure the water meters works. and customer has water		
	Not receiving and expelling collector sometimes	Can't deliver the bills	Providing enough water to customers, because if the water available and customer use it, it's normal to get a bill and pay.		
	Sometimes the amount which paid from customer is not deducted from his accumulated credit balance	Expanding the gap between citizens and municipality and distrust of the municipality	More control over the accounting section. and keep all receipts which customers received it from the municipality.		
3. Illegal connection	J.M not respond when readers or collectors inform about any cases	Continuous steal water and water losses	Quick response from J.M, raising number of technical employees	PPWM has tamper protection function.	Yes, Illegal connection is difficult. PPWM has function of warning of tampering of connected pipe for customer to make illegal connection.
	There are no technical teams specialized in illegal connections	More illegal connections but no discovery of current illegal connections	Assign more specialized team and train them on discovering illegal connections		

Category of issues	Issues	Challenges	Countermeasures in existing system	Improved conditions by introduction of PPWM	Improvement potential by introduction of PPWM
	Unclear and firmed procedure for implementing the already existed regulation about illegal connections.	Illegal connections and what exactly is the procedure, who are in charge, and who manages the whole procedure. Continue to steal water through illegal connections	The illegal connection procedure needs to be clarified.		PPWM can reduce illegal connection.
	Water meter removed by customers	Readers cannot read meter, and increasing NRW rate, and this issue is illegal.	Conduct field tours on water meters location and respond quickly to readers feedback and notes	Removal of meter is no water supply or no consumption data.	Yes, Illegal connection is easy to find. If water meter is removed, no consumption data is coming to ledger so that it is easy to check.
4. Debt increase and repayment	Installment boring for debts.	Encouraging customers to non-pay, and rate of collection is too low	Agreement between municipality and court to Installment amount in 3 years max.	Collection rate is 100%.	Yes, collection rate is 100% so that debt does not increase. PPWM has debt repayment function.
	Non-payment culture	Accumulation of debts and lack of collection	Through public awareness campaigns and use penalty for whom not pay.		
	Not Separate debt to be paid by customer through court for the amount owed monthly.	When amount is large, it doesn't help to pay, but when the current bill value is low it's easy to pay (Psychologically).	Separate previous debts for the amount owed monthly		
	High balanced customers pay a little amount by from of the total debts.	When they go to the court and judge against customer, the decision will be pay as customer want. (Convenient installment)	Reconsidering in court decisions, and take deterrent decisions		
	Imaginary debts for some customers especially when customers are out of the city.	Accumulation of debts, because collector put minimum tariff per month.	Public awareness campaign to tell customers whom want to leave the city to fill Meter Temporary Stop form.		
	Problem in old accounting system, when customers get exemption, it is not migrated from customer account.	Accumulation of debt.	Re-analysis of the debt file for each customer who received an exemption.		
5. Owner	Distributions not fair	Some customers access water and do not. This makes problem for readers and collectors when they read water meter or delivery bills for complains.	Reconsidering in water program distribution, and find where is the problem and solve it.	Irrespective of water supply condition, customers have to pay water charge to consume water.	Irrespective of water supply condition, customers have to pay water charge in PPWM system according to consumption.

Category of issues	Issues	Challenges	Countermeasures in existing system	Improved conditions by introduction of PPWM	Improvement potential by introduction of PPWM
	Ownership of water meter in wife's name.	Often wife no need to do Clearance, husband needs it often	Reject any applicant with wife name.	PPWM does not discriminate owner.	Irrelevant of owner, customers have to pay in PPWM system.
	Ownership of water meter in young people name, less 20 years.	In this age no need to pay anything to municipality, it easy to don't pay water tariff.	Select specific age to accept the applicant.		
	Water meter in the name of died person.	heirs don't care to pay, and no direct responsibility for water meter and tariff.	Stop service after owner died and transfer water meter in the name of any son if they need.		
	Some water meters in the name of first and second name or third name.	Can't go to the court in this case, court needs full name,	Rename all meters which has first and second name, through site visit and AIShameel system.		
	Abandoned houses especially in the old city.	Water meters are damaged and there is no one to review.	Affects the bill collection rate.	If PPWM is damaged, no water supply and no data is coming.	Water meter damage is found through data analysis.
	Buildings under construction which has water meter, in this case the owner should be stop the Subscription after he finish from construction.	Accumulation of debts, because collector put minimum tariff per month.	Tours on new buildings, to remind the owner to stop his subscription.	No consumption data is found in suspension of water meter.	Suspension of meter use is found through data analysis.
6.Human resources	There are not enough readers and collectors	They cannot complete tasks on time, and more mistakes	Increase number of staff through transfer some of employees who qualified to public services and collection unit.	Reading and collecting human resources are not required.	Yes, Mitigate human resources needs.
	Inefficient allocation of readers and collectors among two sections; C.S and the Collection unit	The relation between the C.S and Collection unit is unclear regarding managing assignment of the 12 readers and collectors.	To officially allocate the 6 readers to C.S and the 6 collectors to the Collection unit.		
	Lack of enough technical persons in C.S section	To maintain, repair, discover illegal connections and water meter technical problems, etc.	Assign more technical staff to C.S.	Introduction of PPWM can reduce manpower.	Yes, Reduced man power may be assigned to other sections, which lead to more efficient use of human resources.

Category of issues	Issues	Challenges	Countermeasures in existing system	Improved conditions by introduction of PPWM	Improvement potential by introduction of PPWM
	Lack of enough employees	To help current staff in data entry and answers to customers complaints, the current staff is not enough to response the different needs of customers, this slow down the workflow.	Assign more employees to the KATABA division.		
	No maintenance for water network and network is old. Complaints on network.	Continuation of losing water and illegal connection.	Maintenance, solve and follow up complaints.		
7.Collection from refugee camp	Collection rate in Jenin camp is too low, its 1% and debts is 7 million, and there are 1362 customers in the camp.	Does not contribute to development of city's water sector. not help to maintain the water network and effected on water sector in general	Install one meter for Jenin camp, and Popular Committee in the camp is paid.	Collection rate is 100% if PPWM is installed. .	Yes, if PPWM can be installed in refugee camp.
8.Water supply condition	Depend on private wells.	No commitment to pay for municipality because they have not access to municipality water.	Availability more water from municipality.	Water consumption may decrease.	Water can be supply to more customers by reduced water consumption.
	Use pump on water meter to pull water to the tank	Water pressure to other customers is less than who use pump, in this case water does not reach for all customers	Tours especially at night to discover this issue, to discover who use pump or not. And prevent them by penalty.	Water consumption may decrease.	
9.Response by municipality	No quick response from the related section in the municipality.	Lack of trust between citizen and municipality.	Solve problems and quick response and use punishment.		
10. Interference by other parties/departments	Intervention by the municipal council in work, in particular with the judiciary	Weakens readers' and collector's role and becomes weak, not report any illegal issues.	Not interfere with their work and give them financial motives.		
	Direct handling by the municipal council with customers.	Reduce role of the collection unit	Non-interference by municipal Council in customers issues		
	Other departments sometimes enforce personal interests to C.S; for example, recommend accelerated procedure for a friend customer	Such personal interests slow down or interfere the daily activity schedule of C.S.	C.S just simply needs to be firmer about its schedule and reject such personal interest request.		

Source: Compiling from Baseline Survey Report, February 2018, JICA Expert Team

2.2. PPWM system and improvement of the billing and collection issues

With introduction of PPWM, the exiting billing and collection conditions will be changed. The table below summarizes the conditions/activities after introduction of PPWM and improved degree of issues and challenges after introduction of PPWM. As can be seen in the table below, most of the issues and challenges could be solved or mitigated by introduction of PPWM, except response by municipality and interference by other parties/departments.

Table 2 Role of PPWM in solving the existing billing and collection issues

Category of Issues	Conditions/activities after introduction of PPWM	Improved degree of issues and challenges after introduction of PPWM
(1) Meter reading	<ul style="list-style-type: none"> No reading activity on site. (However, meter is to be set in right location for periodical check of PPWM.) 	<ul style="list-style-type: none"> Improved. All meter reading issues can be solved. No supervisor for readers is required.
(2) Billing and collection	<ul style="list-style-type: none"> No billing and collection activity on site. No input data manually nor bill printing is required. 	<ul style="list-style-type: none"> Improved. All billing and collection issues can be solved. Billing has no or fewer mistakes. No protection of readers and collectors from customers is required.
(3) Illegal connection	<ul style="list-style-type: none"> PPWM has tamper protection function; avoiding tampering of connected pipe for customer to make illegal connection. Removal of meter by customer results in no water supply or no consumption data. 	<ul style="list-style-type: none"> Improved. Illegal connection will be reduced using tamper protection function. Improved. It is easier to find illegal connection. If water meter is removed, no consumption data is coming to ledger so that it is easy to check.
(4) Debt increase and repayment	<ul style="list-style-type: none"> Collection rate is almost 100%. 	<ul style="list-style-type: none"> Improved. Collection rate is 100% so that debt does not increase. PPWM has debt repayment function.
(5) Owner	<ul style="list-style-type: none"> Irrespective of water supply condition, customers have to pay water charge for water consumption. PPWM does not discriminate owner characteristics. If PPWM is damaged, no water supply and no data are coming. No consumption data is found in suspension of water meter. 	<ul style="list-style-type: none"> Irrespective of water supply condition, customers have to pay water charge according to consumption in PPWM system. Improved. Water meter damage is found through data analysis. Improved. Suspension of meter use is found through data analysis.
(6) Human resources	<ul style="list-style-type: none"> Human resources and training for reading and collecting are not required. Introduction of PPWM can reduce manpower. 	<ul style="list-style-type: none"> Improved. Human resources needs are reduced. Reduced man power may be assigned to other sections, which lead to more efficient use of human resources.
(7) Collection from refugee camp	<ul style="list-style-type: none"> Collection rate is 100% if PPWM is installed. 	<ul style="list-style-type: none"> Improved if PPWM can be installed in refugee camp.
(8) Water supply condition	<ul style="list-style-type: none"> Water consumption may decrease as customers become more aware of use of water. 	<ul style="list-style-type: none"> Improved partially. Water can be supplied to more customers by reduced water consumption and give more stable supply condition.
(9) Response by the Municipality	<ul style="list-style-type: none"> Irrespective of the existing system and with PPWM system, this should be improved. 	<ul style="list-style-type: none"> Same condition as the existing meter system.

Category of Issues	Conditions/activities after introduction of PPWM	Improved degree of issues and challenges after introduction of PPWM
(10) Interference by other parties/departments	<ul style="list-style-type: none"> Irrespective of the existing system and PPWM system, this should be improved. 	<ul style="list-style-type: none"> Same condition as the existing meter system.

2.3. PPWM system and changes in the billing and collection procedures

Some of the works of the Customer Service Section of the Water and Wastewater Department (WWD) and the Collection Unit would be reduced or removed after using of the PPWM though some other work would be added to manage the PPWM system including:

(1) Removed/Reduced procedures

- Procedures for re-connection/absent customers (reduced workload)
- Meter reading and billing (removed)
- Court case procedure for unpaying customers (but will remain only for previous debts and discovered illegal connections) (reduced workload)
- Procedure for illegal connection (reduced workload)
- Reduce JM's clearance procedure by removing water dues (but will remain for PPWM customers with previous debts) (reduced workload)

(2) Remained procedures

- New application (same workload)
- Customer service and complaints (reduced workload)
- Transfer water meter place/ownership (same workload)

(3) New procedures

- Monitoring PPWM performance, PPWM maintenance, and repair
- Monitoring credit purchase sites/vendors/offices
- Training of the software, maintaining the PPWM management system and data

2.4. PPWM system and changes in the workload

Comparison of requirement of improvement with continuous use of existing meter system and workload with introduction of PPWM by process is summarized below.

Table 3 Comparison of improvement of billing and collection procedures with the existing system and with the PPWM system

Procedures	Within the existing meter system		Workload with introduction of PPWM
	Current workload	Improvement needs	
(1) Connection/disconnection, meter reading, billing, collection			
1. New application	Low	To be improved	Same as the existing meter system
2. Installation of water meters	Low	Same (by customer)	Same (by municipality in most case)
3. Re-connection /absent customers	Low	Needs improvement.	Reduced
4. Meter reading	High	Needs significant improvement.	Removed
5. Billing	High	Needs significant improvement.	Removed
6. Collection	High	Needs significant improvement.	Removed
7. Management of collection offices	Low	Collection offices and other payment modes may be required.	Monitoring limited credit purchase sites/vendors/offices
(2) Finding illegal connection and debt recovery			
8. Finding illegal connection	High	Needs significant improvement.	Reduced (PPWM has illegal coercion alert system and accurate data to find illegal connection)
9. Maintaining data management system and data analysis	Mid	Needs significant improvement.	IT integration will be made by outsourcing. Data management training for PPWM system is required.
10. JM's clearance procedure by removing water dues	Mid	Needs significant improvement.	Reduced/Removed (will remain for PPWM customers with previous debts)
11. Court case procedure for unpaying customers	Low	Needs significant improvement.	Reduced/removed (will remain only for previous debts and discovered illegal connections)
(3) O&M of the system			
12. Meter maintenance, repair, replacement	Mid	Improved regular meter maintenance is required	Meter part is same maintenance as existing meter system. Electrical parts are to be maintained additionally.
(4) Customer service			
• Customer service	Mid	Needs significant improvement.	Same as existing meter system
• Complaints management	Mid	Needs significant improvement.	Same as existing meter system
• Transfer water meter place/ownership	Mid	Needs improvement.	Same as existing meter system

With introduction of PPWM, the high workloads (listed in table above) will be removed or reduced. In particular, meter reading, billing, and collection workloads are higher and would be removed with PPWM system. Furthermore, the workload of the procedure for illegal connection is reduced.

On the other hand, workload of the following new procedures related with PPWM increases:

- Training and operation of the software, maintaining the PPWM management system and data
- Meter maintenance of electrical parts (outsource by supplier)

Meter maintenance of electrical parts will be made by outsourcing and operation of the software and maintaining the PPWM management system and data is carried by one staff in other service providers such as JSC-JWV and Aqraba.

2.5. Benefits of Introduction of PPWM

- 1) With PPWM there would be no need for regular meter readings and collections. The staff could work for other duties after training.
- 2) JM could benefit with updated customer database for the pre-paid customers.
- 3) Easier detection for illegal connections through the PPWM management system, the purchased credit/history, and PPWM location outside of the houses.
- 4) No need to print bills; save time and human resource
- 5) Less complaints from customers regarding miss-reading, no-readings, or bill issues
- 6) No pressure on JM on collection rate by advance payment of the PPWM
- 7) Reduce in number of court cases for high due amounts
- 8) Higher accuracy of data on water consumption and customer information
- 9) Decrease in water consumption and increase in water availability over time
- 10) Increase in number of subscribed customers if JM is generally successful in PPWM system
- 11) 100% of bill collection and increase in water revenue
- 12) Ownership of water meters by JM and better control on the meter functions
- 13) Higher customer satisfaction and change in public attitudes toward payment of water if the entire pre-paid management system works properly.

2.6. Advantage and disadvantage of PPWM

Advantage and disadvantage of PPWM for both JM and the customers are summarized in table below. The PPWM system has many advantages for Jenin Municipality but less disadvantage including initial cost of PPWM. For customer, water supply condition may improve and water charge will be reduced.

Table 4 Advantage and disadvantage of PPWM for both Jenin Municipality and the customers

	Jenin Municipality	Customers
Advantage	<ul style="list-style-type: none"> • Almost 100% collection ratio and increase in water revenue • Collection of part of the previous debt. • Reduce of NRW (illegal connection) • No need for regular meter reading/bill collection • No reading error and input error • Higher accuracy of data on water consumption and customer information • Easier control and decrease in illegal connections and leakage • Reduce in workload • Save the salaries of readers and collectors • Ownership of water meters by JM and better control on the meter functions • Easier customer management system with PPWMs • Higher customer satisfaction and change in public attitudes toward payment of water • Decrease in water consumption, increase in water availability over time, and supply to more customers. • Reduction of consumption and deferral of the investment of water supply facilities. • Long-term rationalization of consumption 	<ul style="list-style-type: none"> • The customer is more conscious about water consumption, resulting in reduction of water consumption and water charge. • Payment of water charge by correct meter consumption • Decrease in water consumption, increase in water availability over time, and supply to more customers. • The capital cost required for upgrade the facilities would be decreased or upgrading can be deferred. Deferral of the investment of facilities eases water tariff increase. • In many cases, water meter is installed by waterworks for free.
Disadvantage	<ul style="list-style-type: none"> • Initial cost for PPWM • Use of new software and its training 	<ul style="list-style-type: none"> • They have to pay water cost in advance. • They have to go and buy charge to vending machine. • Customers of unwilling to pay bill have to pay.

2.7. Risk of PPWM system

The following risks are identified through the PPWM study of the other water providers in the West Bank.

- Introduction of PPWM without any service improvement may provoke a protest among customers (though 65% of the sampled residents in Pilot Area-1 (PA-1) were positive towards PPWM).
- New pre-paid water meter gives more accurate reading and the new bill amount may be thus more than the previous bills or also there is the case less than the current bills. In the case of more than the current bill, customer may protest against meter.

2.8. Conclusion and recommendation

Introduction of PPWM gives lots of benefits to Jenin Municipality. Once PPWM is introduced, the existing laborious meter system, which needs to do a lot of improvement, become less laborious system without monthly meter reading, billing and collection. The collection ratio will become nearly 100%, which indicates debt would not be accumulated and the related work load is cut down. With PPWM the revenue will increase, although operation of software, maintaining PPWM management system and data

is required, which is not high work load and even small service provider of Aqraba can manage it.

The main concern is introduction of PPWM might provoke a protest among un-willing customers although 65% of the sampled residents in PA-1 were positive towards PPWM but yet 35% were not positive towards PPWM which should be taken into consideration for public awareness activities.

As a result of the comparison of improvement of existing meter system and PPWM system, introduction of PPWM system is recommended by minimizing foreseeable risks that customers are against the meter.

3. Type of water meter

3.1. Type of water meter currently installed

The current status on meter types applied in large towns in Palestine is summarized in the table below. Selection of meter type depends on the ownership. According to this table, volumetric and velocity are both popular.

Table 5 List of meters status in large towns in Palestine

Municipality and utility Name	Meter type	Status of the ownership	Current water supply condition (Rationing or 24 hrs)	Responsibility of meter maintenance
1. Bethlehem (WSSA: water supply and sewerage authority)	Volumetric	Dual ownership	Rationing	WSSA
2. Jenin Municipality	Velocity	Customers	Rationing	customers
3. Jericho	Velocity	Customers	24	Municipality
4. JWU: Jerusalem Water Undertaking (Ramallah and Al-Bireh, Jerusalem)	Volumetric	Jerusalem Water undertaking	Rationing	JWU
5. Qalqulliya	Velocity	Customers	24	Municipality
6. Salfit	Volumetric	Municipality	24, but summer not enough	Municipality
7. Tubas (Joint service council)	Volumetric, Velocity	Joint service council	24	Joint service council
8. Tulkarm	Velocity	Customers	24 hours	Municipality
9. Hebron	Volumetric, Velocity	Municipality	Rationing	Municipality
10. Nablus	volumetric	Municipality	Rationing	Municipality

3.2. Ownership of water meter

Ownership of water meters should be considered to change from customer to the service provider. According to the meter readers, they have faced difficulty in meter reading; meters are installed at too high places, too dirty to read, dogs are placed by customers near meters, etc. Also, the water provider cannot select the types of meters if owned by customers. According to the Water Department of Tulkarm, they tried to replace the water meters from velocity to more accurate volumetric, but the customers had rejected. If the ownership of water meter is by the service provider, meters can be selected by service providers and installed at right places to read and maintain any time.

3.3. Main issues on type of water meter

Three types of water meter are compared in the Baseline Survey Report. The followings are the main issues to be considered when deciding on the specifications of the water meter:

(1) Suspended particles in water

The source of water in Jenin is ground water which usually contains small sand particles. Volumetric type of meters is jammed by small particles in water. Ultrasonic type of meters is least affected by suspended particles as they have a clear passage of water without any obstruction.

(2) Water hardness

Ground water is generally higher hardness. The 'Report of Diagnostic Study' states that the hardness of various sources of water supplied in Jenin is in the range of 360 to 450 mg/L as CaCO₃. This is higher than the average. Volumetric type meters are affected more due to the hardness as calcium deposits on measuring chambers reduces measurement accuracy.

(3) Air in water

Giving that the water supply in Jenin is intermittent, when the supply starts each time the air trapped in the pipe during no-supply time flows to taps before the water. This air can rotate the turbine of velocity type meters which then count the air as water, and also volumetric type may count air. After some time, the initial air-only situation may change to air-water mix. Ultrasonic meters do not measure air but they also do not measure water as long as the water contains air bubbles. It is not confirmed if volumetric meter measures water mixed with air bubbles.

(4) Low flow measurement

If customer has overhead tank, to which water is directly supplied from the distribution pipe without ground tank and the flow is controlled by float valve, a very low flow likely occurs when water is used at the house. In this case, it is better to have a water meter which can accurately measure flow as low as possible. Ultrasonic meter is the most accurate.

(5) Installation position

Finding horizontal installation position is sometimes difficult in crowded areas thus water meters which can be installed in any position will be preferable compared to 'horizontal only' models. Velocity type meters are generally 'horizontal only' where as volumetric or ultrasonic types can be installed in any position.

(6) Installation record

Ultrasonic has been never utilized as customer meter in Palestine, which thus needs more experience in the actual field.

(7) Conclusion and recommendation

Both velocity and volumetric meters have disadvantage in intermittent ground water supply. Ultrasonic meter may be the best choice but it still has uncertainty of functionality in intermittent supply of water when water flow contains air bubble. To verify the functionality of ultrasonic type, field experiment of ultrasonic type along with velocity and volumetric water meters should be made in Jenin water supply service area.

4. Sustainability Check of PPWM

4.1. Financial sustainability

Financial sustainability or feasibility for introduction of PPWM is checked by financial cost and benefit analysis.

(1) Billing and revenue data in 2017

Item	Subscribers (Customer)	Total bills	Total bill revenue	Total bill without revenue	Collection ratio
(NIS)	Nos.	NIS/year	NIS/year	NIS/year	%
Total subscriber in 2017	10,220	7,393,416	2,820,888	4,572,528	38.2
Refugee Camp	1,409	1,104,650	205,259	899,391	18.6
Other areas except Refugee Camp	8,811	6,288,766	2,615,629	3,673,137	41.6
(USD)	Nos.	USD/year	USD/year	USD/year	%
Total subscriber in 2017	10,220	2,121,910	809,595	1,312,316	38.2
Refugee Camp	1,409	317,035	58,909	258,125	18.6
Other areas except Refugee Camp	8,811	1,804,876	750,686	1,054,190	41.6

Exchange rate: NIS= 0.287US\$

(2) Cost data

Item	Unit	Cost
The unit price of PPWM including meter box and installation) Installation cost : 5 USD/meter (assumption)	USD/meter	170
Accessories (server, software, handheld)	USD/set	10,000
Accessories (5 bending machines)	USD	10,000 (USD2000/setx5)
Meter maintenance cost	USD/meter/year	5
Average salary of JM employee	NIS/month	2,780

Exchange rate: NIS= 0.287US\$

(3) Financial costs and benefits analysis

1) Financial costs and benefits

Financial feasibility is analyzed by benefit-cost ratio (BCR), net present values (NPV), internal rate of return (IRR) and payback period (PBP) with the following costs and benefits in addition to estimated financial benefit-cost value. Payback period (PBP) indicates how many years are required to recover initial cost from increased revenue.

Financial item	Contents	Calculation
Financial revenue	Additional revenue and saved costs with PPWM	- Increased revenue (100% collection ratio for the current year bill with PPWM) (the collection of past debts is neglected.) - Saved personal cost (meter reader and collector) (8 among 16 of existing Meter Readers and Collectors are assumed to be reduced and the rest to be Meter Technicians and Pre-charging Attendants with 100% PPWM replacement)
Financial costs	Additional costs with PPWM	- Initial cost for introduction (PPWM system costs) - Operation and maintenance cost of PPWM system

Saved personal cost calculation (=financial benefit):

The personnel cost that can be saved by the introduction of PPWM is expected to be:

- Meter Readers and Collectors: 8persons*2,780NIS/person/month*12months
= 266,880NIS/year
- Auditor and Sub Cashier: 2 persons*2,780NIS/person/month*12months
= 66,720NIS/year
- Total: 333,600NIS/year

Increased revenue calculation (=financial benefit) :

The increase of revenue per year in 2017: Total billed amount for 2017 (7,393,000 NIS) - Collected amount for 2017 bills (2,820,000 NIS) = **4,573,000 NIS/year** (100% collection for the current year bill)

2) Assumptions

- Bill collection ratio: 100% after PPWM introduction (refer to other waterworks such as JSC-JWV and Aqraba)
- Assumed project period: 8 years of use of PPWM system
- Initial cost: Paid by Municipality (PPWM is installed by the JM and the owner of meter will be JM)
- Water consumption reduction per customer: 10% after PPWM system

- Additional revenue from unpaid customers is reduced by 10%.
- Revenue from current paying customer is decreased by 10%.
- Free O&M costs of PPWM system: 3 years
- NPV discount rate: 10%

The calculation sheets are given in Table 6.

3) Analyzed case

The following two cases are analyzed.

Case	Contents
1	Meter replacement of all customers with PPWM
2	Meter replacement of all customers except refugee camp with PPWM

(4) Summary of results

In both cases, the PPWM project has very high net present value and internal rate of return, and short payback period thank to expected huge increased water revenue. Therefore, the projects have good financial feasibility. The part of the retained earnings shall be utilized for future replacement or improvement of PPWM. In addition, other service providers use debt recovering program of PPWM, which is additional revenue to JM.

Case	Contents	Annual financial benefit-cost (USD)	Average annual financial benefit-cost (USD)	Internal rate of return (IRR)	Payback period (PBP) (years)	Discounted (10%) Benefit/cost ratio (BCR)	Total net present value (NPV) for 8 years (USD)
1	Meter replacement of all customers with PPWM	943,638	565,790	53%	1.86	1.44	2,377,960
2	Meter replacement of all customers except refugee camp with PPWM	725,697	416,068	46%	2.09	1.19	1,695,237

Table 6 Financial benefit cost analysis calculation sheet for PPWM replacement

Meter replacement of all customers with PPWM

USD

Sq No.	Year	Financial Cost with PPWM			Financial Benefit with PPWM			Benefit -Cost
		Initial cost	O&M	Total	Personnel saving	Increased revenue from unpaid customers	Total	
1	2020	878,700		878,700	0	0	0	-878,700
2	2021	878,700		878,700	95,743	656,158	751,901	-126,799
3	2022			0	95,743	1,312,316	1,408,059	1,408,059
4	2023		25,550	25,550	95,743	1,312,316	1,408,059	1,382,509
5	2024		51,100	51,100	95,743	1,312,316	1,408,059	1,356,959
6	2025		51,100	51,100	95,743	1,312,316	1,408,059	1,356,959
7	2026		51,100	51,100	95,743	1,312,316	1,408,059	1,356,959
8	2027		51,100	51,100	95,743	1,312,316	1,408,059	1,356,959
total		1,757,400	229,950	1,987,350	670,202	8,530,051	9,200,253	7,212,903
NPV	10%discount			1,653,102				4,036,455
IRR								79%
Payback period (year)								1.25
BCR								2.44

Consumption decrease -10%

Financial Benefit by reduced water consumption (10%)		Benefit -Cost by reduced water consumption (10%)
Increased revenue from unpaid customers	Decreased revenue from current paying customer	
0		-878,700
686,285	141,044	-333,459
1,276,827	282,089	994,738
1,276,827	282,089	969,188
1,276,827	282,089	943,638
1,276,827	282,089	943,638
1,276,827	282,089	943,638
1,276,827	282,089	943,638
8,347,248	1,833,577	4,526,321
		2,377,960
		53%
		1.86
		1.44

Meter replacement of all customers except refugee camp with PPWM

USD

Sq No.	Year	Financial Cost with PPWM			Financial Benefit with PPWM			Benefit -Cost
		Initial cost	O&M	Total	Personnel saving	Increased revenue	Total	
1	2020	758,935		758,935			0	-758,935
2	2021	758,935		758,935	82,543	527,095	609,639	-149,296
3	2022			0	82,543	1,054,190	1,136,734	1,136,734
4	2023		22,028	22,028	82,543	1,054,190	1,136,734	1,114,706
5	2024		44,055	44,055	82,543	1,054,190	1,136,734	1,092,679
6	2025		44,055	44,055	82,543	1,054,190	1,136,734	1,092,679
7	2026		44,055	44,055	82,543	1,054,190	1,136,734	1,092,679
8	2027		44,055	44,055	82,543	1,054,190	1,136,734	1,092,679
total		1,517,870	198,248	1,716,118	577,804	6,852,237	7,430,041	5,713,923
NPV	10%discount			1,427,587				3,167,794
IRR								73%
Payback period (year)								1.34
BCR								2.22

0.1

Consumption decrease -10%

Financial Benefit by reduced water consumption (10%)		Benefit -Cost by reduced water consumption (10%)
Increased revenue from unpaid customers	Decreased revenue from current paying customer	
0		-758,935
556,929	130,781	-332,787
1,031,315	261,563	769,752
1,031,315	261,563	747,724
1,031,315	261,563	725,697
1,031,315	261,563	725,697
1,031,315	261,563	725,697
1,031,315	261,563	725,697
1,031,315	261,563	725,697
		3,328,541
		1,695,237
		46%
		2.09
		1.19

(5) Revolving fund by JICA grant 2000 PPWM

The trial calculation of use of JICA grant 2000 PPWM as revolving fund was made. The following are assumption of calculation.

- 2000 PPWM will be installed in PA-1 to 3 as grant of JICA.
- The billing and revenue data in 2017 is used as basic data.
- The bill correction ratio of PA-1 to 3 is assumed as 55%.
- After installation of PPWM in PA-1 to 3, the bill collection ratio will be improved to 100 % from 55 %; the corresponding revenue collection increase by 184,359 USD/year as shown in the table below.

JICA meter	Unit	Total bills	Total bill revenue	Total bill not revenue
2000	NIS/year	1,427,481	785,114	642,366
	USD/year	409,687	225,328	184,359
	USD/year			Half of not-revenue 92,180

- In the calculation, potential water consumption reduction by PPWM is not considered.
- In the calculation, only additional revenue is considered but additional O&M costs not.

With these assumptions, some part of additional revenue will be utilized to install additional PPWM in the next year. The two cases are analyzed.

- Case 1: half of the additional revenue
- Case 2: all additional revenue

The calculation results are shown in Table 7. If half of the additional revenue is used for PPWM introduction in each next years, 7 years are required to install PPWM to all existing customers, mathematically. If all additional revenue is used, 4 years are required, mathematically.

Table 7 Trial calculation of use of JICA grant 200 PPWM as revolving fund

year	Case 1: half of the additional revenue		Case 2: all additional revenue	
	Annual increase of PPWM	Total number of PPWM	Annual increase of PPWM	Total number of PPWM
JICA PPWM installation	2,000	2,000	2,000	2,000
1st year	542	2,542	1,084	3,084
2nd year	686	3,229	1,666	4,750
3rd year	872	4,100	2,565	7,315
4th year	1,107	5,207	3,950	11,265
5th year	1,406	6,613		
6th year	1,786	8,399		
7th year	2,268	10,667		

(6) Impact of PPWM introduction on financial situation of the Water and Wastewater Department (WWD)

The deficit of WWD in 2016 was 2,984,351 NIS. If PPWM can be installed in all areas (8,811) except the Refugee Camp, additional revenue by PPWM will be 3,673,137 NIS/year. With PPWM, surplus of 688,786 NIS/year will be brought to WWD.

No.	Items	In 2016	
		NIS	USD
1	WWD revenue total	4,403,809	1,263,893
2	WWD revenue total excluding previous debt to be collected	2,926,439	839,888
3	WWD expense total	5,910,790	1,696,397
4	Deficit (including debt)	-1,506,981	-432,504
5	Deficit (excluding debt)	-2,984,351	-856,509
6	Additional Revenue by 8,811 PPWM	3,673,137	1,054,190
7	Additional Revenue by 2000 PPWM	833,762	239,290
8	Surplus if 8,811 PPWM is installed (5+6)=	688,786	197,682

(7) Fund raising for project costs

As the project shows high financial feasibility, especially high annual net benefits (benefit-cost), high IRR and short repayment period, the implementation of the project by lending loan from commercial bank or private investment is feasible. In addition, donor assistance and the grant from the government agency such as the Ministry of Local Government shall be explored for fund for project costs.

Once introduction of PPWM system is successful in a pilot basis and expansion plan is prepared, donor or government agency may finance JM.

If the fund is not available, the part of increased revenue by JICA 2000 PPWM introduction will be earmarked for introduction of PPWM.

4.2. Social sustainability

Social sustainability of the PPWM possibly depends on the satisfaction of the customers on the entire system including the meter specifications and functions, water availability, and the JM's management of such new system.

According to the Project's social survey, generally, the current customer satisfaction is very low in both PA-1 and the entire city for JM's water services especially for the water pressure and water availability on daily/hourly/weekly basis. With the PPWM system in place, the customers would expect improvement in the JM's water services and would be disappointed if no tangible improvements follow with their advance payment system and this could socially disturb the success of JM in its PPWM system. Thus, introduction of PPWM in the PA-1 area as the pilot would not be without challenges.

According to the Project's social survey in the PA-1 area, 65% prefer PPWM which also reflects the 61% of the bill collection ratio in the same pilot area. This could suggest that those who are already paying are also willing to replace their meters with pre-paid (yet if the water availability improves). The unpaying subscribers/customers would perhaps present opposition and objections with the PPWM if not convinced enough how they would benefit from the PPWM.

Giving the situation above, the PPWM should be as an option first among those that are already paying and/or are willing to replace. This could be a pilot implementation of PPWM and the lessons could be learnt for the other PA areas.

Consideration of low income families (poor families) could also help the social sustainability of the PPWM. The Law stipulated that water tariff shall be reduced for poor people, which is identified by the Ministry of Local Government (MoLG)/Ministry of Social Affairs (MoSA). This is adopted for both regular meter and PPWM. The software of PPWM has this function for calculating reduced tariff. In Aqraba, there are 86 social cases (poor families) and water charge is free for these social cases. The municipality has such budget. Consideration of social cases should be noted regardless of regular meter or PPWM systems.

The followings are recommendations that could help the PPWM sound socially sustainable:

1. JM must put efforts to improve water availability in daily/hourly and weekly basis.
2. There is much challenge to introduce PPWM as the bill collection ratio in Refugee Camp is very low (18.6%). Therefore, the introduction of PPWM in the Refugee Camp is deferred after JM acquires the required capacity to promote PPWM. Otherwise, a different collection mode should be adopted.
3. Convenient and hassle-free payment methods; properly located charge centers (vending stations) with extended service hours and friendly/knowledgeable staff. This service can be outsourced to the private sector such as supermarket.
4. JM must take preventive workflows to eliminate situations that could cause customer complaints on the PPWM services and respond to customer complaints and resolve issues as quick and properly possible.
5. Conduct public awareness and involvement activities before and after PPWM system for better understanding of the public about the system :
 - Organize public meetings with residents and key community members to explain the prepaid system especially the technical specifications and accuracy of the meter devices and the tariff and fees of water consumption. Presence of key people (i.e. the city Mayor and council members and head of water department, etc.) would help getting positive results of such public meetings.
 - Invite guest speakers from areas that successfully implemented PPWM; other municipality

or JSC-JWV or Tubas JSC to share their experiences.

4.3. Technical sustainability

(1) Type of water meter

As mentioned earlier, both velocity and volumetric meters have disadvantage in the current water supply conditions. Ultrasonic meters may be the best choice but they still have uncertainty how it functions in intermittent water supply conditions when water flow may contain air bubble.

It is necessary to have a pilot test in the real condition of field for ultrasonic meters, comparing the result with velocity and volumetric types.

Box: Pilot test for ultrasonic meter

The outline of demonstration experiment:

- Domestic water meters installed: one set of three types (ultrasonic, volumetric, and velocity)
- Duration: 1 to 3 month(s)
- Locations: 10 households by different water supply condition in the Municipality

(2) Operation and maintenance of PPWM

1) Technical Specification of PPWM

According to the Technical Specification of PPWM (PWA, MoLG, PSI), the supplier will do operation and maintenance for the prepaid meters for 5 years. After that, the service provider (the Municipality) will do the operation and maintenance as specified below.

“2.5 Maintenance and after sales services may include, but are not limited to the followings:

- 24 hours - 7 days a week telephonic support
- Onsite support on request
- Local support
- Onsite support for a duration of five years.
- The Bidder shall sign with the Service Provider agreement concerning the maintenance and after sales services after signing the contract.
- Commitment form shall be filled, signed, stamped and submitted with the offer as required according to the attached Form No 1. Original form shall be submitted upon request.”

(Source) Technical Requirements and Specifications for Supply and/or Installation of Prepaid Potable Water Meters System (Ver.3, June 2017 (PWA, MoLG and PSI))

As shown in the clause below, the supplier trains the technical people in service providers how to install and maintain the meters, how to manage database, etc.

“1.14 Training

The bidder is required to provide on-site training for the installation, commissioning and maintenance of all equipment. The bidder must provide a training schedule together with the bid. The training must conclude with a test for the training personnel to ensure and verify competence. The training schedule will detail the various levels and types of training: this is envisaged to include, but is not limited to, training to the following personnel:

1. Installation technicians: for the installation, commissioning, maintenance and testing of equipment
2. Administrative personnel: for the software application and vending environment
3. Database and application personnel: for assistance and maintenance of the back office integration

The training will be held in service provider premises.

4. The training shall cover the following:

- a) three training sessions for the administrative personnel and the database and application personnel
- b) three training sessions for the installation technicians personnel.”

(Source) Ibid.

2) Maintenance of water meter

Maintenance of PPWM should be conducted under the responsibility of the service provider. The maintenance includes collection of malfunctioned PPWM, replacement from existing one to tentative one, cleaning of metering part, maintenance of prepaid card part, check-up of accuracy with using test bench, sealing work, and re-installation of the meter.

The mechanical parts of PPWM require same maintenance as regular meters. The current maintenance work of water meters should be improved regardless of PPWM or regular meter. The electrical part of water meter is not possible to repair by the service provider and it should be maintained by the PPWM provider. The service providers can replace battery only in electrical parts. Therefore, maintenance contract is required to maintain the PPWM, especially for electrical parts. PWA recommends making a service contract with the supplier on maintenance of PPWM.

The following is an example of maintenance of PPWM in JSC-JWV:

- In general, the PPWM deficiency rate is about 1%. Sometimes the sensors get broken.
- Replacement policy: Replacement of PPWM is free because JSC has such agreement with a maintenance company.
- 2 batteries are inside. The life time will be 10 years but if they charge money more frequently the life time will be reduced (8 years or so).
- No regular calibration. When it is broken it will be checked by a maintenance company in Ajja.
- Out of 6,000 meters, 10~12 meter/month are needed repair.
- Spares parts stocked in JSC-JWV are battery, caps, etc.

The following are maintenance practices of PPWM in the maintenance center of a PPWM company in Ajja, Jenin Governorate:

- Seven municipalities are serviced by the maintenance center
- They have three sections (water prepaid meters, electricity prepaid meters and IT (software))
- Technical staff: 8 members
- Only broken meters are collected from providers for repair
- On average, 10 meters per day are repaired.



3) Operation and maintenance organization

The following organization set up is required for operation and maintenance of PPWM but most of them are not only limited to PPWM but also needed by the regular meter system:

- a) To manage PPWM system consisting of database, bending stations, programs, etc.
- b) To check, repair and replace of meters (both meter systems)
- c) To find illegal connection (both meter systems)
- d) To ensure quick response to customer complaints (both meter systems)

According to the Technical Specification of PPWM (PWA, MoLG, PSI), the training which is given by PPWM supplier are required for following staff members.

- a) **Installation technicians:** for the installation, commissioning, maintenance and testing of equipment
- b) **Administrative personnel:** for the software application and vending environment
- c) **Database and application personnel:** for assistance and maintenance of the back office integration

The staff and their main duties at JSC-JWV, as a successful implementation case of PPWM with 6,000 customers, are shown below. There are seven staff members for vending stations and server management and 6 technicians who are simultaneously working on maintenance of the pipe network to maintaining the PPWM system.

Table 8 Staffing and Main Duties of JSC-JWV related to PPWM

No#	Job title	Number of employees	Main duties
1	Technician (PPWM and maintenance of pipe network)	6	<ul style="list-style-type: none"> • Maintenance of pipe network • Meter maintenance which includes: <ul style="list-style-type: none"> - install prepaid meter - replace the battery - if there is failure on prepaid meter, remove the meter and replace it with standby by one, sending the unworked meter to Maintenance center to repair. When the meter is fixed the technician reinstall it again.
3	Vending station	6	<ul style="list-style-type: none"> • Working in 10 villages who are members in JSC
4	Server management	1	<ul style="list-style-type: none"> • Working in database and sever management. • Following up the vending stations and any problems in it
2	Other staff	17	<ul style="list-style-type: none"> • Executive manager • Secretary • Financial manager • Technical manager • Warehouse director • Pumps, wells, reservoirs • Office boy • Accountant • Managerial assistant • Others
	Total	30	

The following is an example of O&M practices for PPWM system in JSC-JWV and Aqraba Municipality.

- JSC-JWV checks PPWM every 6 months and Aqraba every month.
- They check monthly consumption, find abnormal values, and check the meter of abnormal value at site for possible illegal connections.
- They check water volume of main meters (source) and branch main meters and compare corresponding bill consumption for illegal use or leakage.
- The staff uses WhatsApp for good communication with customers.
- The service is in good response; a 24 hours phones service. (They have trust with customers and good communication.)
- If there is a complaint, they solve quickly.

4) Vending Station

Vending stations will be established at accessible points for customers' convenience for extended hours. A vending station per 1,000 customers is suggested by the supplier. The equipment necessary for the vending station will be PC system including software, the device for charging credit, etc., and one staff shall be deployed at this station. Vending station can be outsourced by supermarkets or by companies which offer credit charge services.

(3) Recommendations for sustainable operation and maintenance of PPWM

The following are recommendations for required operation and maintenance of PPWM system for technical sustainable, but most of them are not only limited to PPWM but also needed for regular meter system.

- a) Operational setup
 - to ensure quick response to customer complaints (both meter systems)
 - to check, repair and replace of meters (both meter systems)
 - to find illegal connection (both meter systems)
 - to manage database (both meter system)
 - to manage bending stations and programs
- b) Training of staff members who involve with the new system (i.e. meter installation, system management and customer database of the PPWM)
- c) Training for data analysis of PPWM to check the trend and abnormal values
- d) Sharing responsibility with PPWM supplier, especially in maintenance of PPWM

4.4. Political will and backup

The municipal councilors in Jenin Municipality have decided to introduce PPWM since 2017 according to stringent financial situation of the Municipality. If fund is available, the Municipality has a will to introduce PPWM anytime. If pilot projects of introduction of PPWM by JICA succeed, they will extend the other areas.

4.5. Summary of sustainability of introduction of PPWM

(1) Financial sustainability

The project of introduction of PPWM system has much higher net present value and internal rate of return, and short repayment period. Therefore, the project has good financial feasibility (sustainability) and large retained earnings are possible. The part of the retained earnings shall be utilized for increase and future replacement of PPWM.

However, this is the case that PPWM can be installed to targeted customers. The biggest challenge is whether JM can install PPWM to the targeted customer and operate it. This is related to social sustainability, which is explained next.

(2) Social sustainability

Social sustainability for introduction of PPWM has not been ensured and there is socially challenge. In particular, the bill unpaying subscribers would perhaps present opposition and objections with the PPWM if not convinced enough how they would benefit from the PPWM. The following are summary of recommendations to implement the introduction of PPWM in terms of social consideration.

- PPWM is introduced as an option first among those that are already paying and willing to replace and introduced to new customers.
- Customer's satisfaction on water supply (water availability and service) is improved together with introduction of PPWM, which eases acceptance of PPWM.
- The introduction of PPWM in Refugee Camp is deferred after JM acquires the required capacity to promote PPWM, or otherwise a different collection mode should be adopted.
- JM must take preventive workflows to eliminate situations that could cause customer complaints on the PPWM services and respond to customer complaints and resolve issues as quick and properly possible.
- Conduct public awareness and involvement activities before and after PPWM system for better understanding of the public about the PPWM system.

(3) Technical sustainability

Intermittent water supply and water quality should be considered in selecting water meter. Theoretically, ultrasonic meter may be the best choice except potential air-water mixed flow, followed by volumetric, which does not count air. Ultrasonic has been never utilized as customer meter in Palestine, which thus needs more experience in the actual field.

To ensure technical sustainability of PPWM, organizational setup for operation and maintenance of PPWM system is required and the staff should be trained for operation and maintenance of PPWM system.

(4) Political backup

The municipal councilors have decided to introduce PPWM since 2017 according to stringent financial situation of the municipality. Politically, introduction of PPWM can start anytime.

5. Strategy to introduce PPWM

A strategy to introduce PPWM is prepared below based on the opinions of the Counterparts in JM.

Items	Strategy
1. Main success factors	<p>To increase customer satisfaction and increase acceptance of PPWM</p> <ul style="list-style-type: none"> • Improve water supply conditions • Provide good and agile customer service, obtain trust from customers, exercise good management
2. Policy for introduction	<p>To prepare introduction policy to reduce risk and succeed in PPWM.</p> <ul style="list-style-type: none"> • PPWM is introduced as an option first among those that are already paying and willing to replace and to new customers. • The pilot project will be implemented to introduce PPWM to all or almost all the customers with intensive awareness raising activities. • A successful case will be made at first in small area and expand it to other areas.

	<ul style="list-style-type: none"> • Introduction of PPWM starts with influential people (Mayor, managers, member of council, employees) with signal that we are going to start with us. • If customer has debt, he wouldn't change to PPWM since introduction of PPWM will come with debt recovery in many cases. At the beginning, when PPWM is installed, customer is not asked about debt repayment. After several months, they are asked to be paid by installment. Some % from each charge should be taken from customer who has debt. • PPWM will be installed to large debt customers as priority. • Commercial customer is mandated to install PPWM. Probably, the willing to accept PPWM is higher than domestic customers. • Rental building to be with prepaid meters in order for the owner grantees that all renters pay all bills. • The introduction of PPWM in refugee camp is deferred or different collection mode should be adopted. • Change of ownership of water meter will be considered to ease change of water meter.
3. Awareness raising	<p>To increase of awareness of water supply service of JM and PPWM</p> <ul style="list-style-type: none"> • Strengthen PR Section • Prepare a good strategy for public relation (PR) as a whole. • Conduct public awareness and involvement activities • Activate public relation in water division linking customer service, with complains division, with public service center in order to make the correction action as soon as possible. • The need for creating materials for PR in different subjects • Preparation of PR contents <ul style="list-style-type: none"> - Benefits of using prepaid meters - Reduce your debt - Save water ad save money - Wise management of water use - Save water for other areas - Scheduling water supply table - Understanding of accurate consumption (accurate meter) - Feeling of fairness of payment (everybody pays)
4. Technical	<p>To strengthen technical capacity to back up introduction of PPWM</p> <ul style="list-style-type: none"> • Strengthen the capacity of Water Section on proper operation and maintenance and good water distribution management • Install meters in appropriate location and position for patrolling and avoiding of illegal connection.
5. Water tariff and debt recovery	<p>To give financial motivation to participate in PPWM</p> <ul style="list-style-type: none"> • The replacement to the customer should be free to motivate them to replace. • Reduce maintenance and operation fee. • No fee for the first 3-5 m³ of water use when charge the card for the first time. • To avoid rejection by customers, no previous debt charges should be mentioned when PPWM is first introduced. It can be applied later after the introduction has progressed.
6. Customer service	<p>To strengthen capacity to manage PPWM system and improve customer service</p> <ul style="list-style-type: none"> • Training of staff members who involve with the new system • Strengthening of Customer Service Section • Creation of meters maintenance division • Customer contract to be modified. Ownership of PPWM should be the Municipality if PPWM is provided by the Municipality.

6. Strategy to introduce PPWM

6.1. Main strategy to introduce PPWM in Pilot Area

- (1) Introduction of PPWM will be first implemented in the pilot project area as to create a successful model, which could be extended to the other pilot areas and to the other areas of JM in the future.
- (2) For this purpose, an adequate area will be selected and PA-1 is selected among the three pilot areas for NRW because it has higher collection ratio, educated and higher income residents, which could ease the introduction of PPWM.
- (3) As an introduction policy, either of followings will be adopted:
 - a) PPWM is introduced as an option first among those that are already paying and willing to replace and introduced to new customers.
 - b) PPWM is introduced to all or almost all the customers in the area with intensive awareness raising activities.
- (4) In this pilot activities, required organizational set up and training for PPWM will be made in JM.

6.2. Outline of PA-1

- (1) Characteristics of area

The characteristics of PA-1 are as follows:

- a) Name of area: The area is separated into 3 sub-areas: Sabah Al Khir, Kharoube, and Nasraa Street.
- b) The area is newly developed area, and mainly residential with some commercial.
- c) The people are high income and educated.
- d) Main water supply source is by a pump, but there is some possibility that water also enters from adjoining area when the pump is not operating.
- e) The PA-1 is a recent built up area and still developing thus new connections will increase in the future.
- f) The total area: 1,741,900 m²
- g) Number of Customers¹: 606
- h) Bill collection ratio: 61 %

Note: 1; the numbers are based on GIS database. Latest customer records for whole Jenin show about 35% more number of customer connections compared to the numbers in GIS. So, the number of connections at present will likely increase in all these PAs by about 20-40%. After the completion of Customer Data Survey (CDS) which is still on-going, the actual number will be identified.

- (2) Opinion on PPWM in Social Survey

The Project conducted a social survey in PA-1. The details are explained in Section 4.5 of the Baseline Survey Report, February 2018. The following are the result of opinions of the surveyed residents on

PPWM:

- a) From the total 124 respondents, 81 (65%) prefer PPWM and the rest don't. (56% for city-wide).
- b) If JM takes a decision to install PPWM, slightly a higher number of residents accept PPWM (67%). (61% for city-wide). This means an obligatory PPWM will not make a difference in the Public's acceptance of PPWM.
- c) The respondents stated the following reasons for accepting PPWM:
 - 1) They already pay regularly and would be the same with PPWM.
 - 2) Hope to get water every day without cutting with PPWM.
 - 3) The PPWM system is better.
 - 4) Easier system for both customers and the Municipality.
 - 5) More accurate charges with PPWM which depends on how much people consume.
- d) Reasons for not accepting were:
 - 1) Not enough money to charge regularly.
 - 2) It's more expensive.
 - 3) No trust to the Municipality.
 - 4) They are paying cash so no need for this system.
 - 5) The PPWMs would read more than they actually consume.
 - 6) Not suitable for poor people.

6.3. Purpose

The purposes of introduction of PPWM in PA-1 as a pilot project are set as follow:

The main purpose

- PPWM is introduced to all or almost all the customers in the area with intensive awareness raising activities.
- Testing how to install PPWM to current unpaid customers or unwilling customer of PPWM.

The other main purpose:

- a) To set up policy of introduction of PPWM
- b) To understand the entire procedure of introduction of PPWM and to test it
- c) To set up the public awareness activities for introduction of PPWM and to implement
- d) To set up the organization structure of management of PPWM and to implement
- e) To find improvement measures of water supply condition in PA-1 and to implement
- f) To compile all the test results, evaluate them, find challenges and issues, and compare before and after the Project
- g) To prepare conclusions on the results of the pilot project
- h) To prepare recommendations and improvement plan for next pilot project or the next stage

6.4. Procedure of Pilot project

(1) Before the PPWM Introduction

- 1) Set up policy of introduction of PPWM
- 2) Set up public awareness activities for introduction of PPWM
- 3) Set up organizational setup for introduction of PPWM
 - Customer service
 - Maintenance of PPWM
 - PPWM system management (database management, vending stations)
- 4) Prepare maintenance contract of PPWM for outsourcing
- 5) Find improvement measures of water supply condition in PA-1
- 6) Implement public awareness activities for pre-introduction of PPWM by JM

(2) Installing of PPWM system

- 1) Install the PPWMs by JM
- 2) Set up the PPWM system (main server, software, program and vending stations) by the provider
- 3) Implement public awareness activities for PPWM by JM
- 4) Give training on customer service, maintenance of PPWM, and PPWM system management by the provider and the JICA experts

(3) Operation of the PPWM system by JM

- 1) Implement good customer service
- 2) Implement good maintenance
- 3) Implement database management
- 4) Identify illegal collection
- 5) Implement improvement measure of water supply condition
- 6) Post evaluation

別冊資料 CD 1.13

**Implementation Plan of Introduction of Prepaid
Water Meter System in Pilot Area-1 (PA-1) –
English Version**

Palestinian Water Authority (PWA)
Jenin Municipality

Implementation Plan of
Introduction of Prepaid Water Meter System
in Pilot Area-1 (PA-1)

Under
the Project for Strengthening the Capacity of
Water Service Management in Jenin Municipality

September 2018

Japan International Cooperation Agency (JICA)

TEC International Co., Ltd.

PADECO CO., Ltd.

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Appendix

Appendix- 1:

1-1 Social Survey in PA-1 Area

1-2 Social Survey: PPWM Satisfaction of Current Users in Other Water Authorities

1-3 Consumption and Debt Statistics in PA-1 Area

Appendix- 2:

2-1 Results of Experiment Meter

2-2 Causes of meter malfunction observed at Ajja meter maintenance center

Appendix- 3: The number of bids for procurement of PPWM

Abbreviations:

Technical Specification of PPWM (PWA, MoLG, PSI): Technical Requirements and Specifications for Supply and / or Installation of Prepaid Potable Water Meters System, Version 3, June 2017.

JM: Jenin Municipality

WWD: Water and Wastewater Department

PA: Pilot Area

PCSC: Public Customer Service Center

PPWM: Prepaid water meter(s)

Discussion for PPWM implementation (after discussion)

24th Sept 2018

Check list of required decision

No.	Items	Option/Case	Section	Decision	Further activities	When
1	Installation strategy of PPWM	Strategy for PA-1. 1. All customers area by area (sub-area) 2. Accepted customers 3. Debtors 4. Other, if any (high water consumption?)	2.	PPWM installation shall be mandatory for all customers in PA-1 and the installation process shall be by area wise. Installation of public institutions will be clarified.	Completed	
2	Improvement of water supply conditions	Need network and pump improvement to improve water supply condition. Can Municipality do this improvement?	3.	Discussed in difference section	Detail explanation to JM Need trial run	November, when Mr. Thapa is available.
3	Selection of type of PPWM	1. Velocity 2. Volumetric 3. Ultrasonic	4.2.1	Ultrasonic meter has been selected.	Completed	
4	Vending stations and handheld unit	1. The number of vending stations 2. Handheld unit 3. What percentage for fee of vendors and how to pay?	4.2.4	1. 1 customer center + 3 pilot locations (PA-1, 2, 3) 2. 3 pilot locations 3. % to be decided and prepare contract with vending station.	1. Decide vending station site (1) in PA1. 2. Contract including commission % 3. How to carry or transfer money of sales to JM.	After October by Mr. Harada
	Server system	Location of server and data analysis			Decide server room and room for data analysis	???
5	Location of PPWM	1. Outside customer property 2. Same as it is, replacement with existing meter 3. Priority is outside but final location is the position agreed with customer. 4. Relocate meter if difficult access to outside property. If it is easy to access, the location is same as it is.	4.3.1	Option 4 has been selected. But the outside customer property is preferable.	Preparation of meter installation guidelines by Mr. Harada	From the middle of October.
6	How to execute installation	The Municipality is responsible for execution of installation. 1. By own staff 2. By contractor 3. By mixture of contractor and ow staff	4.3.6	Option 1. PPWM shall be installed by the existing staff with incentive per meter installation, where amount and kind of incentive is to be determined. PPWM installation will be conducted by 4 teams at least.	Need followings: - team formation - incentive - detailed design of meter replacement - detailed planning of meter replacement and relocation - working schedule	????

No.	Items	Option/Case	Section	Decision	Further activities	When
7	Cost of fittings for replacement and relocation	Relocation needs many fittings and pipes. Who will procure fittings for replacement and relocation	4.3.7	The Municipality in principal will supply them. But if it needs large quantity and the Municipality cannot afford to purchase, JICA's remaining budget may be utilized.	Estimation of quantity and cost of fittings	Oct to Nov. 2018 And request the budget to JM or JICA
8	Integration with accounting software (AIShamel)	The integration can be done by the Supplier and/or accounting software company (Al Isra) for both quantity and transaction. With integration, efficient data transfer can be achieved and laborious work is saved every day.	4.4	Yes, required. It shall not be included in PPWM procurement bid. If possible, budget by transfer in consultant budget may be utilized.	- Preparation of specifications - Request of change of JICA budget category for use of this purpose	Spec: in Sept 2018 Change budget: in Nov. Work start in Jan 2019 after PPWM server installation
9	Guarantee period	PWA specification: 2 years WWD request: 3 years	5.1.1(1)	3 years has been decided. The cost is considered in PPWM bid price.	Completed	
10	After sales service period after completion guarantee period	5 years PWA specifications (can be decide later) 1. Annual contract (XUSD/meter/annual) 2. General service + Piece by piece repair contract Which maintenance activities should be outsourced by the supplier	5.1.1(2) 5.1.3	Conditions of contract will be decided later.	Need to consider after the installation of PPWM .	
11	Organization set up for PPWM	1. Meter maintenance team/crew 2. Database and program management staff 3. Main vending station in Customer Service Center	5.2	Need a further discussion for set up.	Organization set up will be requested in 3rd JCC.	Start in Oct 2018
12	PPWM inspection	How often (every 1 to 6 month(s))	5.2	To be decided.	Need to decide What procedure	Oct 2018
13	Meter installation and replacement policy	Who is owner and covers expense of connection? 1. For new customer 2. For existing customer (replacement)	5.3.2	To be decided.	by Mr. Harada	Middle of Oct
14	Water tariff and maintenance fee	Discounted or not for PPWM customer	5.5	No discount of water tariff and any charges shall be given to customers.	Completed	
					It needs the study how to make sewerage bill for PPWM customer.	
15	Debt recovery policy	Whether or not debt recovery comes with PPWM introduction.	5.5	Debt shall be recovered from the beginning in every credit charge, of which amount/percentage is to be determined.	Debt recovery policy shall be prepared and inform to the residents together with PPWM system introduction.	Start from Oct 2018 and inform to community leaders and then residents
16	Initial credit for replacement	Free offer or not of initial credit for replacement of traditional meter with PPWM as an incentive	5.5	No free initial credit. Initial credit is charged and it will be recovered	Completed	

No.	Items	Option/Case	Section	Decision	Further activities	When
		for introduction of PPWM		from the credit charged later.		
17	Subscriber contract	1. Who will be the owner of PPWM, customer or Municipality? 2. Is any item in the customer contract changed?	5.6	Owner will be the municipality but a further scrutiny of current customer subscription contract is required with Legal Unit.	Check with Legal Unit	Oct in 2018
18	Necessity of decision of city council	Installation of PPWM may need city council decision on following points before start. <ul style="list-style-type: none"> • Installation strategy • Location of PPWM • Financial incentive, if adopted • New penalties, if adopted • Change customer subscription contract • Debt recovery policy, if adopted 	5.6	Needed for followings: <ul style="list-style-type: none"> • Financial incentive (No) • New penalties • Change customer subscription contract • Debt recovery policy 	Preparation of policy and need decision by council	Before January 2019
19	Penalty or additional charge (how much?)	1. Illegal connection, not reporting meter leakage, tempering censer 2. Unpaid (misuse) water due to illegal use 3. Meter damaged by customer, displacement of PPWM, damage of box, stolen or lost card.	6.5	Penalties will be set.	Need to be decided	Before the end of 2018
	Strategy for customer service	Strengthening of customer service.			- Customer care: who will receive calls and complaints? And need special staff for this. - Technician staff for meter checking is not enough to cover every things, need two at least. Special staff is required for PA1 for taking care.	
20	Strategy of public awareness	What campaign, workshop, or consultation is required? <ol style="list-style-type: none"> 1. Meeting with PA-1 community leader, mosque imam, and key people 2. JM website announcement 3. Project Q/A or public opinion section 4. Radio/Facebook announcements 5. Visit tour of WJSC 6. Workshop as introduction 7. Invite guest speakers from areas that successfully implemented PPWM. 	7	It starts from meeting with PA-1 community leader, mosque imam, and key people. Then PA strategy will be prepared.	Need to be decided. <ul style="list-style-type: none"> - Intimation of community leaders at Saba Hal Khi - NEDCO experience - 	Restart from Sept 2018
21	The number of procurement bids	1. 1 lot for PA-1 2. 2 lots for PA-2	Appendix 3	1 lot has been selected.	Completed. 1,850 meters, 1 server, 4 vending equipment, and 3 hand held tools	

Implementation Schedule (version 1)

24th Sept 2018

Items	Sep 2018	Oct	Nov	Dec	Jan 2019	Feb	Mar	Apr	May	Jun	Jul	Aug	Responsibility
1. Procurement of PPWM													
1.1 Selection of a supplier	■	■											JICA
1.2 Procurement of server and vending machine (tentative)			■	■									JICA
1.3 Procurement of PPWM			■	■	■	■							JICA
1.4 Stockyard for 1,850 PPWM and fittings					▲								JM
2. Installation of PPWM server and vending station (VS)													
2.1 Installation of main server					■	■							Supplier, IT
2.1.1 Preparation of room				▲									JM
2.1.2 Set up server and system					■	■							Supplier, IT, CS
2.1.3 Commissioning						■	■						Supplier, IT, CS
2.1.4 Set up database and program management					■	■	■						Supplier, IT, CS
2.1.5 Preparation of reporting format and system					■	■	■						Supplier, IT, CS
2.2 Set up of vending machines (VM)		■	■	■	■	■							
2.2.1 Preparation of contract (mechanism of money transfer, % of fee, etc.)		■	■										LU, CS
2.2.2 Contract with Palpay, if required													CS
2.2.3 Selection of a location of VM in PA 1, (1 is in CSC)				■									CU
2.2.4 Enter into contract with private/Palpay					■	■							LU
2.2.5 Install machine and test in VS					■	■							Supplier, IT
2.2.6 Training by supplier						■	■						Supplier
2.3 Integration with Alshamel if JICA is approved			■	■	■	■							
2.3.1 Specification for integration and cost estimation	■	■											IT, JET
2.3.2 JICA request for budget category		■	■										JET

Items	Sep 2018	Oct	Nov	Dec	Jan 2019	Feb	Mar	Apr	May	Jun	Jul	Aug	Responsibility
change													
2.3.3 Contract with Alisla				▲									JET
2.3.4 Implementation of integration					■								Alisla, supplier, IT
3. Installation of PPWM in PA1													
3.1 Before installation	■	■	■	■	■	■							
3-1-1 Meter installation guidelines (locations, replacement, install, remove, repair, etc.)		■	■										JET, CS, CU
3-1-2 Detailed survey for design and quantity of fittings for PA1		■	■										JM assisted by JET
3-1-3 Procurement of fittings				■	■	■							JM
3-1-4 Installation team formation and working rules					■	■							JM assisted by JET
3-1-5 Installation training by supplier						■							Supplier
3-1-6 Demonstration to JM staff how to use PPWM						■							Supplier
3-1-7 Preparation of installation schedule					■								JM, WS
3.2 During installation							■	■	■				
3.2.1 Pre-visit to the customers and consent to install							■	■					PR, CS
3.2.2 Installation of PPWM							■	■	■				CS, WS, JM
3.2.3 Registration of PPWM in system							■	■	■				CS
4. Setup O&M system													
4.1 Set up PPWM organization		■	■	■	■	■							CU, CS, WWS, AD
4.1.1 Set up organization structure		■	■	■									JM
4.1.2 Preparation of duty and O&M, inspection manuals		■	■	■									CU, CS, WWS,
4.1.3 Training/demonstration for O&M				■	■	■							Supplier
4.2 Data transfer from Alshamel to PPWM system					■	■							IT, CS
4.3 O&M of PPWM							■	■	■	■	■	■	

Items	Sep 2018	Oct	Nov	Dec	Jan 2019	Feb	Mar	Apr	May	Jun	Jul	Aug	Responsibility
PPWM and teach customers													
6.2 During installation and operation													
6.2.1 Introductory survey (before replacement)							■						PR
6.3 In operation													
6.3.1 Evaluation									■	■	■	■	PR, CS
7. City council decision													
7.1 Replacement policy (budget)		■	■										PM, City council
7.2 New penalties			■	■									PM, City council
7.3 Change customer subscription contract			■	■									PM, City council
7.4 Debt recovery policy		■	■										PM, City council
8. Improve water supply condition													
8.1 Analysis and study for PA1	■	■	■	■									WWD
8.2 Improvement of distribution network				■	■	■							WWD
8.3 Test operation at site					■	■							WWD
8.4 Actual operation (start)							■	■	■	■	■	■	WWD
9. Implementation in PA2 and 3													
9.1 Planning										■	■	■	
9.2 Installation												■	
9.3 Public awareness campaign								■	■	■	■	■	

CU: Collection Unit
CS: Customer Service Section
CSC: Customer Service Center
LU: Legal Unit
FD: Financial Dept.
AD: Administration Dept.
PR: Public Relation Dept.
WS: Water Section
WWD: Water and Wastewater Dept.
PM: Project Manager

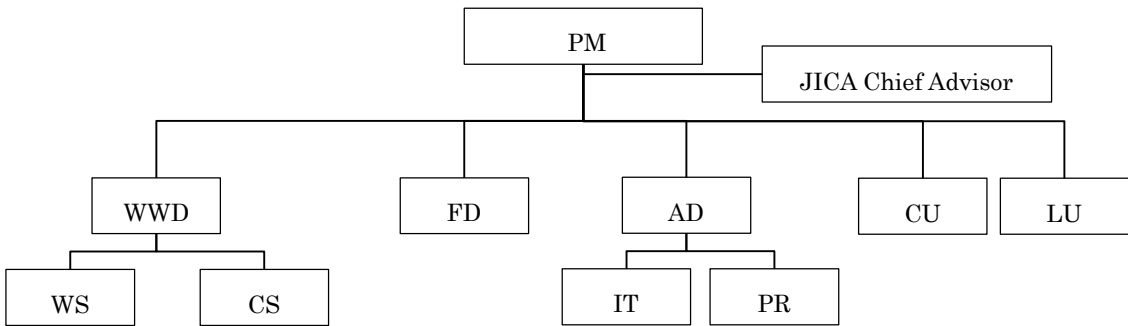
Discussion Items

1. O&M organization structure

Setting up of Organization for PPWM for PA-1

No.	Job title	Number of employees	Section	Duties
1	PPWM maintenance crew - Technician	2: existing (part-time, share with existing duties) 2 more new engineer and technician	Meter maintenance team in Customer Service Section (CS)	<ul style="list-style-type: none"> • Check existing mechanical meter • PPWM maintenance which includes: <ul style="list-style-type: none"> - Install, remove prepaid meter - Meter accuracy check by test bench - Check meter according to complaints and request - if there is failure on prepaid meter, remove the meter and replace it with standby by one, sending the unworked meter to outsourced maintenance center to repair. When the meter is fixed the technician reinstall it again. • PPWM periodical inspection of meter every 2 to 6 months. • Checking of the meter of abnormal value at site for possible illegal connections • Use of handheld machine
2	Vending station clerk	1 (full-time) 1 (outsourced)	CU	<ul style="list-style-type: none"> • Sales of credit to the customer; one working in Customer Service Center in Municipality and staff in Municipality. • Sales of credit to the customer; one working in PA-1 (possible outsourced to supermarket)
3	Database/program management	1 (full-time)	CS	<ul style="list-style-type: none"> • Working in database and sever management. <ul style="list-style-type: none"> - Application, registration, disconnection, etc. - Reporting - Program management • Monitoring and following up the vending stations • Use handheld tools for remote controlling of ON/OFF. • Checking of monthly consumption, find abnormal values, ad report to Customer Service Section. • Checking of the meter of abnormal value
4	Customer service	part-time, share with existing duties	CS	<ul style="list-style-type: none"> • Respond and solve complaints quickly. • Provide good service with good communication with customers.
5	Public relation	(part-time, share with existing duties)	PR	<ul style="list-style-type: none"> • Receive complaints from customers in PA-1 • Request the related sections to solve complaints • Statistics of complaints and reporting • Public awareness activities for PA-1 (before, during..)
6	Water distribution	1 (part-time)	WS	<ul style="list-style-type: none"> • Check of service pipe including PPWM if requested by CS • Checking of water volume of main meters (source) every month and branch main meters and compare corresponding bill consumption for illegal use or leakage.
	Total	4 new full-time and part-time		

- 2. Task forth team for PPWM and monthly meeting
 - Task forth team for PPWM will be formulated
 - A monthly meeting will be carried out to check the progress.



- 3. Following plan shall be prepared and implemented
 - Customer service improvement plan (CS)
 - Public awareness plan (PR)
 - Water supply condition improving plan (WWD)

1. Conditions for Preparation of PPWM Plan for PA-1

1.1. Main purpose

The main purposes of introduction of PPWM are as follows:

- To achieve equitable/fair water supply by rationalizing water consumption
- To improve water supply service by rationalizing water consumption
- To achieve people's equity for water supply service by achieving all customers to pay for water supply service they received.
- To increase revenue of water supply service to improve water supply service and maintain good service for the customers by increasing bill collection and recovering debt.

1.2. Purpose to introduce PPWM to Pilot Area (PA)-1

The purpose of introduction of PPWM in PA-1 is to test PPWM as a pilot basis and evaluate its validity for future adoption of PPWM in other areas of the Jenin Municipality, in which the lessons learned will be identified. In particular, a key issue is how to install PPWM to the customers who do not pay water bill or are unwilling to use PPWM.

Introduction of PPWM will be first implemented in pilot area to create a successful model, which could be extended to the other pilot areas and to the other areas of the Municipality in the future.

The following are purposes for introduction of PPWM in PA-1.

- a) To create successful model of PPWM introduction in Jenin Municipality
- b) To set up a plan of introduction of PPWM
- c) To understand and test an entire procedure of introduction of PPWM
- d) To enhance awareness of the customers for PPWM introduction and increase willingness of customers' use of PPWM
- e) To set up an organization of operation and management of PPWM and to train them for this purposes
- f) To find improvement measures of water supply condition in PA-1
- g) To test all activities above
- h) To compile results and evaluate them, find challenges, and compare before and after the project
- i) To prepare conclusions on the results of the pilot project
- j) To prepare recommendations and improvement plan for next pilot project or the next stage

1.3. Political will

The municipal councilors in Jenin Municipality have decided to introduce PPWM since 2017 according to stringent financial situation of the Municipality. If fund is available, the Municipality has a will to introduce PPWM anytime. If pilot project of introduction of PPWM by JICA succeed, they will extend to the other areas.

1.4. Main success factors

The main success factors of introduction of PPWM are assumed as follows:

- a) To increase customer satisfaction for PPWM use
- b) To increase customer satisfaction for water supply services provided by the Municipality after installation of PPWM. To increase customer satisfaction, following are required.
 - Improvement of water supply conditions
 - Provision of good and agile customer service
 - Exercise of good management of water supply service
 - 24 hour customer service
 - Good and responsive customer service
 - Free meter replacement cost for customer
- c) To increase customer awareness of JM water supply service
 - Improvement of social situation (public awareness, tools to communicate)
 - Enhancement of willing to change (of customers)
- d) As a result
 - Acceptance or willingness of the customers of use for PPWM would be raised.
 - Customers' trust to the Municipality would be earned by good communication.
 - Good services

The PPWM plan is prepared focusing on these success factors in mind.

1.5. Benefits and disadvantages of customers and municipality

Benefits and disadvantage of PPWM for both JM and the customers are summarized in table below. The PPWM system has many advantages for Jenin Municipality but less disadvantage including initial cost of PPWM. For customer, water supply condition may improve and water charge will be reduced.

Table 1: Benefits and disadvantages of PPWM for both Jenin Municipality and the customers

	Jenin Municipality	Customers
Benefits	(1) Meter reading and collection <ul style="list-style-type: none"> • There would be no need for regular meter readings and collections. • Almost 100% collection ratio and the staff could work for other duties after training. increase in water revenue • Collection of part of the previous debt. • No reading error and input error • No need to print bills; save time and human resource • Reduce in workload • Less complaints from customers regarding miss-reading, no-readings, or bill issues • Reduce in number of court cases for high due amounts 	<ul style="list-style-type: none"> • The customer is more conscious about water consumption, resulting in reduction of water consumption and water charge. • Payment of water charge by correct meter consumption • Decrease in water consumption, increase in water availability over time, and supply to more customers. • The capital cost required for upgrade the facilities would be decreased or upgrading can be deferred. Deferral of the investment of facilities eases water tariff increase. • Water meter is installed by JM for free. • It increases fairness among the customers who currently pay or not water charge

	Jenin Municipality	Customers
	<p>(2) Customer data</p> <ul style="list-style-type: none"> • JM could benefit with updated customer database for the pre-paid customers. • Higher accuracy of data on water consumption and customer information • Ownership of water meters by JM and better control on the meter functions • Easier customer data management system with PPWM <p>(3) NRW</p> <ul style="list-style-type: none"> • Reduce of NRW • Easier control and decrease in illegal connections, through PPWM data management system, purchased credit/history, and change of PPWM location outside of the houses. • Reduce NRW with new accurate water meter • Revenue increases <p>(4) Water supply condition</p> <ul style="list-style-type: none"> • Decrease in water consumption, increase in water availability over time, and supply to more customers. • Long-term rationalization of water consumption • Increase in number of subscribed customers if JM is successful in PPWM system • Reduction of consumption and deferral of the investment of water supply facilities. 	<p>because all customers have to pay for water.</p> <hr/> <p>Conditional if JM improves</p> <ul style="list-style-type: none"> • Water supply conditions will be improved. • Customer service will be improved • Higher customer satisfaction and change in public attitudes toward payment of water if the entire pre-paid management system works properly. • In-house leakage may be found and reduced; thus less water charge for customers based on the data collected and analyzed.
Disadvantage	<ul style="list-style-type: none"> • Initial cost for PPWM is high. • Introduction to the customs is a key issue: how to convince customers to install. • Reallocation of meter readers and collectors are required. 	<ul style="list-style-type: none"> • They have to pay for water in advance. • They have to go and buy charge to vending machine. • Customers of unwilling to pay water bill have to pay. • The poor people may not able to pay for water in advance.

1.6. Risk in PPWM Introduction

The following risks are identified through the PPWM study of the other water providers in the West Bank.

- Introduction of PPWM without any service improvement may provoke a protest among customers (though 65% of the sampled residents in Pilot Area-1 (PA-1) were positive towards PPWM), if not convinced enough how they would benefit from PPWM.
- New pre-paid water meter gives more accurate reading and the new bill amount may be thus more than the previous bills or also there is the case less than the current bills. In the case of more than the current bill, customer may protest against meter.
- Customers may oppose PPWM if JM does not follow the promises they would agree with customers before introduction of PPWM; e.g., water supply is not improved, schedule is not fixed and/or properly not followed.
- If no visible improvement of water supply service is seen in PA-1, it may be difficult to

implement PPWM in other areas.

1.7. Outline of PA-1

1.7.1. Characteristics of PA-1

The characteristics of PA-1 are as follows:

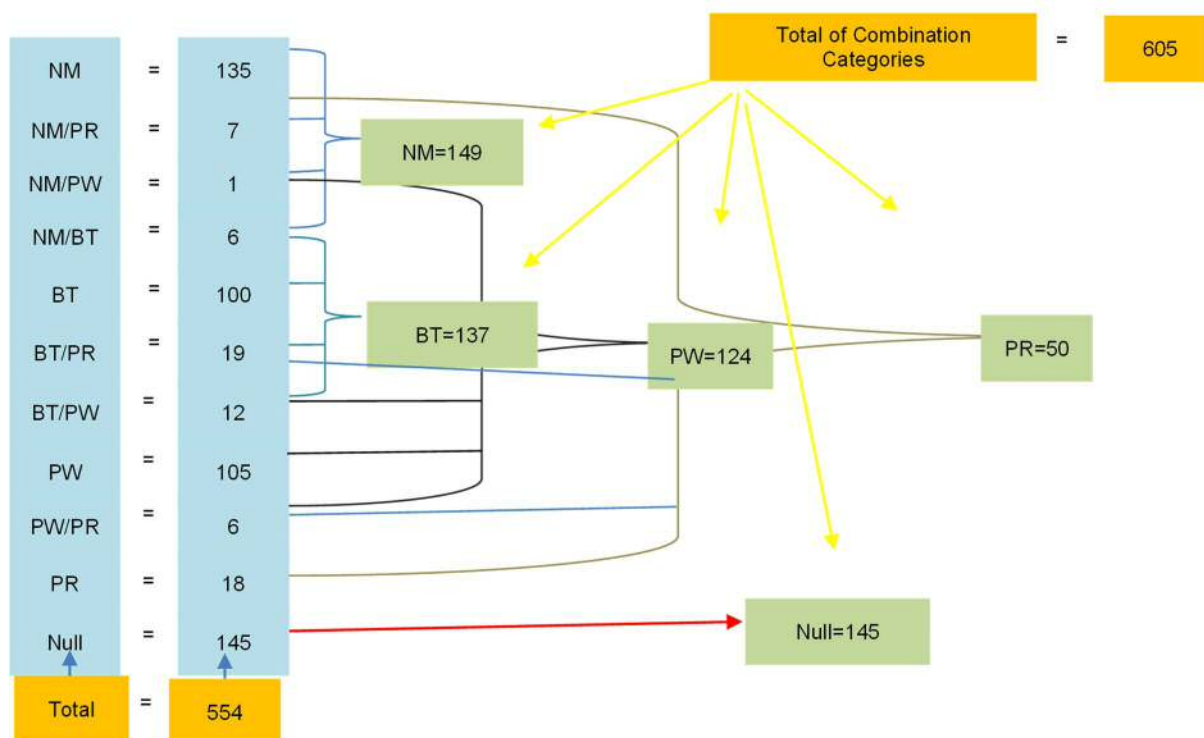
- a) Name of area: The area is separated into 3 sub-areas: Sabah Al Khir, Kharoube, and Nasraa Street.
- b) The area is slightly hilly, not perfectly flat
- c) The area is mainly residential with some commercial.
- d) The area is a recent built up area and still developing, thus new connections will increase in the future.
- e) Main water supply source is by a pump, but there is some possibility that water also enters from adjoining area when the pump is not operating.
- f) The total area: 1,741,900 m²
- g) Bill collection ratio: 61 % in 2017
- h) Number of registered customers: are 657.
- i) The result of customer data survey (CDS) is summarized as follows.

Table 2: Result of customer data survey (CDS)

Category	Kharoubeh	Sabah Al Khir	Al Naserah Street	Total	Kharoubeh	Sabah Al Khir	Al Naserah Street	Total
	Number				%			
Subscriber (Customer) Metered	250	182	255	687	50	64	52	54
Non-Subscriber (Non-Customer)	241	87	226	554	48	31	46	44
- Neighbor meter (Neighbor subscriber)	34	41	74	149	14	47	33	27
- Private reservoir (rain water)	30	10	10	50	12	11	4	9
- Private well	98	2	24	124	41	2	11	22
- Buy tanker	46	15	76	137	19	17	34	25
- No water supply	65	25	55	145	27	29	24	26
Revisit for survey	13	14	7	34	3	5	1	3
Total of No. of Houses	504	283	488	1,275	100	100	100	100

Note: Total sum of non-subscriber components is not same as total of No-subscribers because a subscriber of them uses plural water sources.

The composition of water sources of Non-Subscriber in PA-1 is shown in the Figure below. There is 554 Non-Subscribers, out of which 51 Non-Subscribers use plural water sources. 145 Non-Subscribers do to use any water sources.



Note: NM: neighbor meter, PR: Private reservoir ,PW: Private well, BT: Buy tanker, Null: No water supply

Figure 1: Composition of water sources of Non-Subscriber in PA-1

1.7.2. Social survey results

The Project conducted a social survey in PA-1. The details are explained in Section 4.5 of the Baseline Survey Report, February 2018. The detail results are given in Appendix 1-1 and Appendix 1-2.

(1) Findings in Social Survey in PA-1 Area

1) Status of Water Access

- Out of the 124 surveys, 108 (87%) are connected to the water network.
- Water availability has no pattern and doesn't show a concrete weekly or monthly schedule.
- In the summer, water is available to most of the respondents only one day a week and mostly only for 4 to 12 hours, while in winter more have access to 3-4 days a week.
- The respondents have to purchase water to fulfill their needs. The water availability is unclear, and lack of schedule has caused some respondents not to be aware about the days/hours they have access to city water.

2) Amount and cost of purchasing water from private vendors

- Half of the connected customers still need to buy water for about 20m³ per month to meet their needs which costs them on average about 207NIS per month. When asked for other reasons they mentioned that the JM water is not clean and suitable to drink, it disconnects sometimes and not available continuously.

- The unconnected residents so buy water; about 20m³ per month to meet their needs which costs them on average about 190NIS per month. They have their own reasons not to be connected. Beside of lack of water network for their properties, other reasons for un-connection is that they get free water from the neighbors, they don't want to deal with the Municipality, and that water tariff and connection are too expensive.
- Interestingly, those who are connected to city water network buy same amount of water as the un-connected buy, on average. This could indicate that the water supplied to the area in general is not enough and both groups have to turn to the vendors for their need of water.

3) Customer Satisfaction

The 108 connected respondents were asked about their satisfaction of JM water service in past year if they used any of the service. The survey found that the satisfaction order of the services from high to low is as follows (the percentage indicates satisfaction ratio).

- a) Bill distribution every month 92.6%
 - b) Payment method 92.6%
 - c) Meter reading by meter readers 86.1%
 - d) Type of water meter 72%
 - e) Meter installation 65%
 - f) Water quality 39%
 - g) Water availability in the pipes for use 19.4%
- 80% of the respondents are not satisfied with the water supply amount at their house.
 - They pointed that the water taste (30% of respondents), water smell (28% of respondents), water color (23% of respondents), and water particles of sand (45% of respondents) should be improved.
 - All the surveyed population was asked about their requests on improved water services from the Jenin Municipality. The responses show that they mostly are looking for improved water pressure, expansion of water network, installation of water meters and connection by the municipality, quick response and fixation of complains, request 3 days of water availability, and increased amount of water by 2 times.

4) Willingness to Pay

- 83.3% of the connected surveyed population said that they pay their bills and 9.3% don't pay and the rest pay sometimes.
- 70% of the 124 surveyed people did not know about the amount of current water tariff fee.
- When explained about the current tariff fee of Jenin Municipality and some other cities in Palestine, only half of them (50%) believed that it is a fair fee and mostly believed that it is still expensive.
- If water services improved, over half of the respondents are willing to pay a little more (4.87NIS/m³ instead of the current 4.3NIS/m³).

The 45.5% who are not willing to pay more have the following reasons for their opinion:

- a) It's municipality responsibility.
- b) They have no enough money.
- c) It's already so expensive.
- d) They don't trust municipality.
- e) They are good by well water they purchase so no need to improve and pay more.

(2) Opinion on PPWM in Social Survey

The following are the result of opinions of the surveyed residents on PPWM:

- a) From the total 124 respondents, 81 (65%) prefer PPWM and the rest don't. (56% for city-wide).
- b) If JM takes a decision to install PPWM, slightly a higher number of residents accept PPWM (67%). (61% for city-wide). This means an obligatory PPWM will not make a difference in the Public's acceptance of PPWM.
- c) The respondents stated the following reasons for accepting PPWM:
 - 1) They already pay regularly and would be the same with PPWM.
 - 2) Hope to get water every day without cutting with PPWM.
 - 3) The PPWM system is better.
 - 4) Easier system for both customers and the Municipality.
 - 5) More accurate charges with PPWM which depends on how much people consume.
- d) Reasons for not accepting were:
 - 1) Not enough money to charge regularly.
 - 2) It's more expensive.
 - 3) No trust to the Municipality.
 - 4) They are paying cash so no need for this system.
 - 5) The PPWMs would read more than they actually consume.
 - 6) Not suitable for poor people.

1.7.3. Consumption and debt statistics

Although PA-1 has higher collection rate compare with other areas in the city, data analysis of the water consumption and debts has released that the PA-1 has still a high number of consumers who are not paying for the water they use, have high consumption, or both. Table below shows the amount of debts by number of debtors, also the amount of water consumption per month. It also presents number of customers whom both water consumption and debt are high.

Table 3: Debt and consumption analysis by amount and number

Debts* and Consumption**			
Debts NIS	Total Amount (NIS)	Total Subscribers/Debtors (a)	Total Number (b) (%)
Negative debts	-93 NIS	681 (total subscribers)	42 (b/a*100= 6%)
0- 1 NIS	4,438 NIS	681 (total subscribers)	278 (b/a*100= 40%)
1.1- 3,000 NIS	231,920 NIS	361 (total debtors)	211 (b/a*100= 58%)
3,001- 6,000 NIS	355,757 NIS	361 (total debtors)	82 (b/a*100= 22.7%)
6,001- 10,000 NIS	325,477 NIS	361 (total debtors)	41 (b/a*100= 11.3%)
10,001- 36,000 NIS	426,004 NIS	361 (total debtors)	27 (b/a*100= 7.4%)
Consumption (March 2018)		Number of water meters (% of total water meters of 684)	
0 m ³		58 (8.4%)	
1- 50 m ³		597 (87.2%)	
51- 70 m ³		15 (2.3%)	
71- 126 m ³		13 (2%)	
944 m ³		1 (0.1%)	
Red Customers (with both over 30m ³ of water consumption in March 2018 and total debt higher than 1,000 NIS			
>30m ³ & >1,000 NIS		41 out of 361 (11.3%)	

Source of Data: JM's AlShamel Database

*18 customers were not included because additional re-visit was needed to confirm the data.

** 16 customers were not included because additional re-visit was needed to confirm the data.

As seen in the Appendix-1-3 for GIS map of the debtors, water consumption, and red customers, there is no pattern in distribution of these specific customers and a further detailed analysis is needed to investigate the situation of these customers case by case which is time consuming. These customers are spread across the PA-1 and this could affect the decision on the strategy of the PPWM installation plan; to be area by area or to be by these target customers.

Average consumption and debt by sub-area in PA-1 are shown in table below. The average consumption and average debt is almost the same by sub-area. Sabah Al Khir has the highest average consumption and average debt. Kharoubeh has the highest percentage of debtors: 65% of total customers.

Table 4: Average consumption and Debt by area in PA-1

Sub-area	Ave consumption m ³ /month	Ave. debt *1 (NIS)	Debtor (%) > 0 NIS	Debtor >100 NIS
Sabah Al Khir	21	2,106	88 (46%)	79 (41.5%)
Kharoubeh	18	1,970	165 (65%)	140(54%)
Al Naserah Street	17	1,756	127 (51%)	116 (47.3%)

Note: *1: Average debt of debtors.

2. Strategy of Introduction of PPWM

2.1. Strategy of introduction of PPWM for Success

Following are the components of the strategy for success of PPWM introduction. There are 3 main strategies, in which several components of the strategies are composed. The success probability of PPWM introduction will be increased by implement this strategy.

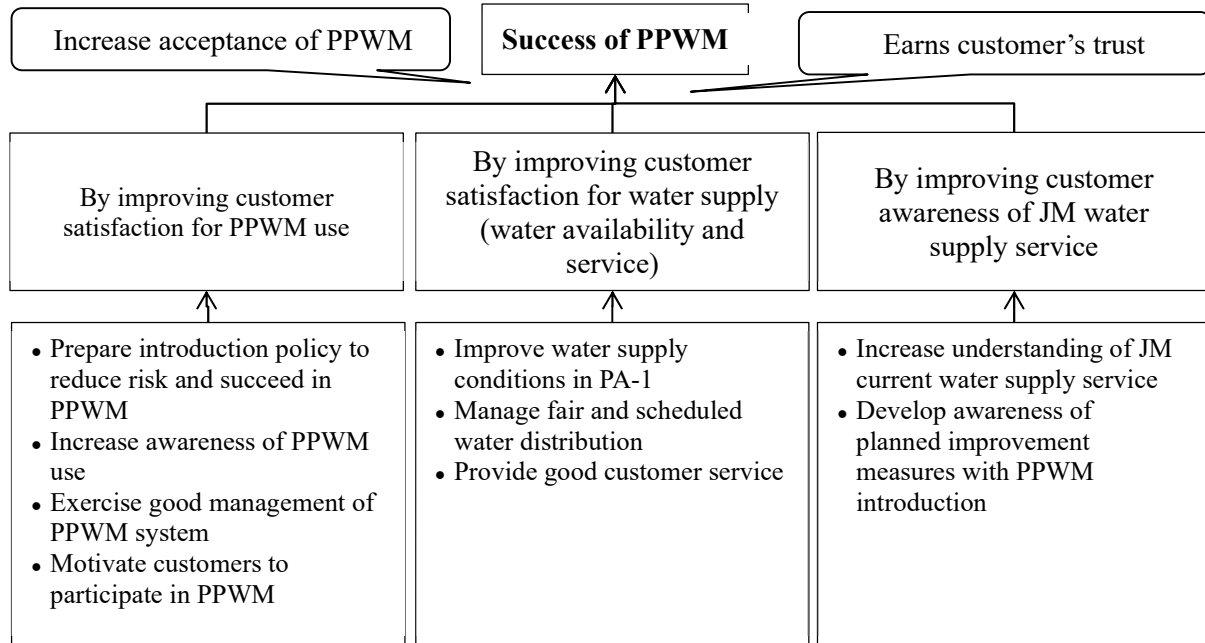


Figure 2: Strategy of introduction of PPWM for Success

The summary of each strategy for success is as follows and the measures to realize the strategies are developed in each chapter of this report.

Table 5: Summary of strategy for success

Items	Contents of Strategy
1. Prepare introduction policy to reduce risk and succeed in PPWM	<ul style="list-style-type: none"> • Implement pilot project to introduce PPWM to all customers area by area with intensive awareness raising activities before introduction. • As an option, install PPWM to other target customer such as influential people (Mayor, managers, member of council, employees) with signal that we are going to start with us, and high debtors, • Change ownership of water meter to ease change of water meter. <ul style="list-style-type: none"> ➤ Section 2.2 for more details
2. Increase awareness on PPWM use and current JM water supply service	<ul style="list-style-type: none"> • Strengthen Public Relation (PR) Section. • Collaborate among the related sections including Water Section, Customer Service Section, Collection Unit, PR (complaints redressal related section with public service center) and develop a system of corroboration for good public relations and customer service • Prepare a good strategy for PR as a whole. • Implement public awareness and involvement activities before, during and after the PPWM introduction. • Preparation of materials for PR in different subject. • PR contents will includes: <ul style="list-style-type: none"> - Benefits of using prepaid meters

Items	Contents of Strategy
	<ul style="list-style-type: none"> - Reduce your debt - Save water and save money - Wise management of water use - Save water for other areas and future generation - Scheduling water supply - Understanding of accurate consumption (accurate meter) - Feeling of fairness of payment (everybody pays) - Payment system for the poor • Increase understanding of JM current water supply service <ul style="list-style-type: none"> - Water sources availability and uncontrollability - Financial conditions - Others • Develop awareness of planned improvement measures with PPWM introduction and PPWM plan
3. Exercise good management of PPWM system	<ul style="list-style-type: none"> • Strengthen the capacity to manage PPWM system • Set up PPWM organization • Develop operational setup <ul style="list-style-type: none"> - to ensure quick response to customer complaints - to check, repair and replace of meters - to find illegal connection - to manage database - to manage bending stations and programs • Prepare job descriptions of related organization for PPWM • Give training staff members who involve with the new system (i.e. meter installation, system management) • Give training for data analysis of PPWM • Share responsibility with PPWM supplier, especially in maintenance of PPWM.
4. Motivate customers to participate in PPWM	<ul style="list-style-type: none"> • Replace water meter for free to motivate them to replace. • The following should be decided by the Municipality.(Decision) <ul style="list-style-type: none"> - Water tariff is discounted? (No discount) - Maintenance and operation fee may be reduced?(Not reduced) - Debt recovery comes together with PPWM or later ? (Together) • Credit for the first 3-5 m3 of water use is installed and it will be recovered from the charge. • Consider low income family for payment
5. Improve water supply conditions	<ul style="list-style-type: none"> • Enhance the capacity of water distribution management • Improve supply days, pressure • Set up time schedule by area • Improve infrastructure • Implement fair water distribution <ul style="list-style-type: none"> ➢ Chapter 3 for details
6. Manage fair and scheduled water distribution	<ul style="list-style-type: none"> • Set up a proper organization • Strengthen technical capacity of Water Section on <ul style="list-style-type: none"> - water distribution management - proper operation and maintenance of facilities - leakage detection and repair • Take preventive measures for reducing customer complaint on water supply
7. Provide good customer service	<ul style="list-style-type: none"> • Create meters maintenance division/team. • Strengthen the capacity of Customer Service Section on <ul style="list-style-type: none"> - response to customer complaints/request and resolve issues as quick and properly possible. - proper water meter management • Take preventive measures for reducing customer complaint on customer service on the PPWM services • Customer contract may be modified. The ownership of PPWM should be the Municipality if PPWM is provided by the Municipality? (Need further analysis)

2.2. Installation strategy of PPWM

(1) Comparison of installation strategy

To adopt the strategy of PPWM for PA-1, following three main alternatives of target customer for introduction of PPWM are selected for a comparison.

1. All customers area by area (Kharoubeh, Sabah Al Khir, and Al Naserah Street)
2. Only customers who accept PPWM
3. Customers with debtors

Table 6: Fur options of introduction target customer of PPWM ad expected results

Item	1. All customers area by area (Kharoubeh, Sabah Al Khir, and Al Naserah Street)	2. Only customers who accept PPWM	3. Customers with debtors
Expected numbers of PPWM installed	700 (264, 161, or 232)	About 450 65 % of PA-1 by Social survey	364
Advantage for JM	<ul style="list-style-type: none"> • Collection rate of PA-1 would increase. • Water saving would be encouraged and water would be used more efficiently in the entire area. • All customers in PA-1 are treated equally and all have to pay water charge in advance. • Debt payment can be scheduled. • Installation is area by area starting low risk area so that risk would be reduced. 	<ul style="list-style-type: none"> • Installation of PPWM for only accepted customers of PPWM does not cause objection. 	<ul style="list-style-type: none"> • Collection rate of PA-1 will be increased. • Water saving will be encouraged and water is used more efficiently in the entire area. • Debt payment can be scheduled. • If PPWM can install debtors, it can be installed to all customers without difficulty.
Disadvantage for JM	<ul style="list-style-type: none"> • Some customers may object the installation of PPWM. • The low income family may not pay for water in advance. 	<ul style="list-style-type: none"> • Collection rate in PA-1 would not increase. • Water saving may not encourage since non-payment customers who may waste more water than paid customers still do not have any incentive to save water. • Only some 450 PPWM will be installed. • To improve NRW (commercial) in PA-1, regular water meter should be purchased and installed for inaccurate meters. 	<ul style="list-style-type: none"> • Some customers may object installation of PPWM since they current are not paying and have debt. • The low income family may not be able to pay for water in advance. • Only some 360 PPWM will be installed. PPWM is installed only selected customers, which is not fair. • To improve NRW (commercial) in PA-1, regular water meter should be purchased and

		<ul style="list-style-type: none"> • PPWMs are scattered in the area and management of PPWM may have difficulty. • Only scattered accurate data of PPWM is collected. • PPWM customers who pay charge may complain about nonpayment customers, which is not equitable. 	<p>installed for inaccurate meters.</p> <ul style="list-style-type: none"> • Only scattered accurate data of PPWM is collected.
Evaluation	Selected		

Three alternatives of introduction target and expected results are compared and simplified results are shown in the figure below. If PPWM is installed to all customers in PA-1 area by area, the purposes of PPWM would be achieved but its success requires measures for possible objection of installation of PPWM. On the other hand, If PPWM is installed only to accepted customers of PPWM, there would be no objection of installation of PPWM but the purposes of PPWM would be not achieved. The latter case indicates no meaning of implementation of PPWM. The expected result of the alternative 3 (installation to debtors) is almost same as the alternative 1. However, if PPWM can be installed to debtors, perhaps it can be installed to all customers without difficulty.

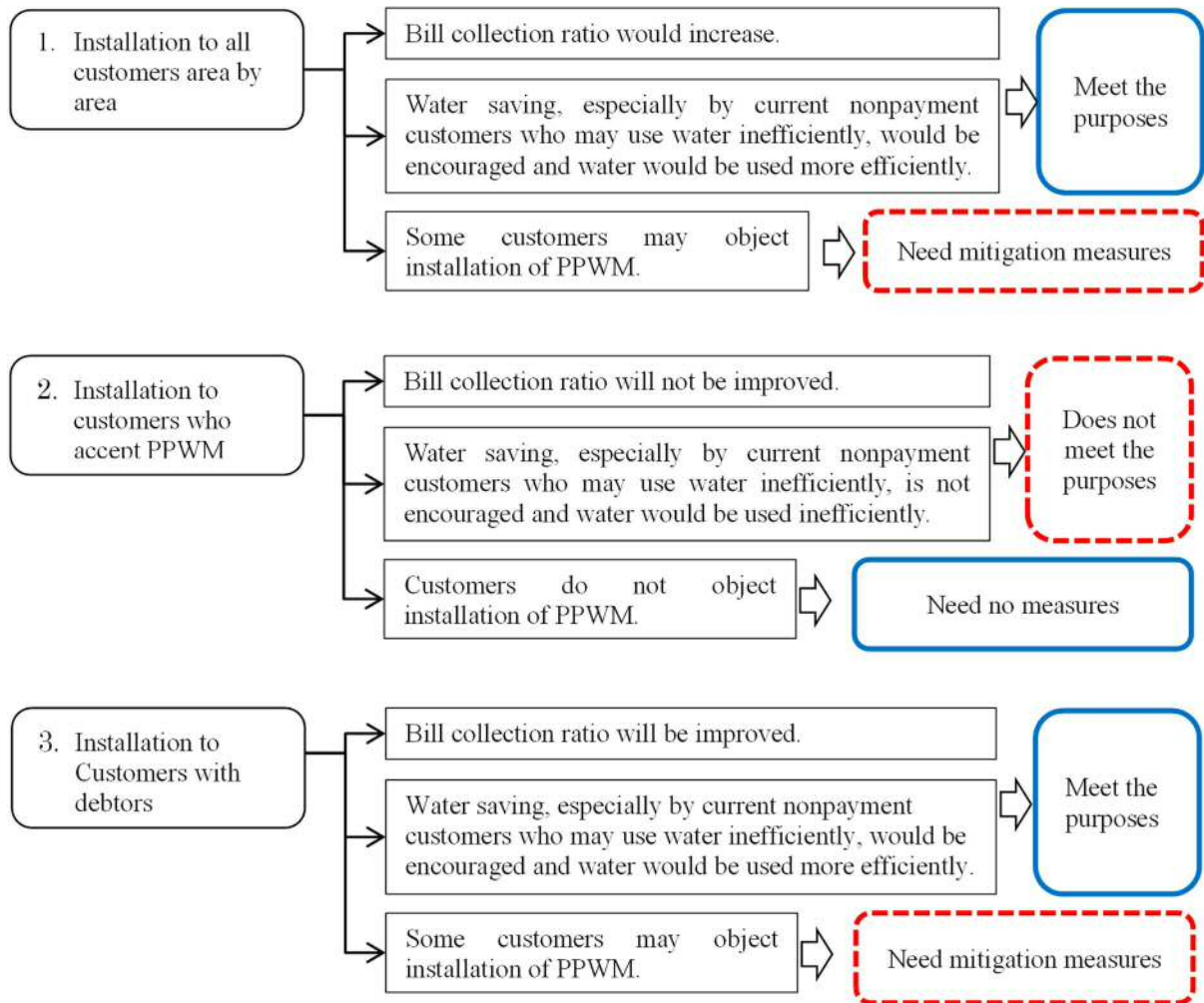


Figure 3: Comparison of three options of introduction target and expected results

(2) Sequence of installation of PPWM in PA-1

The sequence of installation of PPWM in PA-1 area by area shall be decided, considering easiness of installation (need to study more).

1. Sabah Al Khir
2. Kharoubeh
3. Al Naserah Street

(3) Additional installation strategy

In addition to installation n PA-1, PPWM may be installed to other target customer such as

- Influential people (Mayor, managers, member of council, employees) with signal that we are going to start with us,
- Customers with large debtors

(4) Other consideration for installation strategy

- a) Introduction of PPWM starts with influential people (Mayor, managers, member of council, employees) with signal that we are going to start with us.
- b) If customer has debt, he wouldn't change to PPWM since introduction of PPWM will come with debt recovery in many cases. At the beginning, when PPWM is installed, customer is not asked about debt repayment. Later, e.g. 1 year, they are asked to be paid by installment. Some % from each charge should be taken from customer who has debt.
- c) Commercial customer is mandated to install PPWM as probably, the willing to accept PPWM is higher than domestic customers.
- d) Rental building to be with prepaid meters in order for the owner grantees that all renters pay all bills.
- e) Public institutions may not be able to adapt to PPWM system so that traditional meter is installed to public institutions.

3. Improvement of water supply conditions (Preliminary results)

This section will be discussed in the different session.

3.1. Existing facilities and supply condition

This study covers PA1+ Basateen Area (Areas supplied by Jalameh Source).

Water source: Jalameh (Mekorot water); Quantity: in 2015 daily average = 1028 m³/day (range 718-1445 m³/day), in 2016 daily average = 894 m³/day (range 488-1448 m³/day), in 2017 (until August end) daily average = 645 m³/day (range 370-1147 m³/day). The Master Plan has used an average value of **833** m³/day as the current input from this source.

Reservoir: Sabah Alkhir tank, 2 tanks with total capacity of 100 m³.

Pump: 1 number working. Model EBARA multi-stage pump EVM 32 8-2F5/15.

Flow (LPS)	3.30	5.83	8.33	10.00	11.67
Head (m)	172	157	130	103	75

Supply schedule:

Sabah Alkhir: 1 day every 4 days (day 1, 5,...)

Kharoubah: 1 day every 4 days (day 2, 6, ...)

Nasraa Street: 1 day every 4 days (day 3, 7,...) + during supply period to Basateen

Basateen: 1 day every 4 days

Pressure at network:

Sabah Alkhir: 20-80 m

Kharoubah: 10-75 m

Nasraa Street: 20-75 m

Basateen: not measured yet

3.2. Water consumption of area supplied by Jalameh connection

Al Shamel billing data for a period of 13 months (June 2017-June 2018) is collected and summarized below.

Table 1: Monthly water consumption from Al Shamel

Month	PA1 total	Sabah Alkhir	Kharoubah	Nasraa Street	Basateen
6-17	11,663	3,964	4,156	3,543	
7-17	14,870	4,302	4,495	6,073	
8-17	13,784	4,132	4,711	4,941	
9-17	14,127	4,804	3,915	5,408	
10-17	12,302	3,580	3,924	4,798	
11-17	12,946	4,300	4,400	4,246	
12-17	12,136	3,907	4,087	4,142	
1-18	12,390	4,110	4,323	3,957	
2-18	10,822	3,902	3,424	3,496	
3-18	9,933	2,920	3,664	3,349	
4-18	12,213	3,332	3,728	5,153	
5-18	12,373	3,753	3,784	4,836	

Month	PA1 total	Sabah Alakhir	Kharoubeh	Nasraa Street	Basateen
6-18	10,958	3,625	3,484	3,849	
Total	160,517	50,631	52,095	57,791	
Average (m ³ /month)	12,347	3,895	4,007	4,445	
⇒ Seasonal peak factor	1.20				

Table 2: Consumption analysis

Description	PA1 total	Sabah Alakhir	Kharoubeh	Nasra Street	Basateen
Daily consumption Average (m ³ /day)	406	128	132	146	
Seasonal peak factor	1.2	-	-	-	
Peak daily (m ³ /day)	488	154	158	176	
(LPS)	5.64	1.78	1.83	2.03	
Physical loss (as per MP)	29%	29%	29%	29%	
Peak daily demand including physical loss (LPS)	7.95	2.51	2.58	2.86	3.47*
(m ³ /day)	687	217	223	247	300
If supplied 3 days/week (LPS)		5.85	6.02		
If supplied 4 days/week (LPS)				5.01	6.07

* For Basateen, the demand is calculated from connected population and per capita demand of MP (131 LPCD including leakage)

3.3. Improvement options

- (1) Continuous supply considering seasonal peak factor but without hourly peak factor
- (2) Continuous supply considering both seasonal and hourly peak factors (as per PWA demand pattern; hourly peak factor of 2)
- (3) Three days supply to Sabah Alakhir and Kharoube, and four days supply to Nasraa Street and Basateen areas (considering seasonal peak factor but without hourly peak factor)

3.4. Result

- (1) Continuous supply considering seasonal peak factor but without hourly peak factor
 - 1) Pump: existing pump is adequate
 - 2) Reservoir: existing reservoir size is adequate
 - 3) Network: some pocket areas in Nasraa Street and Basateen have high unit headloss (~7-145 m/km). Additional pipes (quantities as shown below) in parallel to the existing pipes may be laid to reduce the headloss. However, pressure is adequate even without changing these pipes.

Nasraa Street	Diameter (mm)	Length (m)	Basateen	Diameter (mm)	Length (m)
	50	518		50	390
				75	374

Results of simulation are shown in Figure 2. According to this scenario, pressure in the area varied from a low of 23 m to a high of 93 m, with an average of 73 m.

(2) Continuous supply with PWA demand pattern.

The demand pattern is shown in the following Figure 1.

- 1) Pump: the existing pump alone is not sufficient. So, two more pumps; one working and one stand-by will be required. Proposed size of the pump is.

Flow (LPS)	12
Head (m)	50

- 2) Reservoir: the existing size is not adequate. Total size required is about 200 m³.
- 3) Network: improvement same as in 4.1 above is required.

Results of simulation are shown in Figures 3 and 4.

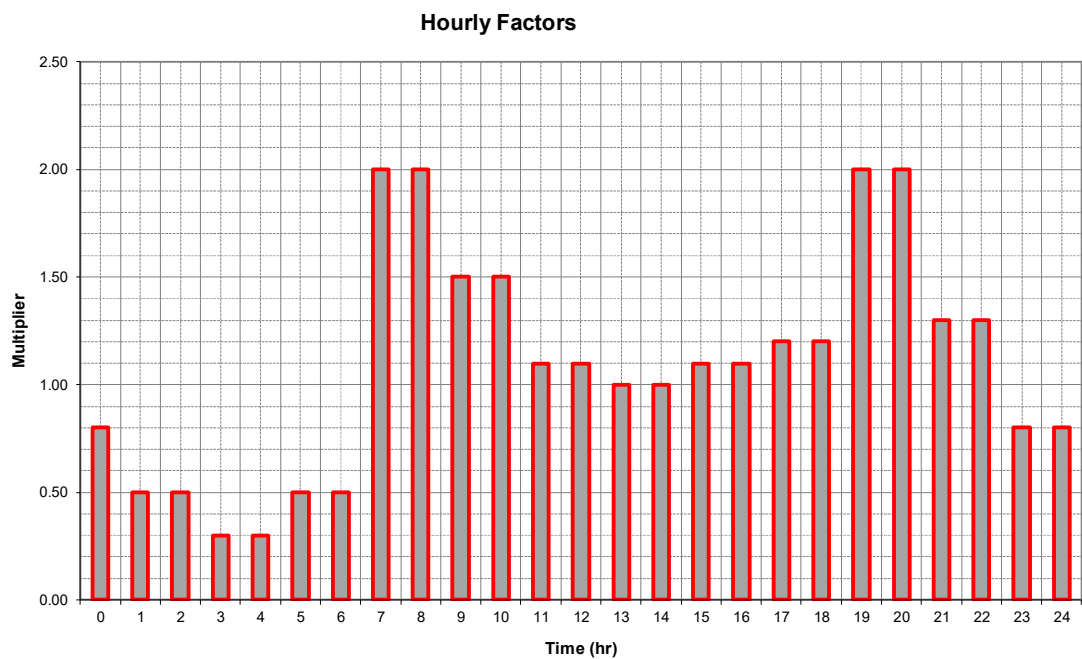


Figure 1: Demand pattern (PWA Recommended pattern)

According to this scenario, at minimum demand time pressure varied from 23 to 80 m with an average of 60 m. At maximum demand time the pressure varied from 17 to 65 m with an average of 44 m.

- (3) Three days supply to Sabah Alkhir and Kharoube, and four days supply to Nasraa Street and Basateen areas
 - 1) Pump: existing pump is at boarder line (rated capacity 11.67 LPS, actual flow 11.87 LPS during supply to Sabah Alkhir and Kharoube, and 11.09 LPS during supply to Nasraa Street and Basateen).
 - 2) Reservoir: minimum required size is 116 m³ against the available size of 100 m³. So the size is also in the boarder line.
 - 3) Network: needs to be changed as mentioned in 4.1 above.

Results of simulation are shown in Figure 5 and 6.

According to this scenario, pressure in Sabah Alkhir and Kharoubeh area varies from 23 m to 84 m with an average of 60 m. In Nasraa Street and Basateen area pressure varied from 16 to 93 m with an average of 63 m.

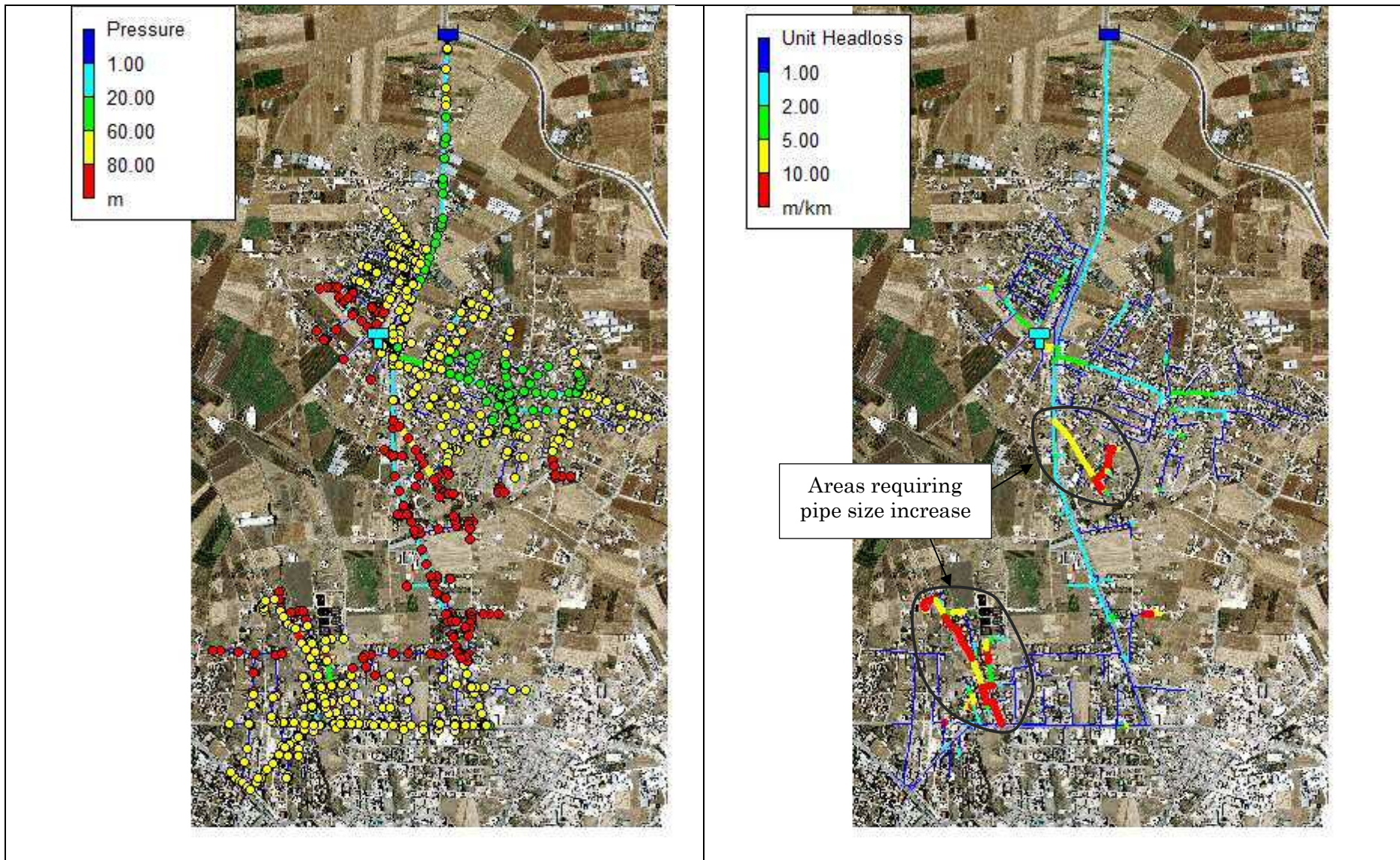


Figure 2: Result of hydraulic simulation 24 hours supply considering seasonal peak but no hourly peak

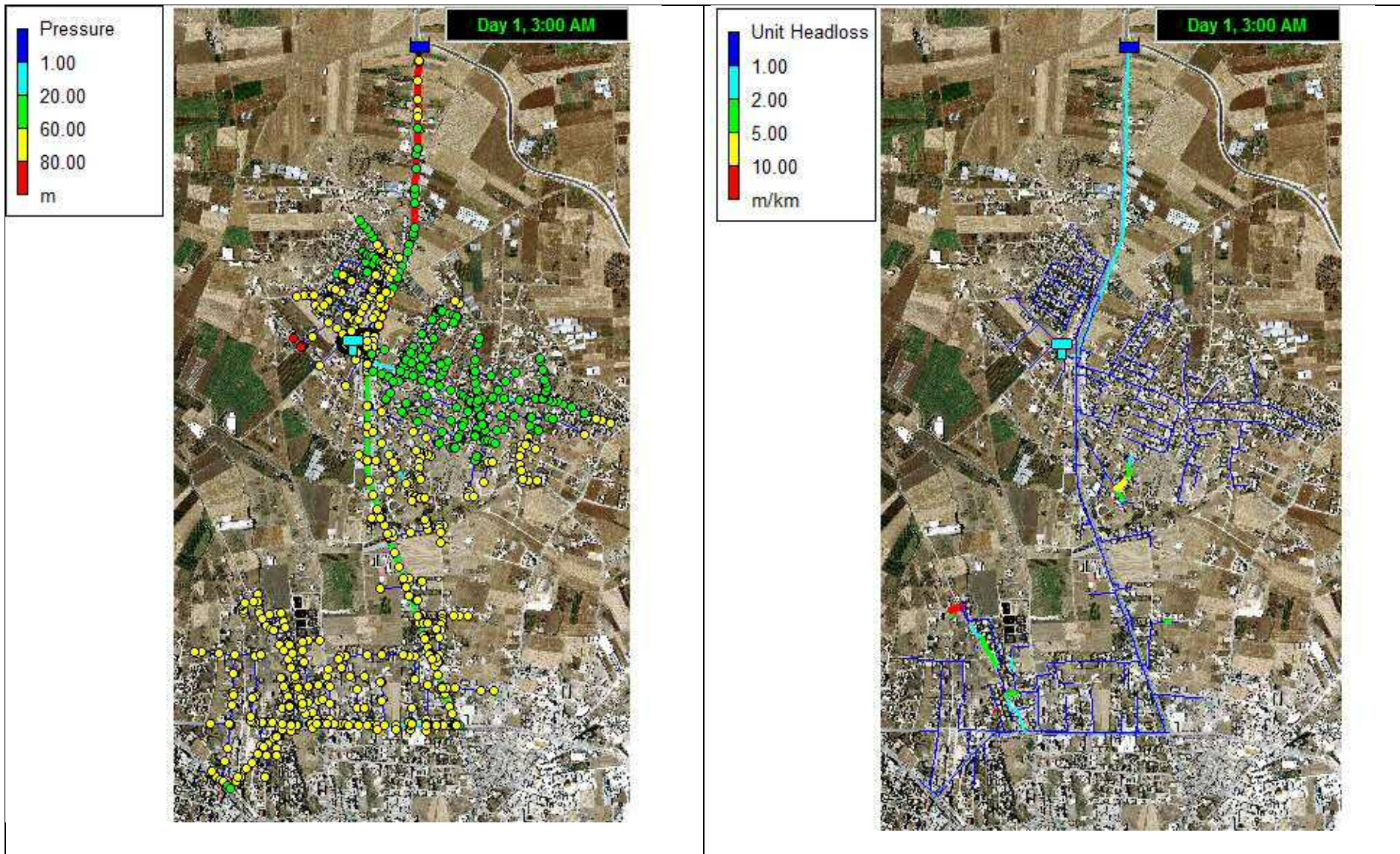


Figure 3: Result of hydraulic simulation 24 hours supply considering seasonal peak and PWA Hourly Pattern (at minimum consumption time)

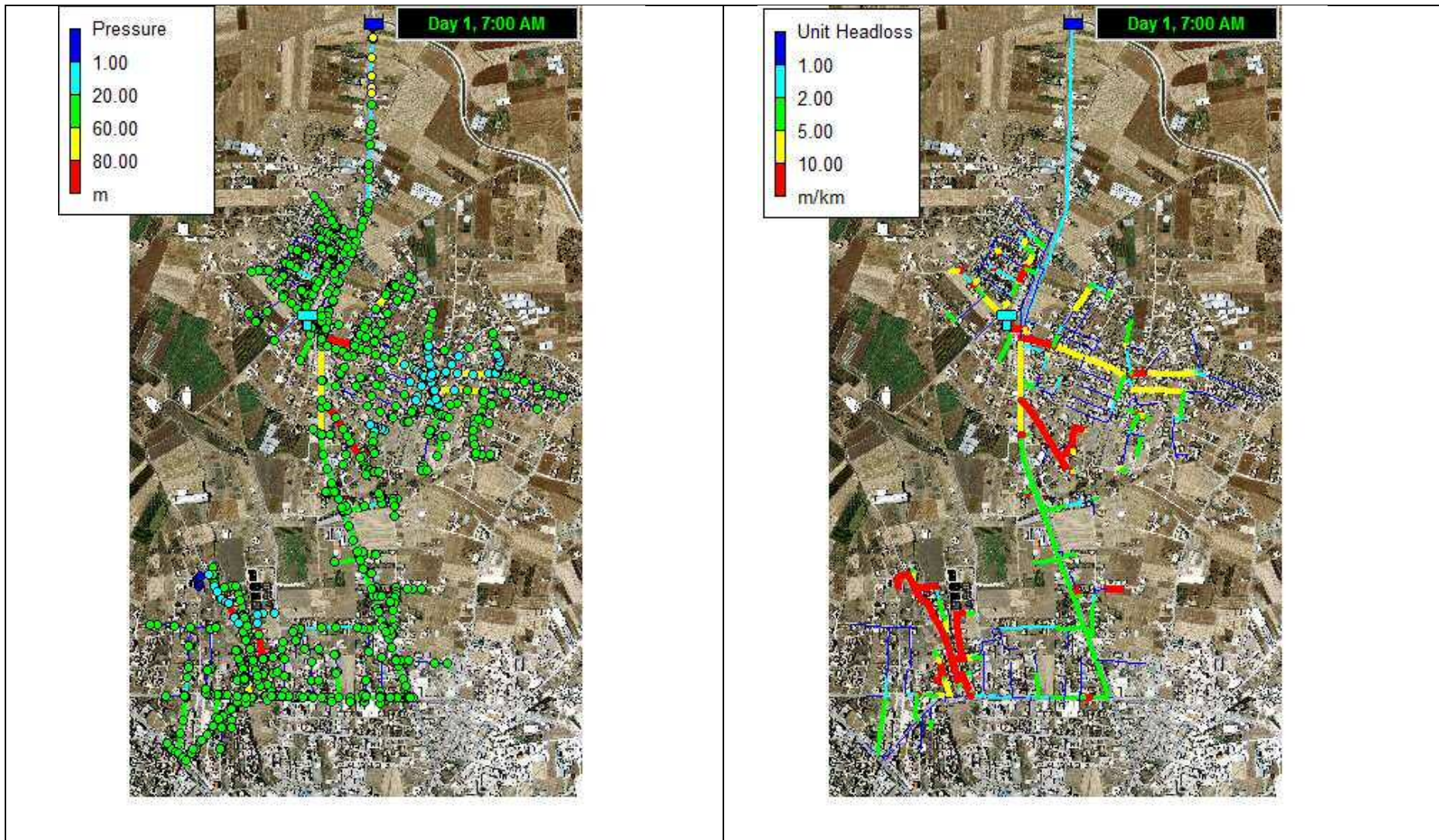


Figure 4: Result of hydraulic simulation 24 hours supply considering seasonal peak and PWA Hourly Pattern (at maximum consumption time)

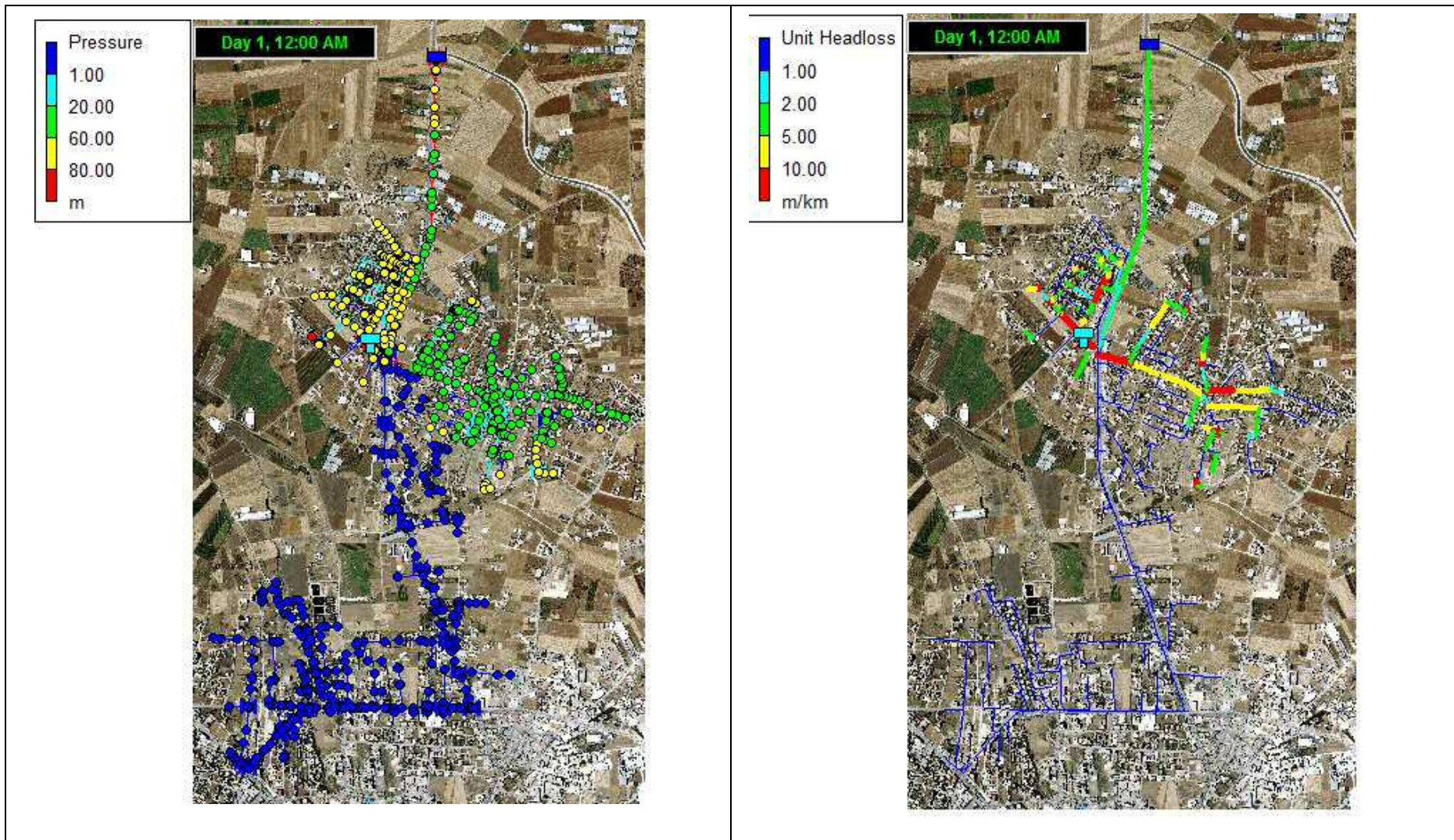


Figure 5: Pressure and unit headloss at Sabah Alkhir and Kharoubeh (3 days/wk supply) (no supply to Nasraa Street and Basateen at this time)

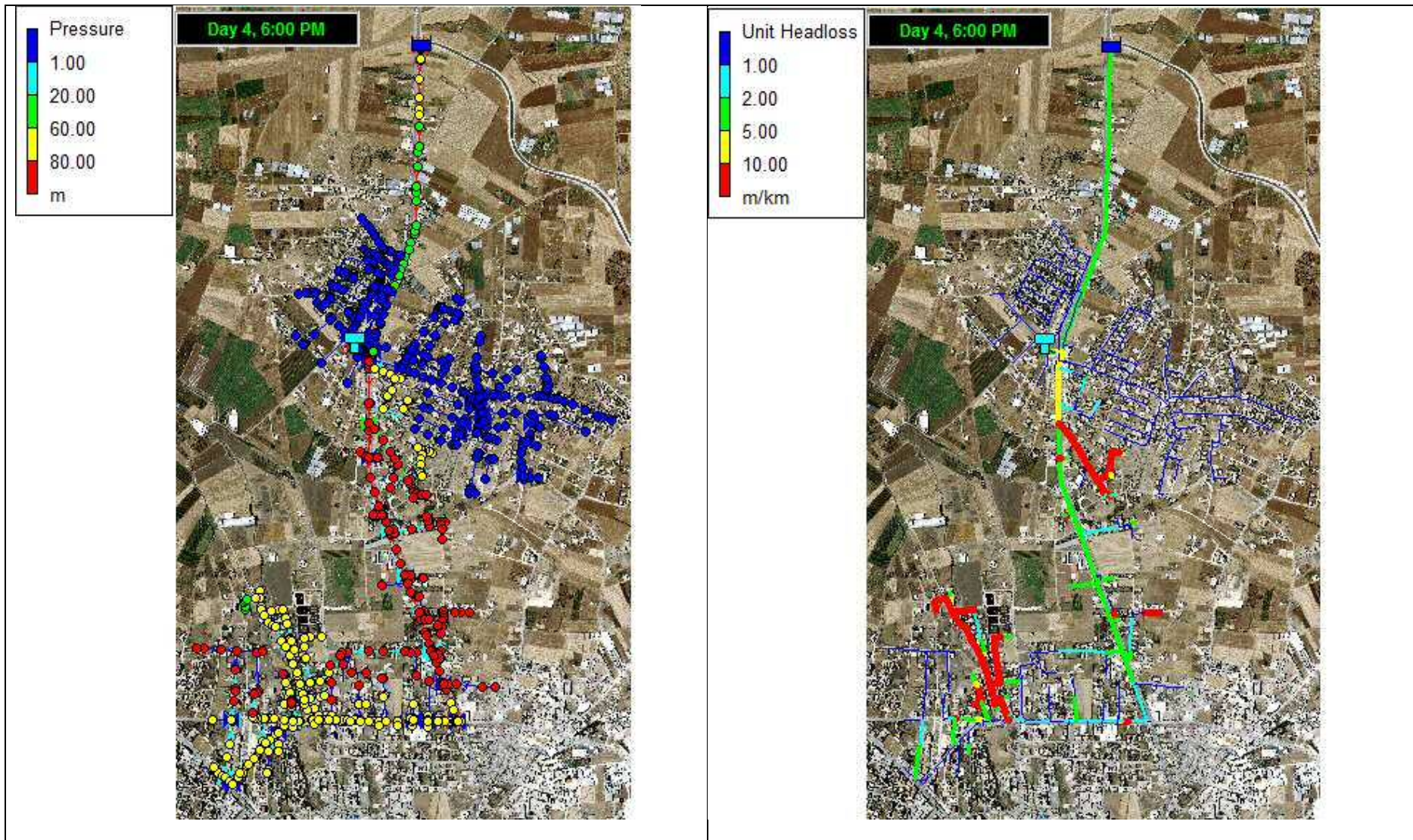


Figure 6: Pressure and unit headloss at Nasraa St and Basateen (4 days/wk supply) (no supply to Sabah Alkhir and Kharoube at this time)

4. Set up of PPWM System

4.1. Prepaid water meter system

4.1.1. Prepaid water meters system overview

Prepaid Water Meters System includes prepaid water meter, token, vending station (PC computer, card reader, UPS, printer ...etc), hand held unit, software.

The prepayment environment is made up of the following equipment and components:

- **The metering device**, this includes the user interface for the loading of credit and other data. The metering device must be securely mounted to prevent tamper.
- The credit and data transfer device: **token**
- **The vending station**, specifically the hardware, software and interface to the token
- **Flexible and user defined reports from the software** to allow reporting on all aspects of the system and the consumer consumption and spend. Trend analysis must form part of the reporting options.

The PPWM system consists of metering, dispensing (vending), and credit-loading components. The customer purchases a specific amount of water at the vending station by charging their PPWM cards. This purchased (credited) water is registered into media (token), and the payment for credited water will be automatically transmitted to the customer database in the center of billing system by internet. Vending stations (sale points) are established at the most accessible points with flexible hours for customer to conveniently charge their cards.



P-1: PPWM installed at household



P-1: PPWM installed at household



P-3 Inter a card (token)



P-4 Database computer



P-5: Dispensing equipment at



P-6: Server (Data transmission)

Vending station

equipment to existing financial system)

PPWM is divided into two parts: 1) attachment of prepaid system (electrical part) and 2) measurement part (regular meter) as shown in following photos.



P-7: Top view of PPWM



P-8: Side view of PPWM



P-9: Bottom view of PPWM

The prepaid water meter software can be integrated with the service provider's accounting and financial software. The system also supports the use of hand held units to program and interrogate the metering devices in the field. The hand held unit is able to perform the same functionality as the software provided that is used for the metering device data up/down loads.

4.1.2. Software and vending machine

(1) Software

The service provider prepaid water meters system shall be uniquely coded via a database code or identifier linked to the prepaid water meters, so that meters and tokens from one area cannot be used in another area.

(2) Vending station

Vending stations will be established at accessible points for customers' convenience for extended hours. A vending station per 1,000 customers is suggested by the supplier. The equipment necessary for the vending station will be PC system including software, the device for charging credit, etc., and one staff shall be deployed at this station. Vending station can be outsourced by supermarkets or by companies which offer credit charge services. Convenient and hassle-free payment methods; properly located charge centers (vending stations) with extended service hours and friendly/knowledgeable staff are established. The software will be used on a standard computer with an attached reader/writer for the token.

(3) Token

- The token is a data transfer mechanism. The token transfers metering data to the vending station or payment point and transfers credit (in cube meter) or credit to the metering device.
- Token shall be bi-directional token, calling for a mobile robust secure passive memory device.

- The token must transfer data to and from the metering device/end point (vending station, payment station).
 - Data transfer from vending station to metering device
 - Purchased Credit – This may be in credit units or cube meter. The Bidder shall detail the method employed.
 - Program parameters – This will consist of updated rate tables, consumption limit. These parameters should be transferred automatically without operator intervention.
 - Data transfer from metering device to vending station
 - Metering parameters – measured and calculated metering parameters.
 - Program parameters – All parameter used to set-up the metering device.
 - Rate parameters – All parameters used to calculate rate of cube meters charged to the prepaid water meter.
 - Tariff parameters – All parameter used to establish the charges to the consumer
 - Tamper conditions – All conditions indicating the state of tamper

(4) Hand held unit

The system must support the use of robust hand held units, except laptops, to program and interrogate the metering devices in the field. The hand held unit must be able to perform the same functionality as the software provided that is used for metering device data up and down load.

Hand held unit shall allow to access water meter via authority card directly to read data. Hand held unit shall allow read tokens, create special purpose cards including time, authorization, maintenance, open, close, control (Info)...etc.

4.1.3. Meter functions/programs

Item	Operational Requirements
Measurement	The meter must measure water flow with a range as specified in the Technical Data Tables.
Real Time Clock	The metering device must have a real time clock providing an accuracy of better than 0,5-seconds/day drift (IEC requirement).
Data storage	The metering device must be able to store all program parameters and metering data on a non-volatile memory in case of any power failure. The non-volatile memory shall be transferable to a new meter in case of malfunction of the current meter in use (meter black box).
Credit display in credit amount	The prepaid meter must be able to display the remaining credit in a cube meter amount or money, based on a programmable rate.
Reserve (spare	It is a pre-defined and programmed critical limit of credit that warns the subscriber to

Item	Operational Requirements
credit)	recharge the prepaid water meter. In this case, the shut off valve will be closed temporary and it will re-opened using the consumer card to allow consuming the remaining reserve credit.
Low Credit Alarm, Message or Warning	Once the available credit falls below a pre-defined and programmed critical limit of credit , a visual message or warning or alarm must be triggered.
Friendly credit	It must be possible to program the prepaid water meter so that it does not disconnect during certain periods. This feature must override the out of credit parameter. This will ensure that consumers are not disconnected over night , weekends and holidays , when it is not possible to make purchases form the vending station. Alternatively the device should accept a programmable emergency token used by the consumer.
Tariff	<p>The prepaid water meter shall have the capability to be programmed to calculate the consumption with</p> <p>Stepped tariff:</p> <p>The prepaid water meter must allow for a programmed stepped tariff according to Palestinian Water Authority (PWA) tariff standards , with a minimum of 5 steps. The stepped tariff requires energy to be charged at a predetermined rate from zero usage to x–cube meter (step 1), from x–cube meter to xx–cube meter (step 2) and so on. The prepaid water meter must reset the step count at the start of every month.</p> <p>Fixed charge:</p> <p>The prepaid water meter must allow for a fixed charge to be loaded into the meter via the token or programmed. The fixed charge should be decremented in equal steps per day.</p> <p>Multi tariff utility structure plan such as (Domestic, commercial, industrial, etc)</p> <p>The Tariff must be loaded automatically on the consumer token</p> <p>Value Added Tax (VAT)</p> <p>The system must allow for dealing with two values of VAT depending on the location.</p>
Consumption Limit	<p>The prepaid water meter must allow for monthly consumption limiting to be programmed.</p> <p>The prepaid water meter valve shall be switch off after consumption limit has exceeded.</p> <p>The prepaid water meter must reset the consumption limit at the start of every month.</p>

“Technical Requirements and Specifications for Supply and / or Installation of Prepaid Potable Water Meters System, Version 3, June 2017” (Technical Specification of PPWM (PWA, MoLG, PSI))

4.1.4. Prepaid meter accessories

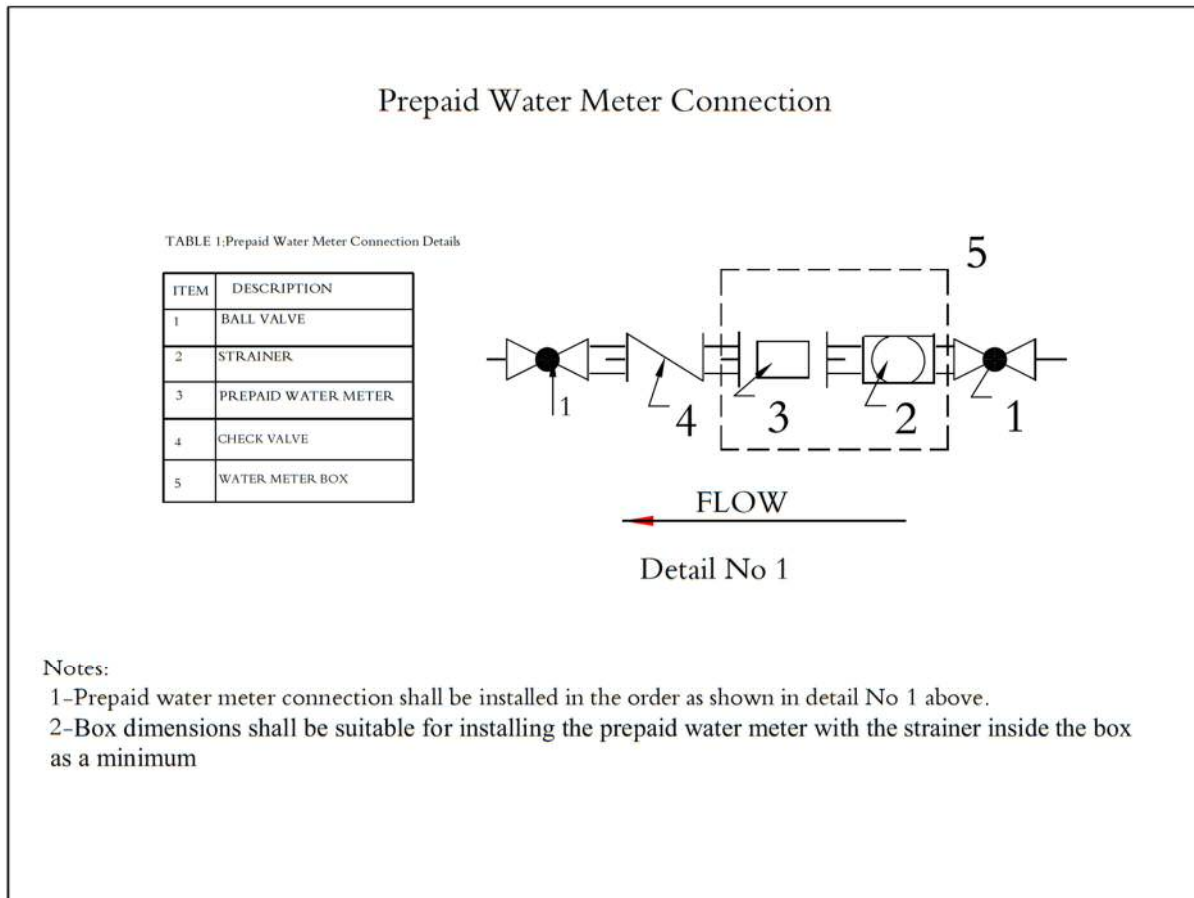
Item	Operational Requirements
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Item	Operational Requirements
User interface	<p>The prepaid water meter user interface (information, messages, warnings,... etc) displayed on the meter LCD screen shall be English or Arabic language.</p> <p>Push button or any similar interface allowing the consumer to:</p> <ul style="list-style-type: none"> ➤ Scroll through the displays <p>Display –</p> <p>All features listed above must be available on the display in a user-friendly manner. Display sequences, parameter list and the display time must be user programmable.</p> <ul style="list-style-type: none"> ➤ Backlit ➤ Token activity: Insertion, Error insertion, Successful insertion, credit transferred ➤ Error and Fault conditions
Electronic device	The electronic device of the prepaid water meters, can be combined with the meter or not combined (splitted) from the meter.
Shut off valve	<p>The valve will provide the function to open and close the water. The valve will be triggered on the following conditions:</p> <ul style="list-style-type: none"> Zero credit reached, with the exception of friendly credit Consumption limit exceeded Tamper condition
Built-in strainer and non-return valve (NRV)	Residential mechanical water meters shall be equipped with built in strainer at the inlet of the prepaid water meter and NRV at the outlet of the prepaid water meter.
Prepaid water meter box	<p>Residential prepaid water meters shall be installed inside boxes for the protection of the prepaid water meter in locations far away from vibrations and shocks.</p> <p>Prepaid water meter box can be made from:</p> <ul style="list-style-type: none"> Galvanized steel metal box (min sheet thickness 2mm) , or Rigid Plastic <p>The design of the prepaid water meter box shall be in such way to allow the consumer (subscriber) to have access only to the screens and button of the water meter and to allow charging of the prepaid water meter.</p> <p>The prepaid water meter box specifications and dimensions shall be as follows:</p> <ul style="list-style-type: none"> The box shall be water proof. The box shall be rigid. The opening angle of the hinged cover shall be max 90 degree to the horizontal. The box shall have lock Box shall include all needed accessories for sealing, locking and fixing the box in the required places. Overlapping and drop-in covers to prevent dirt and grass from settling between body and cover, making it easier to remove over time. Box dimensions shall be suitable for installing the prepaid water meter with the strainer inside the box as a minimum. <p>In addition to the above specifications and requirements plastic box shall:</p> <ul style="list-style-type: none"> Contain UV inhibitors for sustained durability and performance in direct sunlight. Plastic shall accommodate extreme weather conditions. <p>Light industrial, commercial prepaid water meters shall be installed inside door in locations far away from vibrations and shocks</p>
Battery	<p>The battery / batteries shall be lithium</p> <p>The battery / batteries life must be min 5 years (from the project commencement date) for the (valve & LCD battery) and Printed Circuit Board battery.</p> <p>The prepaid water meter shall have an alarm or message or warning showing that the battery is low or damaged.</p>

“Technical Requirements and Specifications for Supply and / or Installation of Prepaid Potable Water Meters System, Version 3, June 2017” (Technical Specification of PPWM (PWA, MoLG, PSI))

The standard drawing of PPWM is shown in the drawing below. As for ultrasonic meter, built-in strainer shall not be installed, which may affect accuracy of meter due to occurrence of turbulence

flow.



“Technical Requirements and Specifications for Supply and / or Installation of Prepaid Potable Water Meters System, Version 3, June 2017” (Technical Specification of PPWM (PWA, MoLG, PSI))

Figure 4: Standard Drawing of Prepaid Water Meter

4.1.5. Other remarks

1. The supplier will do the linkage between the Main server and the various vending stations without additional cost rather than offered.
2. The supplier recommended to use the ONLINE option as the off line vending option may cause some problems in transferring the data to the main server. Note that the off line method requires high quality computers in the vending stations. VPN is better than ADSL.
3. For calculating the consumption, the handheld unit will allow the remote reading up to 200 m distance, no additional parts needed to be install to communicate with the PPWM. Or the GPRS will be installed at cost 5\$/meter additionally.
4. The tariff categories can be managed by the meter, and whatever the customer charges it will be understood as deposit money for him and not cubic meters.
5. If the internet is weak the vending station will not stop charging because the size of transferred data to the charging card is not big...as stated by PPWM supplier.

6. The PPWM software can backup the database.

4.2. Selection of prepaid water meter

4.2.1. Selection of type of prepaid meter

The following table is a summary of evaluation of 3 types of water meter. In addition, results of experiment meters by the Project and causes of meter malfunction observed at Ajja meter maintenance center are given in Appendix-2.

As a result of evaluation, ultrasonic type is selected for the advantages below.

- Good performance (low minimum flow).
- Water with air and air bubble is not measured.
- Without mechanical parts, life is longer.
- Ultrasonic type is less likely to be blocked by any dirt or sand particles
- It can be utilized in a condition that water supply is intermittent and the dirt such as rust, sand, and calcium potentially contains in the water supplied.

Type	Velocity (impeller)	Volumetric	Ultrasonic
Advantage	<ul style="list-style-type: none"> • Maintenance is simple. 	<ul style="list-style-type: none"> • Can be installed in any position. • Minimum flow is small. 	<ul style="list-style-type: none"> • Ultrasonic meters do not measure air • Minimum flow is small • No moving parts and long life with good accuracy. • Low pressure loss. • 11 meters without prepaid unit were tested for 3 months in the project and show good results.
Disadvantage	<ul style="list-style-type: none"> • Count air in intermittent supply. • Should be installed in horizontal position only. • Mechanical parts can be damaged, making accuracy decrease and frequent testing necessary. • Prone to wear in silty water, resulting in loss of accuracy and frequent need for replacement. • Shorter service life. • Significant head loss occurs at higher flow rate. • Minimum flow is high. Less sensitive at low flow rate. • Meter is choked by debris and soil which reduce water passage and cause low pressure. 	<ul style="list-style-type: none"> • Count air in intermittent supply • With silty water (particles/dirt) and calcification, meter gets jammed and does not work accurately. • Additional strainer to remove particles is required. But it causes frequent choking of filter if the water contains sand particles or dirt. • According to a PPWM supplier, it is clogged up by particles in 2 or 3 years after installation, which happened in Arraba municipality near Jenin. • Meter is choked by debris and soil which reduce water passage and cause low pressure. 	<ul style="list-style-type: none"> • There may be air-water mix in intermittent supply, and ultrasonic does not measure water as long as the water contains air bubbles. • (No experience of the use of ultrasonic meter in actual conditions.)
Life time	<ul style="list-style-type: none"> • In general, 7 years or more and depend on raw water quality. • With mechanical parts is 	<ul style="list-style-type: none"> • In general, 7 years or more and depend on raw water quality. • With silty water (particles) 	<ul style="list-style-type: none"> • In general, 7 years or more. Life type of electrical parts is also 7 year or more. • The battery life is usually

Type	Velocity (impeller)	Volumetric	Ultrasonic
	damaged, short life time.	and calcification, short life time.	more than 5 years depending on the frequency of charges (how often the meter is charged) and data transmission. The battery is exchangeable.
Experience	<ul style="list-style-type: none"> • Many but they are getting older since they were installed long time ago. • Decreasing installation due to air problem and decreased accuracy at lower flow rate. 	<ul style="list-style-type: none"> • Many 	<ul style="list-style-type: none"> • An ultrasonic PPWM was installed for testing purpose only in JSC-JWV. • 11 test meters without prepaid unit for experiment purpose are installed in this project in different water supply conditions in Jenin and show a good result.
Unit price (indicative)	• Around 120~130 USD	• Around 120~130 USD	• Around 140~150 USD
Customer perspective	• Customers have negative preconception that meter counts air.	• Customers have negative preconception that meter counts more than consumption.	• Customer may claim it is no experience.
Results of experience of 11 experiment meters	<ul style="list-style-type: none"> • Smallest quantity: 3.3% less than volumetric flow meter. • Velocity types still run even when the flow in pipe is not full or when there is only air or air mixed water is running in pipe. But the quantity is less than ultrasonic, so that air problem may be negligible in Jenin. • Velocity meters used in this experiment have higher minimum flow rate (lower accuracy at lower flow rate), so their recorded volume is lower than the other two types. • However, it is minimal difference between velocity and ultrasonic in Jenin. If meter with R160 or more is used, the difference may be decreased. 	<ul style="list-style-type: none"> • Largest quantity. • Two of existing volumetric meters are not functioned, probably choked by debris. • Volumetric types still run (record flow) even when the flow in pipe is not full or when there is only air or air mixed water is running in pipe. But the quantity is almost same as ultrasonic, which does not count air, so that air problem may be negligible in Jenin. 	<ul style="list-style-type: none"> • Lower than volumetric flow rate but the difference is almost null: 0.56 % less than volumetric volume. • From the visual observations it is found that ultrasonic type stops (does not work) when the flow in pipe is not full, or when only air passes, or when the water is mixed with air bubbles. • It is minimal difference between volumetric and ultrasonic in Jenin.
Evaluation	<ul style="list-style-type: none"> • Low flow accuracy is low. • With mechanical parts, it can be damaged. • The accuracy is reduced according to age. • Air is counted even though it does not likely affect the measurement. 	<ul style="list-style-type: none"> • Particle/dirt problems are severe. • Air is counted even though it does not likely affect the measurement. 	<ul style="list-style-type: none"> • Good performance (minimum flow is lower) . • Water with air and air bubble is not measured. • Without mechanical parts, life is longer. • Ultrasonic type is less likely to be blocked by any dirt or sand particles and can be utilized for a residential meter in a condition that water supply is intermittent and the dirt such as rust, sand, and calcium potentially contains in water supplied.
Selection			Selected

4.2.2. Specification

The required specification of ultrasonic PPWM is shown below considering the availability of PPWM in Palestine.

- Diameter: 3/4 inch (ND20mm)
- Q3 (permanent flow) = 2.5 ~ 4.0 m³/h and Q1 (minimum flow) ≤ 0.016 m³/h

4.2.3. The number of meters

(1) The number of meters by diameter of service pipe

The number of service pipes by inlet diameter of service pipe in PA-1

Inlet service pipe diameter (inch)	Kharoubeh	Sabah Al Khir	Al Naserah Street	Total
1/4(HDPE)	0	0	3	3
1/2	65	90	91	246
3/4	171	72	104	347
1	13	22	53	88
2	0	0	1	1
Null	0	0	2	2
Re-survey	13	14	7	34
Total	262	198	261	721

(2) The number of meters estimated for budget preparation

PA	Area	Nos of Customers based on GIS-MP database	Estimated number of customers based on GIS – MP and latest customer data (35% more than GIS-MP)	Registered metered customers by CDS (nos.)	Estimated registered metered (estimated using 19% of the nos. of Customer based on GIS in PA1)
1	Sabah Al Khir, Kharoube, and Nasraa Street	606	818	721 (actual+resurvey) 19% more than Nos of customer based on GIS	-
2	Al Zahraa, and Jenin Camp (new)	466	629	-	555
3	Sharqiya and Halima Al Shadia	361	487	-	430
	Total	1,433	1,934	721	985
			1,940 Estimated number for budget request		1,706

Note: *1; the numbers are based on GIS database of Master Plan (MP). Latest customer records for whole Jenin show about 35% more number of customer connections compared to the numbers in GIS. The number of connections at present will likely increase in all these PAs by about 35%.

The budget of JICA for PPWM is fixed. The following factors affect the number of meters procured.

- Integration with accounting software: If it is integrated, the cost increases by about 1,000 ~15,000 USD, which reduces nos. of PPWM adjusting total cost in the fixed budget. The integration will be made by another budget, possibly of JICA or Municipality. Therefore, integration will be not made together with PPWM procurement.
- The cost responsibility for materials for replacement/relocation: If the materials required for replacement and relocation of meters are to be procured in PPWM procurement, the quantity of PPWM is reduced. It has been decided that, in principle, the materials will be procured by Jenin municipality. Therefore, materials will not be included in this procurement.
- In Pilot Areas, PPWM should be installed to new customers, who may increase in the project time. Therefore, a reserve/stock of PPWM is required.

The quantity of PPWM to be procured will be decided based on the conditions above. The maximum quantity will be 1,940 and as many quantity as possible will be procured within the JICA budget. The required quantity of PPWM system with built-in materials is show in section 4.2.5. The final number is decided as 1,850 based on the JICA budget.

4.2.4. Vending station and handheld unit

(1) Vending station

Vending station should be located in the center of each geographic area of pilot project for convenient service for the customer in each area with extended service hours such as at supermarket, in addition to a vending station in the Municipality, where the customer service center and main server is located. Three vending stations will be set up for 3 pilot areas; each one station for one pilot area. In total 4 vending station including a station in customer center of the Municipality shall be procured.

(2) Handheld unit

One handheld unit will be procured for each pilot area and 3 handheld units will be procured to read and/or check meter at site of customer meter.

4.2.5. A set of PPWM system

The following set of PPWM system will be procured for 3 PAs.

No.	Items and Specifications	Quantity
1	Prepaid water meter (DN20), PN16bar, Ultrasonic type	1,850
2	Check valves DN (20mm), PN 16bar	1,850
3	Ball valves DN (20 mm), PN 16bar	3,700
4	Rigid plastic case for installing PPWM, valves, fittings	1,850
5	Complete vending station with hardware equipment and software	4
6	Installation including commissioning for Vending station	4

7	Server management software and hardware	1
8	Installation including commissioning for Server management	1
9	Handheld Unit (field verifier)	3

4.2.6. Storage for PPWM

With procurement of PPWMs, meter boxes and other fitting, the large stockyard is required. Jenin Municipality should prepare such stock yard and inventory system.

4.3. Meter installation plan

4.3.1. Location of PPWM

The location of PPWM should be outside the customer property in the nearest wall to the street side, entrance or other visible and accessible place by Municipal staff for periodical inspection. This is practice in JSC-JWV and Aquraba Municipality. However, in JSC-Tubas, the first preference for location of PPWM is outside the property. The location of PPWM should be outside property for new customers. But JSC-Tubas cannot force to relocate PPWM to outside property for existing customer. They cannot stick to outside property. The priority purpose is to install PPWM but not the location. JSC install PPWM to any place that customer agree.

Relocation needs cost and time. Jenin Municipality has decided that location of PPWM will be set based on the option 4 of the following options.

1. The location of PPWM is outside the customer property.
2. The location of PPWM is the same location as it is.
3. The priority is outside but final location is the position agreed with customer.
4. If the existing location is easy to access, the location is same as it is. But if the meter is located at the place for maintenance crew difficult to access to meter (see CDS), it is relocated outside the property.





The Jenin Municipality has decided to use rigid plastic box.



4.3.2. Overall process of installation of PPWM

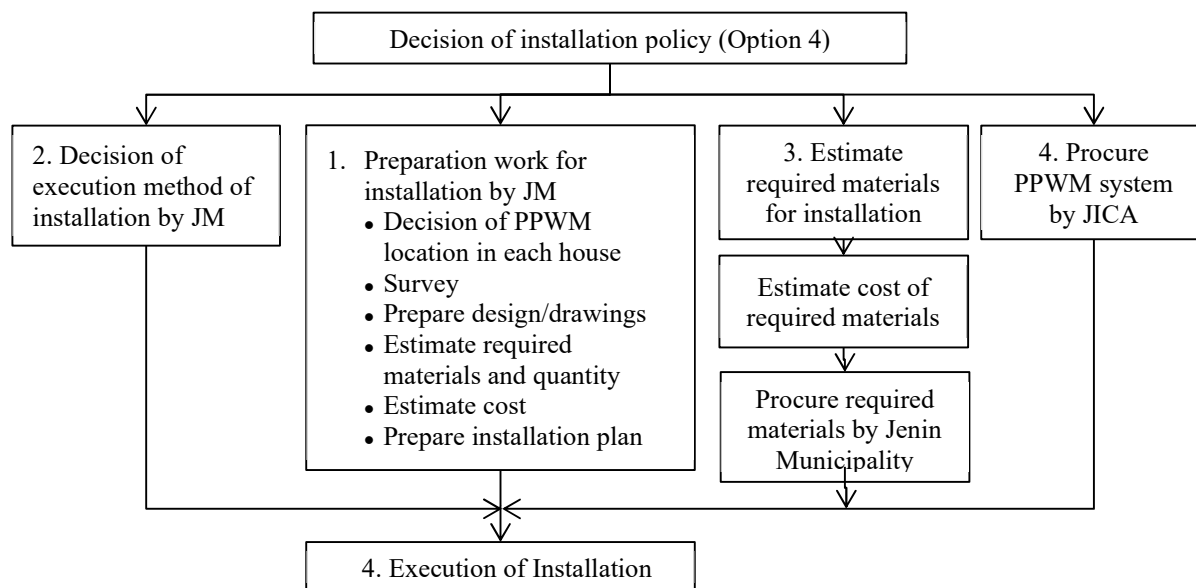


Figure 5: Overall process of installation of PPWM

4.3.3. The quantity of relocation and replacement

According to the observation in Customer Data Survey (CDS), the approximate ratio of relocation and replacement is 2:8, or relocation is less than 20%.

4.3.4. Piping design of replacement and relocation

1) Preparation work for installation

Preparation work below is required before installation work.

At field work

1. Survey existing service pipe and decide the connection point of PPWM, record diameter of pipe
2. Decide the location of PPWM
3. Measure the length of service pipe (GI and PVC) required for connection of PPWM
4. Decide required fittings and record all materials and quantity
5. Make sketch or drawing of PPWM installation (during the above work)

After field work

1. Finalize sketch or drawing of PPWM installation
2. Estimate materials required
3. Estimate the cost of works
4. Estimate required hours for installation
5. Estimate the required or available number of teams
6. Prepare overall schedule

The required timeline of survey work is as follows (to be decided).

- Survey per customer: 20
- Working hours per day: 4

- Days of work in a week: 5
- Number of customers surveyed per day per team: 12
- Number of team: 2
- Required days: 30 days (6 weeks)

Well before installation work, preparation work is required. These works should be completed 2 months before the start of installation because it requires procurement of materials before start the installation. If it is supposed that installation work start from March 2019 and preparation work should be completed in December 2018.

2) Required materials

The required materials and quantity will be estimated.

- GI pipes
- Fittings (vent, connector, reducer/enlarger, nipple, riser, etc.)
- PVC pipes
- Nails
- Bond?
- Etc.

The required equipment

- Hammer drill (procured)
- Plumbing tools (WWD), the quantity depend on the number of team, which will be procured by Jenin Municipality.

3) Piping work

Before installation, the consent of customer for installation of PPWM should be obtained.

There are two types of piping work for installation: replacement of existing meter with PPWM, and relocate of meter. Replacement of existing meter with PPWM is not laborious work but relocation required laborious works.

A. Replacement

1. Visit and confirm with the customer for meter location (5 min.)
2. Close maintenance valve or confirm no water supply day in supply schedule
3. Remove existing meter and install PPWM with adjusted fitting (15 min.)
 - Carry tools, parts and fitting, and discuss in the team.
 - Remove existing meter
 - Replace with PPWM
 - If dimension is different, it should be adjusted by secondary side
4. Do other necessary documentations (5 min. by other staff)
Record the last reading of existing meter and take photo in case of claim by customer
5. Move to next customer (10 min.)

Total 30 min. (including movement)

B. Relocation

1. Visit and confirm no water supply day in supply schedule
2. Confirmed with the customer for meter location (5 min.)
 - Find inlet service pipe outside the customer property (in preparation survey)
 - Carry tools, parts and fitting, and discuss in the team.
3. Digging land to expose inlet service pipe (15 min.)
4. Plumbing between inlet and outlet service pipes and PPWM (15 min.)
5. Fix PPWM (10 min.)
6. Cleaning etc. (5 min.)
7. How to treat existing meter???? Remove or keep it??
8. Do necessary documentations (5 min. by other staff)

Record the last reading of existing meter and take photo in case of claim by customer.
9. Move to next customer (10 min.)

Total 60 min. (including movement)

Note: (min.) assumed required minutes.

4) Fixing PPWM

Following fixing methods of PPWM would be selected.

1. Fix PPWM on wall by nail
2. Stand PPWM by raiser (2 poles) or GI pipe raiser
3. Fix PPWM by GI piping
4. No fixation required

4.3.5. Estimation of schedule of execution of installation

Activity	Replacement	Relocation	Total
• Average work hours per installation:	30 min.	60 min.	
• Working hours per day:	4 hours		
• Number per day per team	8	4	
• Days of work in a week:	5 days		
• Total installation number: total 700	560	140	700
• Required days per team :	70 days	35 days	105 days
• Required wees/months (4 teams)	17.5 days	8.75	26.25 days (6 weeks)

4.3.6. Execution of installation work

The installation work should be made by Jenin Municipality according to MM of the Project. Following four kinds of execution method may be considered:

- **Direct execution by existing staff of Jenin Municipality** (with/without incentive per meter

installation)

- Employ required number of technicians and direct execution
- Sub-contract to local contractor
- Mix of sub-contract and direct execution

The Jenin Municipality has decided direct execution by existing staff of Jenin Municipality with incentive per meter installation, where amount and kind of incentive is to be determined. PPWM installation will be conducted by 4 teams at least. However, the quality of works shall be inspected and ensured.

4.3.7. Cost estimation

1) Required materials

The cost estimation of required materials assuming required materials as below.

	Assumed quantity of materials only(with changing location)	Cost(USD)	Assumed quantity of materials only(without changing location)	Cost(USD)
All meter types	Reducer 2x1\$	2	Reducer 2x1\$	2
	Nipple 2x1\$	2	Nipple 2x1\$	2
	Riser 3/4" 1.2mx3\$/m	3.6	Riser 3/4" 1.2mx3\$/m	3.6
	Clamps+bolts 1x1\$	1	Clamps+bolts 1x1\$	1
	cuppler 3/4" 2x0.8\$	1.6	cuppler 3/4" 2x0.8\$	1.6
	Pipe 3/4" 5x3\$	15		
	elbow 3/4" 2x1.5\$	3		
Total		28.2		10.2

If the ratio of relocation and replacement and total quantity of meters installed are assumed as 2:8 and 1,850 (721 for PA-1), the estimated cost for materials are as follows.

	Relocation	Replacement	Total
Estimated unit costs	28.2 USD	10.2 USD	-
Quantity (PA-1)	370 (144)	1480 (577)	1850 (721)
Estimated total cost for all 3 PAs	10,434	15,096	25,530
Estimated total cost for PA-1	4,061	5,886	9,947

2) Installation work (labor)

The Jenin Municipality has decided that installation work will be made by the staff of Jenin Municipality and provide 4 teams at least and they work after the office work time 14:00 to open with motivation per meter installation.

4.4. Integration with accounting software

(1) Integration plan

The prepaid water meter software is capable to be integrated with the accounting software. The prepaid water meter software is integrated with the Service Provider accounting and financial software.

Integration of prepaid meter system with the Municipality accounting software is carried out and prepaid meter system will be concurrently operated with accounting and financial software starting from the pilot project in PA-1. The PPWM data such as credits and water consumption in prepaid meter system will be continuously transferred to the Municipality accounting software.

(2) Necessity of integration

The following are purposes / benefits of integration.

- Speed up accounting, save manual entry time, cost, human errors, miss typing, and additional employees or employees time. Without integration, daily all the charging records of PPWM transaction should be entered manually to accounting and financial software (Alshamel).
- Illegal transaction /Security (No frauds /misuse of money protect data from change or being copied or viewed by un-authorized persons). It prevents any illegal use of the PPWM charging money.
- Guarantee financial transactions of all sources are entered to the financial system, and get real treasury and bank balances.
- Get real time financial transactions.

Jenin Municipality has financial system, which has daily transaction to preparation of financial statements. PPWM has own system. PPWM has daily transaction through token (charge). Money move every day, it needs to input daily data in Alshamel. Every credit (charge), debt is deducted. Everyday data should be input to Alshamel.

(3) Method of integration

1. The integration will be done using the main server of the PPWM vending stations and Alshamel server.
2. The data of the customer debts and other deductions to be inserted one time to the PPWM software to be processed in every charge.
3. After integration, everyday PPWM data is automatically transferred to Alshamel.
4. Al Isra Company recommends to do the integration in one way; i.e from the PPWM to Alshamel and no need to do it bidirectional.
5. Alshamel upgrading version 6 is to be done before the integration process. The Version up to 6 will be completed in August 2018.
6. Both consumption and financial data can be integrated. But consumption data come late. They said not much of need for water consumption integration because the consumption can be analyzed by the credit charge, be reading the meters often, and by GPR. If customer seldom comes to vending station, hand-held machine is used to collect the date of the customer PPWM.
7. Sewerage tariff could be charged according to water supply consumption. Sewerage charge should be calculated in Alshamel after transfer the data from PPWM system to Alshamel.

(4) Period and cost of integration

- The period and cost of integration will depend on the level of integration and the requirements of integration,(around 1 to 5 months.....1000\$ to 15000\$)
- If from scratch then it takes more time but if it is the same method of integration that they have already done for other cities then the amount of time could be shorter.

(5) Requirement form PPWM supplier

- Some requirements and specifications that are necessary for doing the integration with Alshamel should be requested from the PPWM supplier.
- API (Application program Interface) (XLM format) software is required from the PPWM supplier. This is included in the contract with the PPWM supplier.

(6) Information for Al Isra Company for integration

1) Requirements and data must be provided by the first team (Supplier)

- 1- The first team provides WebApi, which provides the data needed for the integration process (XML)(For example, the Electromed system)
- 2- The main key of the charging record is ID and a non-recurring key
- 3- Charging number (Document number)
- 4- The date of the charging
- 5- Charging time
- 6- Status of the document
- 7- Charging center
- 8- Charging employee
- 9- The name of the customer area
- 10- The number of customer on Alshamel system (Debt collection cannot be recovered without this field)
- 11- Payment amount
- 12- Type of collection
- 13- Type of payment (debt or sale)
- 14- It can be linked with View technology (eg Baylan Co with support fields above), the prepaid provider will provide a WebApi or view mechanism from the Israa website during the inspection period through a VPN connection.
- 15- Before the supplier provides a URL that reads the data from date to date (force Reading from date to date)

2) Defining councils with necessary fields for the integration process:

- 1- ID (integer)
- 2- Name of the Council
- 3- Cost center

- 4- Bond book
- 5- the number of the area of the customer or his name in the WebApi or view
- 6- Cash account number which belong to the municipality
- 7- Account which belong to the first service (water price)
- 8- Account belong to the second service (monthly maintenance fees)
- 9- Account belong to the third service (previous debts)
- 10- Account belong to any service
- 11- A list of the fields to be pulled from WebApi or view (Arabic name, English name, name Field in WebApi, Type of collection in WebApi) for each service Revenue or debt (x services)

3) Definition of charging employees

In Alshamel system, the charging staff is defined in the definition of the current collectors with addition of a. Account number b. Code as defined in the PPWM system of WebApi.

4) Screens Integration with prepaid system

- First screen: Pre-payment system screen:

1. Name of the device that holds the prepaid data
2. Database name
3. The name of the view
- d. Username and password
4. field names as they are in the prepayment database

- Second Screen : Screen Definition of council :

- 1- ID (integer)
- 2- Name of the Council
- 3- Cost center
- 4- Bond book
- 5- the number of the area of the customer or his name in the WebApi or view
- 6- Cash account number which belong to the municipality
- 7- Account which belong to the first service (water price)
- 8- Account belong to the second service (monthly maintenance fees)
- 9- Account belong to the third service (previous debts)
- 10- Account belong to any service.....
- 11- A list of the fields to be pulled from WebApi or view (Arabic name, English name, name
- 12- Field in WebApi, Type of collection in WebApi) for each service Revenue or debt (x services)

- Third screen: The processing screen contains the following operations:

- 1- Data import
- 2- Issuing the arrest data for the total collections by each category and region
- 3- Issuance of bonds for debt collection
- 4- Detailed charging movements report
- 5- Report on total charging movements by region and collectors

5. Operation and Maintenance Plan of PPWM system

5.1. Basic conditions for operation and maintenance of PPWM system

5.1.1. Guarantee and Maintenance and After Sales Services by the Supplier

Based on Guarantee and Maintenance and After Sales Services by the Supplier stipulated in “Technical Specification of PPWM (PWA, MoLG, PSI)”, the operation and maintenance plan of PPWM for Jenin Municipality is prepared.

(1) Guarantee by the Supplier by the Supplier

Bidder shall guarantee for free all the products including the prepaid water meter system and software for 3 years from handing over (taking over) certificate date. Commitment form shall be filled, signed and submitted with the offer as required according to the attached Form No 1. (Source: Technical Specification of PPWM (PWA, MoLG, PSI))

(2) Maintenance and After Sales Services by the Supplier

The Supplier shall provide full services and technical support concerning the maintenance and after sales services for all their products for a period of 5 years starting from the expiry date of the Guarantee. Maintenance and after sales services may include, but are not limited to the following:

- 24 hours - 7 days a week telephonic support
- On site support on request
- Local support
- On site support for a duration of five years.
- The Bidder shall sign with the Service Provider agreement concerning the maintenance and after sales services after signing the contract.
- Commitment form shall be filled, signed, stamped and submitted with the offer as required according to the attached Form No 1. Original form shall be submitted upon request.

(Source: Technical Specification of PPWM (PWA, MoLG, PSI))

(3) Meter maintenance in Maintenance and After Sales Services by the Supplier

5.1.2. Operation and maintenance items

(1) Operation and maintenance organization

The following organization is set up for operation and maintenance of PPWM system but most of them are not only limited to PPWM but also needed by the regular meter system. The following are O&M activities required for PPWM system.

- Installation and registration of PPWM
- Periodical inspection of PPWM including finding of illegal connection and inspection by complaint.
- Maintenance of PPWM (remove, install, and repair)
- Operation of vending stations

- Database and program management and reporting
- Server management
- Customer service and complaints management for PPWM in PA-1
- Public awareness on PPWM for PA-1

5.1.3. Outsourcing O&M of PPWM

Following O&M activities are implemented by supplier for 3 years during guarantee period.

- Meter maintenance (repair)
- Server maintenance

After 3 years of the guarantee period, these activities will be also outsourced as after sales service. However, Jenin Municipality can select two options for meter maintenance for payment.

- Pay annual after sales service by Supplier per meter (6~7 USD in case of Jenin-JWV).
- Pay the cost of repair of water meter piece by piece (in case of JSC-Tubas).

5.2. Setting up of organization for PPWM

Based on the organization of JSC-JWV and JSC-JWV, the following workforce is required for management of PPWM system.

Table 7: Setting up of Organization for PPWM for PA-1

No.	Job title	Number of employees	Section	Duties
1	PPWM maintenance crew - Technician (Sharing PPWM and maintenance of pipe network)	? (part-time, share with existing duties)	Meter maintenance team (new) in Water Section (WS)/ Customer Service Section (CSS)	<ul style="list-style-type: none"> • Maintenance of pipe network • PPWM maintenance which includes: <ul style="list-style-type: none"> - install prepaid meter - replace the battery - if there is failure on prepaid meter, remove the meter and replace it with standby by one, sending the unworked meter to outsourced maintenance center to repair. When the meter is fixed the technician reinstall it again. • PPWM periodical inspection of meter every 1 to 6 months. • Checking of the meter of abnormal value at site for possible illegal connections
2	Vending station clerk	1 (full-time) 1 (outsource)	CSS/ Collection unit	<ul style="list-style-type: none"> • One working in Customer Service Center in Municipality and member in Municipality. • One working in PA-1 (possible outsourced to supermarket)
3	Database/program management	1 (full-time)	CSS	<ul style="list-style-type: none"> • Working in database and sever management. <ul style="list-style-type: none"> - Application, registration, disconnection, etc. - Reporting - Program management • Monitoring and following up the vending stations • Use handheld tools for remote controlling of ON/OFF. • Checking of monthly consumption, find abnormal

No.	Job title	Number of employees	Section	Duties
				values, and report to Customer Service Section. • Checking of the meter of abnormal value
4	Water distribution	1 (part-time)	WS	• Checking of water volume of main meters (source) and branch main meters and compare corresponding bill consumption for illegal use or leakage.
5	Customer service	part-time, share with existing duties	CSS	• Respond and solve complaints quickly. • Provide good service with good communication with customers.
6	Public relation	? (part-time, share with existing duties)	PR	• Receive complaints from customers in PA-1 • Request the related sections to solve complaints • Statistics of complaints and reporting • Public awareness activities for PA-1 (before, during..)
	Total	2 full-time ? part-time (share)		

5.3. Meter maintenance and replacement

5.3.1. Meter maintenance

The mechanical parts of PPWM require same maintenance as regular meters. The current maintenance work of water meters should be improved regardless of PPWM or regular meter. The electrical part of water meter is not possible to repair by the Municipality and it should be maintained by PPWM provider. The Municipality staff can replace battery only in electrical parts. PWA recommends making a service contract with PPWM supplier on maintenance of PPWM.

Following is meter maintenance procedure.

1. Find malfunctioned meter by patrol of meter at site, check meter accuracy by customer reporting
2. Remove and collect meter from the site
3. Replace existing one to tentative one

By outsourced supplier

4. Send it to meter maintenance center of outsourced supplier
5. Clean metering part, maintenance of prepaid card part, check-up of accuracy with using test bench, sealing work, etc.
6. Send it back to the Municipality

Up to here by outsourced supplier

7. Re-install the fixed meter.

The following is an example of maintenance of PPWM in JSC-JWV:

- In general, the PPWM deficiency rate is about 1%. Sometimes the sensors get broken.
- Replacement policy: Replacement of PPWM is free because JSC has such agreement with a maintenance company.
- 2 batteries are inside. The life time will be 10 years but if they charge money more frequently the

life time will be reduced (8 years or so).

- No regular calibration. When it is broken it will be checked by a maintenance company in Ajja.
- Out of 6,000 meters, 10~12 meter/month are needed repair.
- Spares parts stocked in JSC-JWV are battery, caps, etc.

The following are maintenance practices of PPWM in the maintenance center of a PPWM company in Ajja, Jenin Governorate:

- Seven municipalities are serviced by the maintenance center
- They have three sections (water prepaid meters, electricity prepaid meters and IT (software))
- Technical staff: 8 members
- Only broken meters are collected from providers for repair
- On average, 10 meters per day are repaired.



5.3.2. Meter replacement and new installation policy

- Existing customer: Replacement of PPWM is free of charge. Meter is replaced by the Municipality and the Municipality becomes the owner.
- New customer: The following options should be decided by the Municipality.
 - Option 1: Installation of PPWM is free of charge. Meter is installed by the Municipality and the Municipality becomes the owner.
 - Option 2: Installation of PPWM (or as a connection fee) is charged. Meter is installed by the Municipality and the owner is the Municipality.
 - Option 3: Installation of PPWM is charged. Meter is installed by the Municipality and the owner is the customer.
- When existing PPWM is malfunctioned or damaged, the replacement option is decided by site inspection. If damage is not caused by the customer, it will be replaced by the Municipality for free but if the damage is caused by the customer, the replacement cost shall be charged to the customer with penalty if penalty is adopted.

5.4. PPWM database management and reporting

(1) Customer database management

Customer database security is among the important matters when it comes to the management. The PPWM should secure that the database is safe, backed up, and can be recovered when needed.

The followings are points taken into account when managing the database:

1. The vendors are safely connected to the server at JM, and have only ‘viewing’ authority and ‘selling’ authority which means they are not authorized for any data modifications but only selling credits and viewing customer’s past 12 months purchase history.
2. The server that hosts the PPWM software should have a port number in addition to the IP address to be hidden from hackers and possible data thieves.
3. The server must be equipped with firewall for secure and safe data transfer.
4. There must be a 24/7 good internet service and also utilize high quality internet cable for better data transfer.
5. There should be a built-in software with the PPWM that could be connected with the server. This software can monitor the system function and send warnings in case of any issues with the server or the database. This software can also monitor the database use and records any log in history, date and time, with the name of the person who accessed the database.
6. A generator in case the electricity is suddenly down. In addition to the generator the server should be equipped with long-hours batteries and also battery charges in case of any power outage.
7. The database should be backed up in different ways and be synced:
 - a. Backed up on the server
 - b. backed up on an external driver kept in the server room
 - c. backed up on an external driver kept in a hidden location outside the office
 - d. backed up by the PPWM company provider
 - e. backed up on secure and paid cloud service.
8. There must be signs on the server room to prevent entry of not authorized staff
9. The server room should be equipped by security camera and air conditioner.

(2) Reporting

The PPWM system provides the respective data to generate automatically monthly reports separated for the predefined supply areas e.g. sub-area:

- Quantities consumed per tariff step
- Quantities consumed per month per (a) sub-area, (b) vending station, (c) customer
- Credit purchased (NIS/month) per (a) sub-area, (b) vending station, (c) customer
- Credit consumed (NIS/month) per (a) sub-area, (b) vending station, (c) customer
- New customer connected per (a) sub-area, (b) vending station
- Cancelled contracts from customer

- No credit purchased within the month, customers per (a) sub-area, (b) vending station
- Abnormal user behavior (low or high consumption)

The further report can be added according to the necessity of the Municipality.

5.5. Water tariff and maintenance fee

(1) Water Tariff

Water tariff is discounted or not for PPWM customer. It could be possible to discount as an incentive and Municipality can reduce the cost of reading and collection.

- JSC-JWV, JSC-Tubas, and Aqraba Municipality: Not changed.
- Nablus Municipality: Regular charge for mechanical meter is 4.2 NIS/m³; 7 % discount for PPWM (PWA approved).

Jenin Municipality has decided any discount in principle is not adopted.

(2) Maintenance Fee

Maintenance fee is discounted or not for PPWM customer. It is possible to discount because reading and collection activities is saved for PPWM.

- JSC-Tubas: 10 NIS for regular meter customer and 5 NIS for PPWM customer

Jenin Municipality has decided any discount in principle is not adopted.

(3) Debt Recovery

Debt recovery from every credit charge can be included. Jenin Municipality should decide whether or not debt recovery comes with PPWM introduction.

- JSC-JWV: When apply for PPWM they need to first pay 1/3 of their debt amount as settlement and the rest will be paid every month/charge.
- Aqraba: If customer has debt (electricity and other municipal services), payment plan is offered through prepaid system. They decide % of debt for payment by card.
- JSC-Tubas: Debt recovery has not decided but if customer agrees JSC charge it on monthly credit as % of total credit. This is just verbal agreement only.
- To avoid rejection by customers, no payment previous debt charges should be made when PPWM is first introduced. It can be applied later after the introduction has progressed.

Jenin Municipality has decided debt recovery will be adopted from the start of introduction of PPWM.

The percentage shall be decided.

(4) Offer of initial credit for replacement of traditional meter with PPWM

For the replacement of traditional meter with PPWM, the Municipality can give some credit (e.g. 20 NIS) or quantity (4m³) in the first charge as a free for incentive of introduction of PPWM. Jenin Municipality has decided first credit (let say 20 NIS) will be charged but later it will be recovered from the credit charge by customer.

5.6. Required regulations and city council decision

(1) Subscriber's contract

In the JICA project, the existing water meter is replaced with PPWM or PPWM is newly installed by Jenin Municipality free of charge so that the owner of PPWM should be Jenin Municipality. A further scrutiny of current customer subscription contract is required with the Legal Unit and the change of subscriber contract will be studied. However, if the new revised contract shall be signed by customer, it may cause rejection. A careful consideration is required.

(2) City council decision

Installation of PPWM may need city council decision on the following points before start.

- Installation strategy
- Location of PPWM
- Financial incentive, if adopted
- New penalties, if adopted
- Change customer subscription contract
- Debt recovery policy, if adopted

In the mothy meeting o 29th July, it was confirmed that the decision is required for followings:

- Financial incentive
- New penalties
- Change customer subscription contract
- Debt recovery policy (need a further check)

6. Customer Service Plan

6.1. PPWM replacement/installation services

As mentioned before, it is important to make sure that the Municipality provides good services to the PPWM customers, during the re-placement and after the replacement. The followings are taken into consideration by the Municipality when providing the PPWM services:

1. Proficiently manages the services and reduces processing period.
2. Makes the procedures as paperless as possible and holds digital documentations of the provided services.
3. Reduces number of customer commutes to the Municipality for services as possible.
4. Focuses on customer satisfaction, clear, and smooth procedures for the services.
5. Takes constant measures to reduce or prevent errors when providing and/or handling the services.

To achieve the above approaches, the Municipality's customer service quality reflects efficiency -before and after the PPWM replacement (and any new installations).

(1) Before replacement

The following actions are taken before replacing the water meters:

- a. The last meter reading, just before replacement, is documented for customer's information and also to avoid any sorts of claims by the customer at later time.
- b. The replacement team needs to fill out the final reading form, sign, and take the following photos.
 - Photo 1: Existing water Meter
 - Photo 2: Existing water Meter showing the surroundings
 - Photo 3: Installed PPWM
 - Photo 4: Installed PPWM showing the surroundings
- c. The filled-out form and the photos are electronically filed for each customer by customer house ID.
- d. A specific person (from PR department preferable) is assigned for the entire of this task including filling out the form, take the photos, and file electronically.

**Final Water Meter Reading before
Replacing with PPWM**

The final water meter reading is confirmed as below:

Date of Reading/Replacement: (mm/dd/yy)

House ID:

Neighborhood: Khroube Sobah AlKheir N. Street

Address:

Name of the Water Meter Owner:

Type of Regular Water Meter:

Water Meter No.:

Final Reading:

New PPWM No.:

The following photos were also taken:

Photo 1: Water Meter

Photo 2: Water Meter showing the surroundings

Photo 3: PPWM

Photo 4: PPWM showing the surroundings

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the Capacity of Water
Service Management in
Jenin Municipality”



Replacement Staff

Name:
Position:
Signature

Customer (if Present)

Name:
Signature

Customer Service Section

Name: Khaled Abu Obeid
Position: Section Head
Signature

(2) After replacement/new installation

PPWM is a new system to the city and the residents are not familiar with. Thus, an assigned JM staff (PR staff) is available at the time of replacement/new installation and explains the followings and makes sure that the customer understands how to use the system.

The designated staff must go through the checklist below in end of the replacement/installation. The checklist should be electronically filed by House ID.

**PPWM Instruction Checklist
After Installation**

Date of Installation/Replacement: (mm/dd/yy)

House ID:

Neighborhood: Khroube Sobah AlKheir N. Street

Address:

Name of the Water Meter Owner:

New PPWM No.:

The customer is informed:

An introduction on the PPWM's type, how it works, and its parts	
Water tariff fee and PPWM ownership	
How to use the charging card, and read the water meter	
How to maintain the PPWM from damages, or misuse	
The initial available amount of water for first use	
How and where to re-charge the card and purchase credits	
Where to report if notice any damage in the PPWM or malfunction	
What to do if the charging card is stolen or lost	
JM website complaint system and live chat	
Apply for different services at the PCSC	
Customer's other questions are answered.	

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Service Management in
Jenin Municipality"



Japan International Cooperation Agency
وكالة التعاون الدولي الياباني

Replacement Staff

Name:

Position:

Signature

Customer

Name:

Signature

Customer Service Section

Name: Khaled Abu Obeid

Position: Section Head

Signature

(3) After replacement; handling service applications

Like non-prepaid meters, there are different kinds of service applications for PPWMs as well which need to be handled efficiently.

The DAMAS system is the available option for electronic application and processing of different services. The customers should present their applications at the Public Customer Service Center (PCSC) and also receive the results of their applications later on. The customer service applications can be electronically processed through DAMAS. The computers at the center have access to the

DAMAS system and can receive applications.

A staff of the WWD -stationed at the PCSC- receives applications for water services and informs the results to the customers by SMS or phone.

1. Pre- applications for PPWM (Site check)

This application is available to applicants who first need to inquiry if there is water network available in their area before they apply for a subscription.

The applicant needs to go to the PCSC and fill out the “Site Check” application on DAMAS system. The application will go through the following electronic paths for processing:

The application once entered on DAMAS is passed to the Head of Customer Service section (view only) and the Head of Water Section to process. If there is no water network, the Head of Water Section comments on the request and sends back to the PCSC. The PSCS sends an SMS or calls customer to inform the unavailability of the water network. If there is water network, the Head of Water Section comments on the request and sends back to the PCSC. The PSCS sends an SMS or calls customer to inform the availability of the water network and that the customer needs to go back to the PCSC and apply for the new connection. The customer will be also informed what documents to bring to the PCSC.

2. Application for PPWM

The customer comes to the PCSC with the required documents and fills out the applicant for new connection on DAMAS. The application, once completed on DAMAS, is electronically sent to the Head of Customer Service whom checks the documents and the application. The application document is electronically sent to the Head of the WWD to sign and order for network connection. The Head of Water Section completes the connection and send an electronic notice on DAMAS to the head of Customer Service Section. The new customer information is entered into both the AlShamel System and PPWM system.

3. Procedure for account transfer

This is the case when customers want to transfer the account to another name. The application is filled out on DAMAS at the PCSC in person. The form is electronically sent to the Head of Water Section to check the possibility of transfer. If possible, the request is then sent to the Head of WWD to sign and order back to the Head of Water Section and also the Head of Customer Service Section to view and update the new information on the AlShamel and also on the PPWM system.

4. Procedure for location change

Under preparation

5. Consumption check/PPWM check request

Under preparation

6. Subscription cancelation

Under preparation

7. Long term temporarily service stop

Under preparation

8. Reconnection

Under preparation

6.2. Handling Customer Complaints

The staff effort is given to prevent or reduce customer complaints. However, when complaints are received, they are handled professionally and the staff ensures that the issue is resolved within a reasonable period of time to the customer satisfaction.

(1) Complaints received through the JM Website

To avoid or reduce phone calls by the complainers, the new Municipality website is designed to electronically received complaints letters. The customer complaints -once sent vis the website- goes through the following paths:

1. Once the complaint is filled out on the JM website, it is electronically sent to the account of the head of WWD (to process) and also the head of the PSCC head (to view only).
2. The head of WWD orders the related section to process the complaint.
3. After the issue is resolved the head of WWD electronically comments on the complaint with the actions taken to resolve the complaint issue.
4. The response is electronically sent to the PCSC account.
5. The PCSC forwards the response to the complainer by SMS or phone call if SMS is not available. The SMS includes a link to the website where customer can view the head of the WWD's response.
6. After viewing, a satisfaction survey window pops up so customer can express his/her satisfaction by rating.
7. The satisfaction rating is sent back to the head of the WWD to view and follow up in case it is not satisfactory.

(2) Through live chat on the JM's website

The Live Chat part of the JM website is also available for instant complaints/inquiries where customers can type their questions and receive instant response. A staff of the Public Relation section is in charge of the responding this kind of requests. If the staff cannot provide an instant response, he can contact the WWD for answer and write back to the customer. It is also recommended a staff of the WWD to be available for PPWM related questions and inquiries on this Live Chat.

6.3. PPWM Credit Charge

The customers can purchase credits for their water use at the following places.

The places will extend as the number of customers increase over time.

(1) At an authorized vendor

The vendor is chosen based on the pre-existing condition of the internet availability, a computer, personal smartphone, computer and communication skills, popularity and safety of the place, convenient location, and long opening hours. The vendor signs a contract with JM to provide the PPWM purchase service and received an agreed percentage of the collected amount as the fee for his service. The percentage is calculated based on the monthly collection and is deposited to the vendor's account in end of each month. JM provides a printer and the PPWM software with limited authorization. The vendor is authorized to view up to past 12 months of customer's transaction history and print as requested by the customer at the store. The vendor is responsible to transfer the collected amount daily to the JM either in person or by bank transfer.

(2) At the city center collection center

This center is conveniently, located in the city center area for customers to visit to charge their cards as they are in the area for shopping or for business. A permanent staff of the JM is available at the collection center for extended hours with access to the PPWM software and printer with limited authorization. The staff is also authorized to view up to past 12 months of customer's transaction history and print as requested by the customer at the center. This center has been rehabilitated for the purpose of providing a more welcoming atmosphere for customers. New wall and floor tiling, painting, and refurbishing, and improved internet and phone connections are some of the major rehabilitations at this center.

(3) At the Haifa street collection center

The center is also available for customers to purchase credits for their PPWM usage. It is located in an accessible location and has been re-stored for this purpose. A permanent staff of the JM is available at the collection center for extended hours with access to the PPWM software and printer with limited authorization. The staff is also authorized to view up to past 12 months of customer's transaction history and prints as requested by the customer. Internet and phone connections, computer with PPWM software, and printers are available for the transactions and providing customers with receipts of their transactions.

(4) At the Public Customer Service Center

At the PCSC, the customers can also re-charge their prepaid cards. The PPWM software is installed at least on one computer there and connected to the server.

6.4. Inspection of PPWMs

(1) Oddity in the PPWM database and transactions

The customer database of the PPWM should be constantly checked for any abnormality in transactions and water consumptions database. This data inspection helps identify any problems or misuse of the service.

In the database check, the staff looks for:

- a. customer who has not charged the PPWM card for a while.
- b. customer whom consumption or credit charge amount has suddenly dropped in last few months.
- c. customer whom usage of water or amount of credit charge has increased suddenly in past months which could be sign of some leakage in water meter in which customer has not noticed.

Effective measures and actions are taken when any of the above is discovered. Penalty is in place for misuse cases.

Amount of Misused Water (m ³)	Penalty
1. ... to ... m ³	... NIS
2. ... to ... m ³	... NIS
3. ... to ... m ³	... NIS

(2) Inspection of PPWM device

JM launches PPWM inspections every **x months** to check and confirm the PPWMs for the following status:

1. Working status of the water meter and the box:
 - a. Checks if the censor works properly
 - b. Checks if both mechanical and digital meter indicators show the same consumed amount of water.
 - c. Any rotation of the meter box
2. Illegal use and meter leakage:
 - a. Checks if the censor is tempered.
 - b. Checks the valves.
 - c. Checks leakages before and after the water meter
3. Checks displacement or damage of the water meter

After the inspection, a sticker is placed on the PPWM box showing the date of the inspection.

6.5. Penalty

Effective measures and actions/penalties are taken when any of the above is discovered.

Type of Misuse	Penalty
1. Damage to censor	... NIS
2. Damage or cut of the pipes before and after meter	... NIS
3. Remove meter	... NIS
4. Damage to digital and mechanical indicators	... NIS
5. Meter displacement	... NIS
6.	... NIS
7.	... NIS
8.	... NIS

7. Public Awareness Plan

7.1. Preliminary Consultation

Public awareness activities are important to prepare the residents for the PPWM system. The purpose of the activities is to inform public about the positive impacts of the PPWM in providing better water services and to gain public's consents and support towards PPWM. Not only the PPWM plan itself needs public backing but the implementation of the PPWM installation plan also needs their support and should meet the public's expectation.

To understand the public's expectation of the installation procedures an introductory survey is designed and is conducted before implementation of the meter installation. A second survey needs to be conducted in order to collect public information and compare if the implementation plan has met the public's expectation.

(1) Introductory survey (before replacement)

This survey needs to be conducted before the installation starts, a week before.

Introductory survey (before replacement)

House ID

Name of Interviewee/ Phone number

Date of interview

1. PPWM Introduction

1.1 Have you heard that JM is going to install PPWM for your area? No Yes If Yes: How?

1.2 What is your general view about such plan of PPWM in your area? And why? Positive Negative

1.3 Would you be positive to install PPWM in your place? Yes No

2. PPWM Device

2.1 Do you know about these types of PPWMs: PP Volumetric PP Velocity PP Ultrasonic

2.2 Would you like to hear which one is selected for this Project and why?

3. PPWM Implementation

3.1 The water meter of your premise will be replaced with PPWM by JM. What is your expectation of JM at any stage of the replacement:

a. Time of the replacement: Weekday/Weekend Morning Time/ Afternoon Time / Evening Time

b. Woman in the replacement team: No need It is needed

4. PPWM Charge and Use

4.1 Do you know how to use the card? Yes No

4.2 Where would you like to charge your card?

5. PPWM PR Activities

5.1 What method you would like to be reached for the PPWM project public information: Public meetings, workshops, door to door, JM website, Phone call, SMS, tour visits, Imams

6. Satisfaction

6.1 What factors will make you satisfied with the PPWM installation procedure?

(2) Evaluation survey (after replacement)

This survey needs to be conducted when the installations are completed, about a month after and should the same household to be interviewed.

Evaluation survey (after replacement)

House ID

Name of Interviewee/Phone number

Date of interview

1. PPWM Introduction

1.2 What is your general view about the PPWM in your area? And why? Positive Negative

1.3 Are you positive to be installed by PPWM in your place? Yes No

2. PPWM Device

2.1 Do you know about these types of PPWMs: PP Volumetric PP Velocity PP Ultrasonic

2.2 Do you know which type is installed in your place and why it was selected by this project?

3. PPWM Implementation

3.1 Has your expectation of JM at any stage of the replacement met?

a. Time of the replacement: Yes No

b. Woman in the replacement team: Yes No

4. PPWM Charge and Use

4.1 Do you know how to use the card? Yes No

4.2 Do you know where to charge your card? Yes No

5. PPWM PR Activities

5.1 What method were you more satisfied to be reached for the PPWM project public information: Public meetings, workshops, door to door, JM website, Phone call, SMS, tour visits

6. Satisfaction

6.1 Are you satisfied with the whole procedure of the replacement? No Yes,

6.2 If yes, what factors made you satisfied with the PPWM procedure?

6.3 if Not, what is the reason?

7.2. Public Awareness Campaign before Installation

The activities before implementation of the PPWM aims on the benefits of PPWM and how the PPWM works and counts water use. It answers all inquiries from the public and includes as follows:

- Prepare project information sheet
- Prepare PPWM flyer

- Prepare give away items
- Meeting with PA-1 community leader, mosque imam, and other key people and explain about Project strategy.
- JM website announcement and Project Q/A or public opinion section
- Radio/Facebook announcements
- Visit tour of WJSC
- Workshop as introduction of the Project
- Invite guest speakers from areas that successfully implemented PPWM; other municipality or JSC-JWV or Tubas JSC to share their experiences.

7.3. Public Awareness During Installation and Operation

The campaign focuses on the proper use of the PPWM, procedures for the related service applications, new service procedures, complaints system, etc.

- Public meetings
- Prepare and distribute instruction sheet on how-to use PPWM.
- Prepare and distribute information sheet about misusing the service
- Visiting tours for the residents to areas with PPWM i.e. other municipality or JSC-JWV or Tubas JSC to see their experiences.

8. Training Plan for PPWM System Management

According to the Technical Specification of PPWM (PWA, MoLG, PSI) as shown below, the Supplier trains the technical people in service providers how to install and maintain the meters, how to manage database, etc.

“1.14 Training

The bidder is required to provide on-site training for the installation, commissioning and maintenance of all equipment. The bidder must provide a training schedule together with the bid. The training must conclude with a test for the training personnel to ensure and verify competence. The training schedule will detail the various levels and types of training: this is envisaged to include, but is not limited to, training to the following personnel:

- 1. Installation technicians: for the installation, commissioning, maintenance and testing of equipment
- 2. Administrative personnel: for the software application and vending environment
- 3. Database and application personnel: for assistance and maintenance of the back office integration

The training will be held in service provider premises.

- 4. The training shall cover the following:
 - a) three training sessions for the administrative personnel and the database and application personnel
 - b) three training sessions for the installation technicians personnel.”

(Source) Technical Requirements and Specifications for Supply and/or Installation of Prepaid Potable Water Meters System (Ver.3, June 2017 (PWA, MoLG and PSI))

9. Implementation Plan (preliminary)

	Aug 2018	Sept	Oct	Nov	Dec	Jan 2019	Feb	Mar	Apr
1. Procurement									
1.1 Set up vending st., server, handheld									
1.2 Meters									
2. Installation in PA1									
3. Public awareness									

10. Countermeasures for challenges during implementation

What is expecting claims from the customers and how to deal with them (Q and A)

11. Post evaluation

Evaluation items

Appendix- 1:

1-1 Social Survey in PA-1 Area

(1) Survey plan

This section of the report is prepared based on the findings from the social survey conducted for the Pilot Area 1. In addition to the basic information, the social survey collected information on:

- 1) Customer satisfaction of JM's water service,
- 2) Willingness to pay in case of any increase of water tariff and,
- 3) Public's opinion on PPWM if the Project decides to install PPWM.

A total of 124 questionnaires were filled out in the PA 1 area, randomly, including 101 households and 23 business establishments. Since the PA1 area is mostly residential and the number of businesses is small and mostly small shops, the survey results were tabulated as all respondents and not separated as households and businesses. However, the data was tabulated as connected customers and not connected customers because the connection status had an impact on the responses.

(2) Basic Characteristics of Water Status

1) Respondents' characteristics

- Number of households per surveyed connected houses: mostly one HH per residential building.
- Ownership: All connected or unconnected houses were owned.
- Connection status to water supply network: 86% of the respondents are connected (households and businesses). (Table 1)

Table 1: Basic Information of the Surveyed Residents and Connection Status (PA1)

Connected Residential Properties				(88 out of 124) 70%
Ownership	Own: 88		Rented: 0	
Gender	Male: 38		Female: 50	
Number of HH	1HH: 49	2HH: 17	3HH: 19	4HH: 3
Education	Illiterate: 8	Elementary:24	Secondary:39	Post-Secondary:26
Un-Connected Residential properties				(13 out of 124) 10%
Ownership	Own: 13		Rented: 0	
Gender	Male:4		Female:9	
Number of HH	1HH: 11	2HH:1	3HH: 1	4HH:0
Education	Illiterate: 2	Elementary:1	Secondary:1	Post-Secondary:9
Connected Business Properties				(20 out of 124) 16%
Ownership	Own:13		Rented:7	
Gender	Male: 13		Female :7	
Type of property	Wedding hall (1), Hotel (1), Car company (1), Gas station (1), Kindergartens (2), Shops (3), Furniture shop (2), Factory (1), Wholesale market (1)		Schools (3), Hair salon (2), Restaurants (2)	
Un-Connected Business Properties				(3 out of 124) 2.4%
Ownership	Own:1		Rented: 2	
Gender	Male: 1		Female: 0	
Type of property	Gift shop (1), and baby shop (1)		Wholesale market (1)	

Source: JICA Expert Team

2) Status of Water Access

- Out of the 124 surveys, 108 (87%) are connected to the water network.
- Water availability has no pattern and doesn't show a concrete weekly or monthly schedule.
- In the summer, water is available to most of the respondents only one day a week and mostly only for 4 to 12 hours.
- The respondents have to purchase water to fulfill their needs. The water availability is unclear, and lack of schedule has cause some respondents not to be aware about the days/hours they have access to city water. The city water and purchased water is stored in the same tank and this is other reasons they don't truly know when they JM water is available at their places.
- The seasonal access is also another issue. In the summer more responded to have access to only a day per week while in winter more have access to 3-4 days a week. (Table 2)

3) Amount and cost of purchasing water from private vendors

- Half of the connected customers (108) still need to buy water for about 20m³ per month to meet their needs which costs them on average about 207NIS per month. When asked for other reasons they mentioned that the JM water is not clean and suitable to drink, it disconnects sometimes and not available continuously.
- The unconnected residents (16 of the total 124) so buy water; about 20m³ per month to meet their needs which costs them on average about 190NIS per month. They have their own reasons not to be connected. Beside of lack of water network for their properties, other reasons for un-connection is that they get free water from the neighbors, they don't want to deal with the Municipality, and that water tariff and connection are too expensive.
- Interestingly, those who are connected to city water network buy same amount of water as the un-connected buy, on average. This could indicate that the water supplied to the area in general is not enough and both group have to turn to the vendors for their need of water. Further look at the total water supply at user level needs to be studied. (Table 2)

Table 2: Status of Access to the Municipality's Water in the Surveyed Area (PA1)

Connected to JM water network				(107)* 87%		
Do you have access to JM water every day?	Winter	Yes (6) 5.6%	No (87) 81.3%			IDN (14) 13.1%
			1 day (27) 31%			
			~3h	4-6h	7-12h | 12-24h | IDN	
			(3)	(9)	(6) | (9) | (0)	
			2 days (25) 28.7%			
~3h			4-6h	7-12h | 12-24h | IDN		
(3)			(6)	(5) | (6) | (5)		
3-4 days (30) 34.5%						
~3h			4-6h	7-12h | 12-24h | IDN		
(1)			(2)	(6) | (19) | (2)		
1 time/month (2) 2.6%						

* Note:
One respondent is excluded for this

question as he refused to answer.			~3h (1)	4-6h (0)	7-12h (1)	12-24h (0)	IDN (0)		
			2 times/month (3) 3.4%						
			~3h (0)	4-6h (1)	7-12h (2)	12-24h (0)	IDN (0)		
	Summer	Yes (5) 4.6%	No (99) 92.5%					IDN (3) 2.8%	
			1 day (47) 47.5%						
			~3h (4)	4-6h (11)	7-12h (25)	12-24h (7)	IDN (0)		
			2 days (28) 28.3%						
			~3h (4)	4-6h (7)	7-12h (8)	12-24h (4)	IDN (5)		
			3-4 days (9) 9.1%						
			~3h (2)	4-6h (1)	7-12h (1)	12-24h (5)	IDN (0)		
			1 time/month (8) 8.1%						
			~3h (3)	4-6h (0)	7-12h (3)	12-24h (2)	IDN (0)		
			2 times/month (5) 5%						
			~3h (2)	4-6h (2)	7-12h (0)	12-24h (0)	IDN (0)		
			Some months (2) 2%						
			~3h (0)	4-6h (1)	7-12h (0)	12-24h (1)	IDN (0)		

Source: JICA Expert Team

(3) Customer Satisfaction

The 108 connected respondents were asked about their satisfaction of JM water service in past year if they used any of the service: New-application process, Meter reading by meter readers, Bill distribution every month, Payment method, Type of water meter, Meter installation, Meter re-connection/owner name change, Water availability in the pipes for your use, and Water quality.

The survey found that the satisfaction order of the services from high to low is as follows. It should be mentioned that meter reconnection, owner name change, and new applications were not used by most of the respondents in past year.

- 1) Bill distribution every month 92.6%
- 2) Payment method 92.6%
- 3) Meter reading by meter readers 86.1%
- 4) Meter installation 65%
- 5) Type of water meter 72%
- 6) Water quality 39%
- 7) Water availability in the pipes for use 19.4%

Table 3: Costs and Amount of Purchased Water from Private Vendors in the Surveyed Area (PA1)

Connected to JM water network				(108) 87.1%	
Do you still need to buy water from vendors? If yes, how much is the cost and the volume?	Yes (54) 50%			No (54) 50%	
	The reasons:				
	1. JM water is not clean				
	2. it disconnect sometimes				
	3. not enough water from JM and it's not supplied for a while				
	4. the water is not suitable to drink				
Cost of Purchased Water				Purchased Amount	
Purchase (a)	Times /month (b)	Cost per time NIS (c)	Total cost NIS/m ³ (b)×(c)	(a)× (b)	
5 m ³	2.8	60	167.9	14	
12 m ³	2.18	113.125	246.6	26.16	
Other m ³	0.0	0.0	0.0	0.0	
Avg.	2.13	86.6	207.25	20.08	
Un-Connected to JM water network				(16) 12.4%	
Why aren't you connected to JM water network and how much is the cost and volume of water you purchase?	Reasons for not being connected:				
	1. Water debt and free water from the neighbors				
	2. No water through the area, and we don't want to deal with the municipality				
	3. water is too expensive, and connectivity is too expensive				
	Cost of Purchased Water				Purchased Amount
	Purchase (a)	Times /month (b)	Cost per time NIS (c)	Total cost NIS/m ³ (b)×(c)	(a) × (b)
5 m ³	2.75	48	132	13.75	
12 m ³	3	97	291	36	
Other m ³	3	50	150	12	
Avg.	2.92	65	190	20.6	

Source: JICA Expert Team

- 80% of the respondents are not satisfied with the water supply amount at their house.
- They pointed that the water taste (30% of respondents), water smell (28% of respondents), water color (23% of respondents), and water particles of sand (45% of respondents) should be improved.
- In general, when asked to rank the water service of JM from 1 to 5 (5 being the highest), over 60% ranked only 1 and 2. (Table 4)
- All the surveyed population (124) was asked about their requests on improved water services from the Jenin Municipality. The responses show that they mostly are looking for improved water pressure, expansion of water network, installation of water meters and connection by the municipality, quick response and fixation of complains, request 3 days of water availability, and increased amount of water by 2 times. More details are shown in the chart below. (Table 5)

Table 4: Customer Satisfaction Level among the Surveyed Population (PA1)

Connected to JM water network					(108)	87.1%			
a. Are you satisfied with the current water service by Jenin Municipality for any of the followings ----if used in past year.									
New-application process?		Yes (15) 14%		No (14) 13%		Didn't use (79) 73%			
Meter reading by meter readers?		Yes (93) 86.1%		No (10) 9.3%		Didn't use (5) 4.6%			
Bill distribution every month?		Yes (100) 92.6%		No (3) 2.8%		Didn't use (5) 4.6%			
Payment method?		Yes (100) 92.6%		No (3) 2.8%		Didn't use (5) 4.6%			
Type of water meter?		Baylan:		Yes		No	IDK		
Baylan: (37) 34.3 %				(28) 75.6%		(7) 19%	(2) 5.4%		
Arad: (60) 55.6%		Arad:		Yes (50)		No (10) 16.7%			
IDK (11) 11.1%				83.3%					
Meter installation?		Yes		No		Didn't use			
		(70) 65%		(15) 13.9%		(23) 21.3%			
Meter re-connection, owner name change?		Yes		No		Didn't use			
		(20) 18.5%		(10) 9.3%		(78) 72.2%			
Water availability in the pipes for your use?			Yes		No		Didn't use		
			(21) 19.4%		(86) 79.6%		(1) 1%		
Water quality improve		No problem	Improve taste	Remove smell	Remove color	Remove particles of sand			
		(42) 39%	(33) 30%	(30) 28%	(25) 23%	(49) 45%			
What would do you rate performance of the current water supply service on a scale of 1 to 5 where 5 is the best and 1 is very poor?					1	2	3	4	5
					(38)	(23)	(32)	(9)	(6)
					35%	21.3%	30%	8.2%	5.5%

Source: JICA Expert Team

Table 5: Requests for Improvements by Surveyed Population (PA1)

All Respondents					(124)	100%
On water supply service		Yes (122) 98.4%			No (2) 1.6%	
a. Improve pressure of supplied water						
b. Days/hours of water availability (#/average hours)		1 day (5) 4%				
		~3h	4-6h	7-12h	12h	24
		(1)	(0)	(0)	(3)	(1)
		2 days (23) 18.8%				
		~3h	4-6h	7-12h	12-24h	24
		(1)	(7)	(2)	(6)	(7)
		3 days (37) 30.1%				
		~3h	4-6h	7-12h	12-24h	24
		(1)	(4)	(7)	(15)	(10)
		4 days (16) 13%				
		~3h	4-6h	7-12h	12-24h	24
		(0)	(8)	(2)	(5)	(1)
		5 days (5) 4%				
		~3h	4-6h	7-12h	12-24h	24
		(0)	(4)	(0)	(0)	(1)
		6 days (2) 1.6%				

	~3h	4-6h	7-12h	12-24h	24
	(0)	(0)	(0)	(1)	(1)
	7 days 35 28.5%				
	~3h	4-6h	7-12h	12-24h	24
	(3)	(3)	(0)	(2)	(27)
c. Increase amount of current water availability	1.5 times	2 times	3 times`	More	No Ans.
	(32) 25.8%	(36) 29%	(20) 16%	(32) 25.8%	(3) 2.4%
d. Expand pipeline network coverage	Yes (121) 97.6%		No (3) 2.4%	Don't matter (0) 0%	
e. Municipality should install meters and connections	Yes (116) 93.6%		No (5) 4%	Don't matter (3) 2.4%	
f. Quick response/fixation to/of complaints	Yes (112) 90.3%		No (11) 8.9%	No Answer (1) 0.8%	
All Respondents				(124) 100%	
On sewerage service	Yes (103) 83.1%		No (17) 13.7%	No Answer (4) 3.2%	
• Fix blocked sewer/sewage	Yes (101) 81.5%		No (17) 13.7%	No Answer (6) 4.8%	
• Quick response/fix/on complaints	Yes (103) 83.1%		No (17) 13.7%	No Answer (4) 3.2%	
• Expand sewer coverage	Yes (106) 85.5%		No (14) 11.3%	No Answer (4) 3.2%	
• Subsidize household connection	Yes (107) 86.3%		No (13) 10.5%	No Answer (4) 3.2%	
• Improve quality of treated wastewater					

Source: JICA Expert Team

(4) Willingness to Pay

As seen in Table 6:

- 83.3% of the connected surveyed population said that they pay their bills and 9.3% don't pay and the rest pay sometimes.
- 70% of the 124 surveyed people did not know about the amount of current water tariff fee.
- When explained about the current tariff fee of Jenin Municipality and some other cities in Palestine, only half of them (50%) believed that it is a fair fee and mostly believed that it is still expensive.
- If water services improved, over half of the respondents are willing to pay a little more (4.87NIS/m³ instead of the current 4.3NIS/m³).

The 45.5% who are not willing to pay more have the following reasons for their opinion:

1. It's municipality responsibility.
2. They have no enough money.
3. It's already so expensive.
4. They don't trust municipality.
5. They are good by well water they purchase so no need to improve and pay more.

Table 6: Willingness to Pay among the Surveyed Population (PA1)

All Surveyed		(124) 100 %			
If connected, do you pay bill every month? Note: 108 are connected.	Yes (90) 83.3%	No (10) 9.3%		Sometimes (8) 7.4%	
If connected or not, do you know how much is the water tariff rate by Jenin Municipality?	Yes (36) 29.9%		I don't know (88) 70.1%		
If connected or not, what do you think about the water tariff in Jenin?	Expensive	Fair	Cheap	No opinion	
	(55) 44.3%	(62) 50%	(2) 1.6%	(5) 4.1%	
What do you think about the sewerage tariff in Jenin?	Expensive	Fair	Cheap	No opinion	
	(12) 9.6%	(76) 61.3%	(31) 25%	(5) 4.1%	
More/improved water service by JM, water network, STP and sewer network mean a healthier life and urban living environment. However, it also could mean an increase in the tariff rate due to the constructions, O&M expense recovery. Would you be willing to pay the rate for water/sewage tariff if increased?	Yes (80) 64.5%	No (44) 35.5%			
		The reason: 1. It's municipality responsibility 2. Not enough money 3. So expensive 4. We don't trust municipality 5. No, we are good be well water			
• If Yes, how much would you be willing to pay more for water tariff or sewerage tariff?	Water tariff: 4.87/m ³		Sewerage tariff: 6.97/mo		
Which system of payment do you think is fair? (for water and/or sewage).	Payment based on a fixed amount (10) 8% Payment based on a flat rate. (98) 79% Payment based on an increasing block tariff (16) 13%				

Source: JICA Expert Team

(5) Opinion on PPWM

- From the total 124 respondents, 81 (65%) prefer PPWM and the rest don't.
- If JM takes a decision to install PPWM, slightly a higher number of residents accept PPWM (67%). This means an obligatory PPWM will not make a difference in the Public's acceptance of PPWM.
- The reasons for accepting PPWM were:
 1. Customer pays regularly
 2. To get water every day without cutting.
 3. This system is better.
 4. Easier for customers and municipal.
 5. More accurate and depends on how much people consume.
- Reasons for not accepting were:
 1. Not enough money to charge regularly.
 2. It cost more money.
 3. Don't trust municipality.
 4. We are paying cash so no need for this system.
 5. This WM read more than consuming.
 6. Not suitable for poor people. (Table 7)

Table 7: Respondents Opinions on PPWM among Surveyed Population (PA1)

Do you prefer PPWM?	Yes (81) 65.3. %		No (43.) 34.7%	
	Owner Yes (80)	Tenant Yes (1)	Owner Yes (42)	Tenant Yes (1)
If JM takes a decision to install PPWM, do you accept?	Yes (83) 66.9. %		No (41) 33.1%	
	Owner Yes (82)	Tenant Yes (1)	Owner Yes (40)	Tenant Yes (1)
Reasons:	Accepting		Rejecting	
	1. Customer pays regularly 2. Makes customer periodic 3. To get water every day without cutting. 4. This system is better. 5. Easier for customers and municipal. More accurate and depends on how much people consume.		1. Not enough money to charge regularly. 2. It cost more money. 3. Don't trust municipality. 4. We are paying cash so no need for this system. 5. This WM read more than consuming. 6. Not suitable for poor people.	

Source: JICA Expert Team

Perhaps the best way to reach out for PR activities are through Facebook/social media, phone, SMS, and also door-to-door visit as these were ranked 2 and 3 out of 5, respectively, when asked about ways to reach out for PR. (Table 8)

Table 8: Best Way of Reaching Out for PR Activities in the Surveyed Area (PA1)

What are the best ways to communicate with you about the City's future projects for water/sewage system improvement? Rank the following list from 1 to 5, with 1 being most effective, and 5 being least effective.	(3) SMS	(4) Newspapers	(2) City Facebook /Website	(5) Radio
	(5) Email	(5) By mail	(4) Neighborhood meetings	(4) TV
	(3) Phone	(3) In person at door	(4) Public meetings at City hall	() Other

Source: JICA Expert Team

1-2 Social Survey: PPWM Satisfaction of Current Users in Other Water Authorities

(1) Survey plan

This section of the report is prepared based on the findings from the social survey conducted for the current users of PPWM. The purpose was to learn their opinions and experiences on using PPWM, any challenges or issues that could help the Project on any decisions on PPWM. A total of 20 questionnaires were filled out randomly, including:

West Jenin JSC (9 questionnaires)

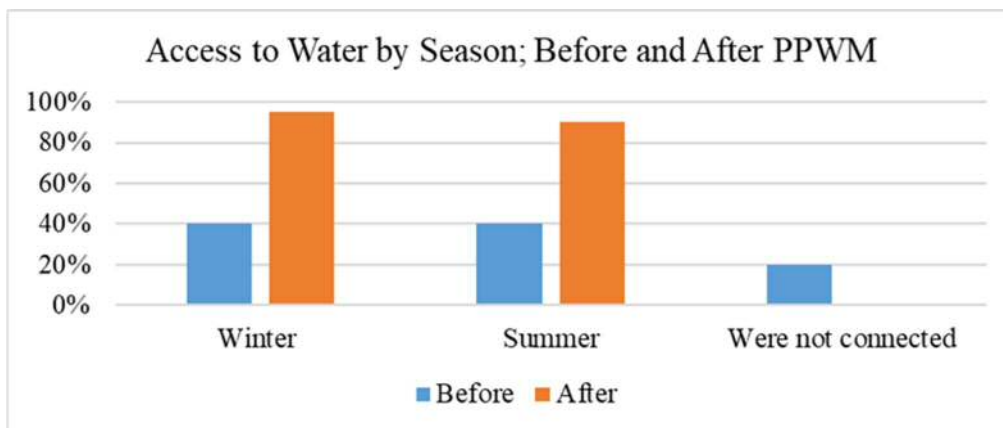
JSC- Tubas (3 questionnaires)

Aqraba village (3 questionnaires)

Nablus city (5 questionnaires)

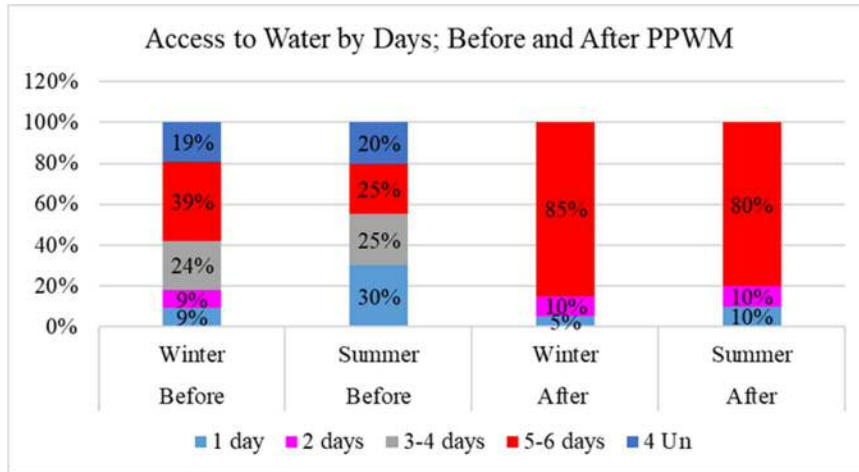
(2) Basic findings; before and after PPWM

1. Access to water before and after PPWM has increased both in winter and summer.
2. Access to water has increased by number of days in both seasons compared with the pre-PPWM; mostly now have water 5-6 days with PPWM.
3. Water consumption decreased after PPWM.
4. Mostly moved to PPWM due to the project requirements. (Figure 11.1 through Figure 11.4)



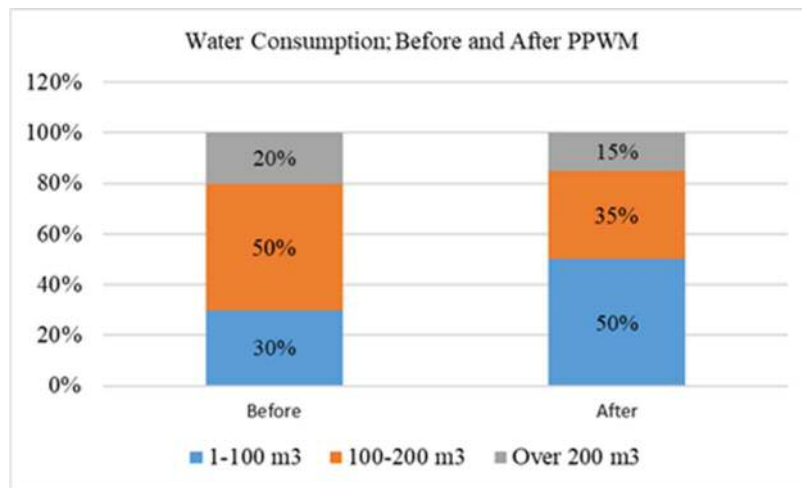
Source: JICA Expert Team

Figure 11.1 Access to Water by Season Before and After PPWM



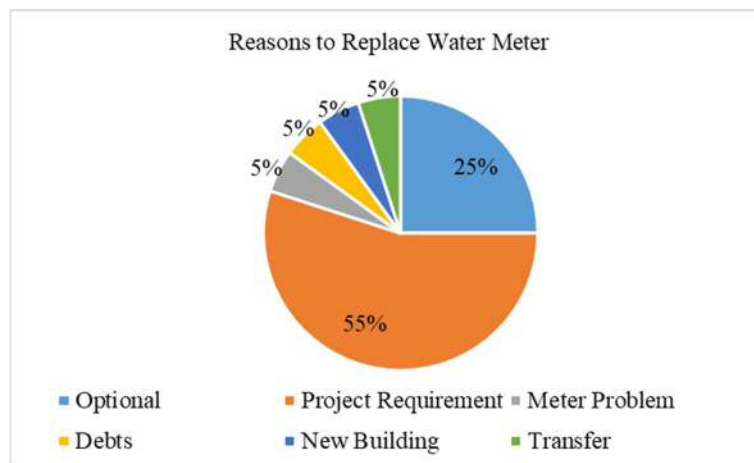
Source: JICA Expert Team

Figure 11.2 Access to Water by Days Before and After PPWM



Source: JICA Expert Team

Figure 11.3 Water Consumption Before and After PPWM



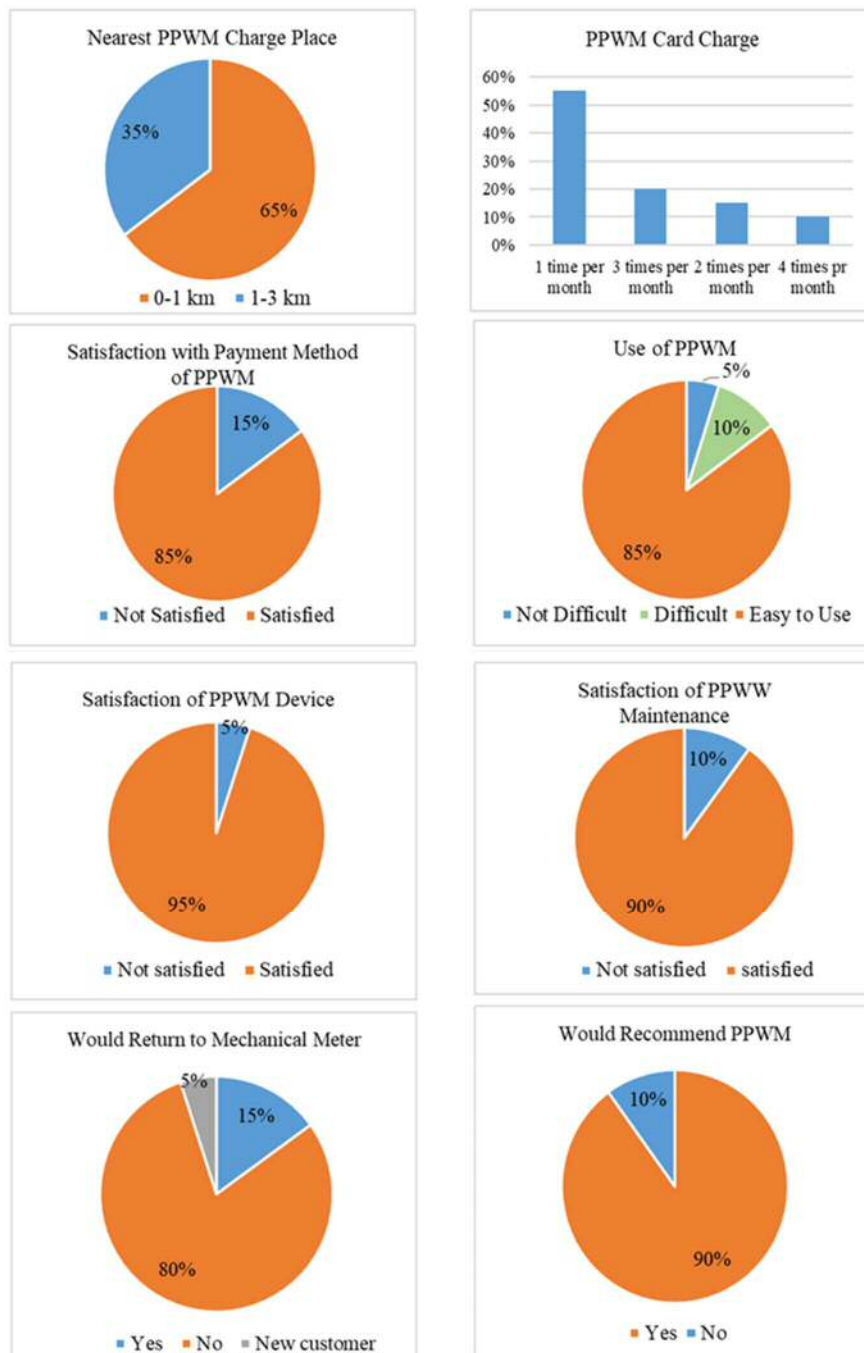
Source: JICA Expert Team

Figure 11.4 Reasons to Replace Mechanical Water Meter to PPWM

(3) Satisfaction

In general, as seen in Figure 11.5, the users are highly satisfied with the PPWM and recommend to others. The reasons for their satisfaction are that the

1. The charge center for PPWM card is close and within 0-1km for most of them. Distance to the charge center has a high impact of the satisfaction.
2. Most of users charge once a month and it is more convenient to them.



Source: JICA Expert Team

Figure 11.5 Satisfaction of PPWM among the Surveyed Users

(4) Other

1. The followings changed since they use PPWM:

Have saved money.

Have saved water.

Have more water available.

Water quality is better.

Water quantity is more accurate and cheaper.

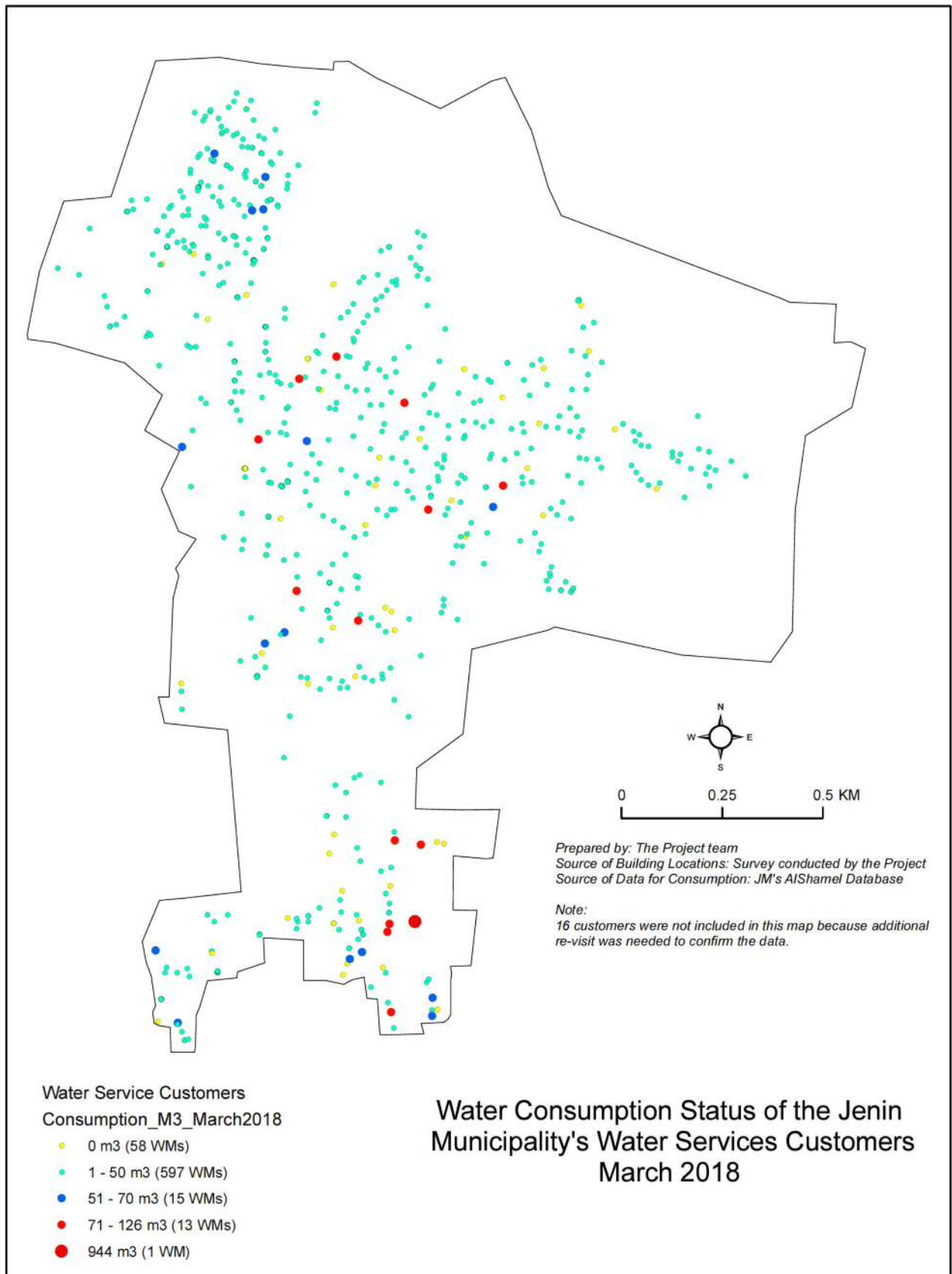
2. There are, however, some issues with the PPWM screen language, the need to have the card to read the screen, and also no signals of warnings.

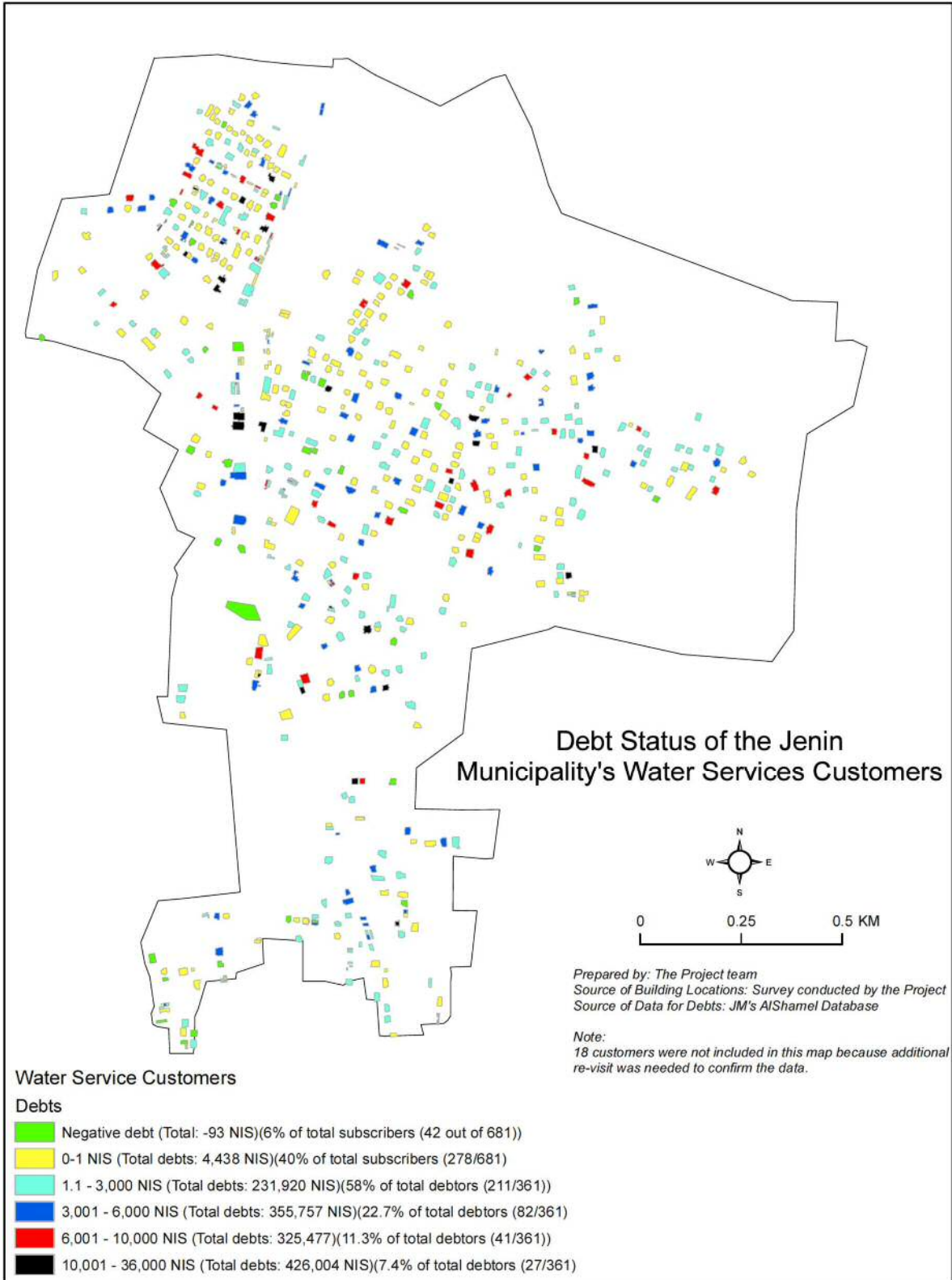
3. Only 10% of the respondents received training on how to use the PPWM.

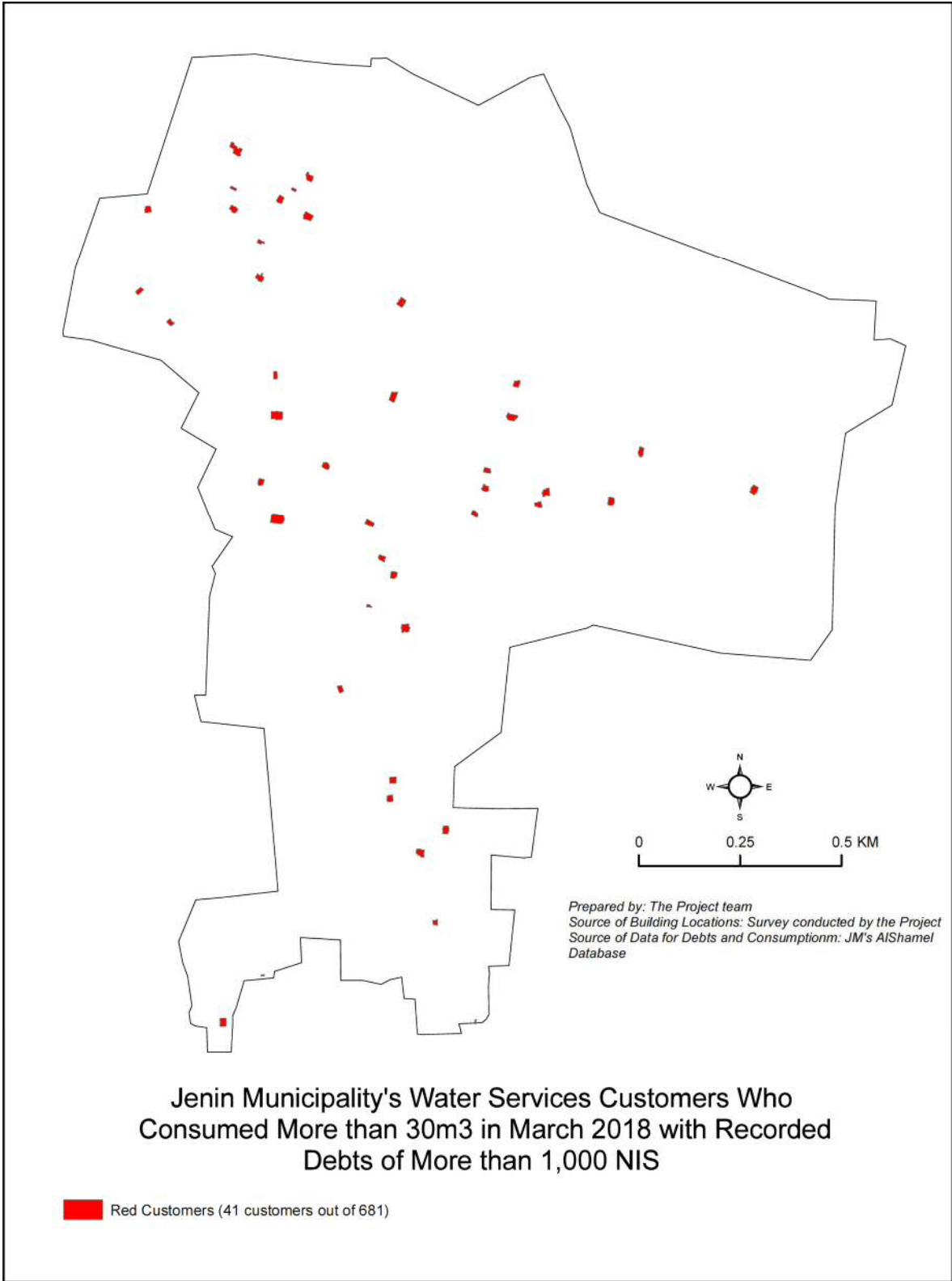
4. 65% are satisfied with the brand of PPWM they are using.

5. Mostly charge up to 100NIS per month.

1-3 Consumption and Debt Statistics in PA-1 Area







Appendix- 2:

2-1 Results of Experiment Meter

A. Outline and Results of Domestic Meter Experiment

1. Background

Velocity and volumetric types are the most prevalent types of domestic water meters. Recently ultrasonic type has also been introduced in the market for domestic metering. Each of these types has merits and demerits depending upon several factors like topography of supply area, water quality, and water supply system (continuous or intermittent). This experiment has been designed in order to understand how each type of these meters function in actual condition of Jenin. The brief outline of the experiment and results obtained so far has been presented in the following section.

2. Specific objectives

- (1) To compare the overall performance of three types of domestic water meters (velocity, volumetric, and ultrasonic types) under existing water supply condition of Jenin,
- (2) To study the effect of air and air-mixed water on measurement performance of these meters, particularly on ultrasonic type.

3. Locations

Eleven locations have been selected (as listed in Table 1 and shown in Figure 1) which are well spread all over Jenin supply area. Some of these locations are at the bottom plain area, some in the mid-hill and some at the top of the hills of Jenin city.

Table 1: Details of test meter locations

Location ID	Area	Owner's Name	Installed Date
1	Sabah Al Kher	Ramzi Ashad	29-Apr-18
2	Kharoube	Thaer Abu Baker	6-May-18
3	Nasra Street	Raghib Malhis (Director of WWD)	3-May-18
4	Water and Wastewater Department (WWD) office (Expert team office)	WWD	26-Apr-18
5	Az Zahara	Yousef Abu Abed	30-Apr-18
6	Jenin Camp	Moute'a (WWD staff)	2-May-18
7	Al Jabriyat	Mohammed Shita (WWD staff)	8-May-18
8	Nablus Street	Mariam Abu Abed	13-May-18
9	Al Maraha	Jafer (driver of project)	2-May-18
10	Halima Al Sadia	Khaled Abu Abed (WWD Staff)	29-Apr-18
11	Sarkia	Mayor of Jenin municipality	6-May-18

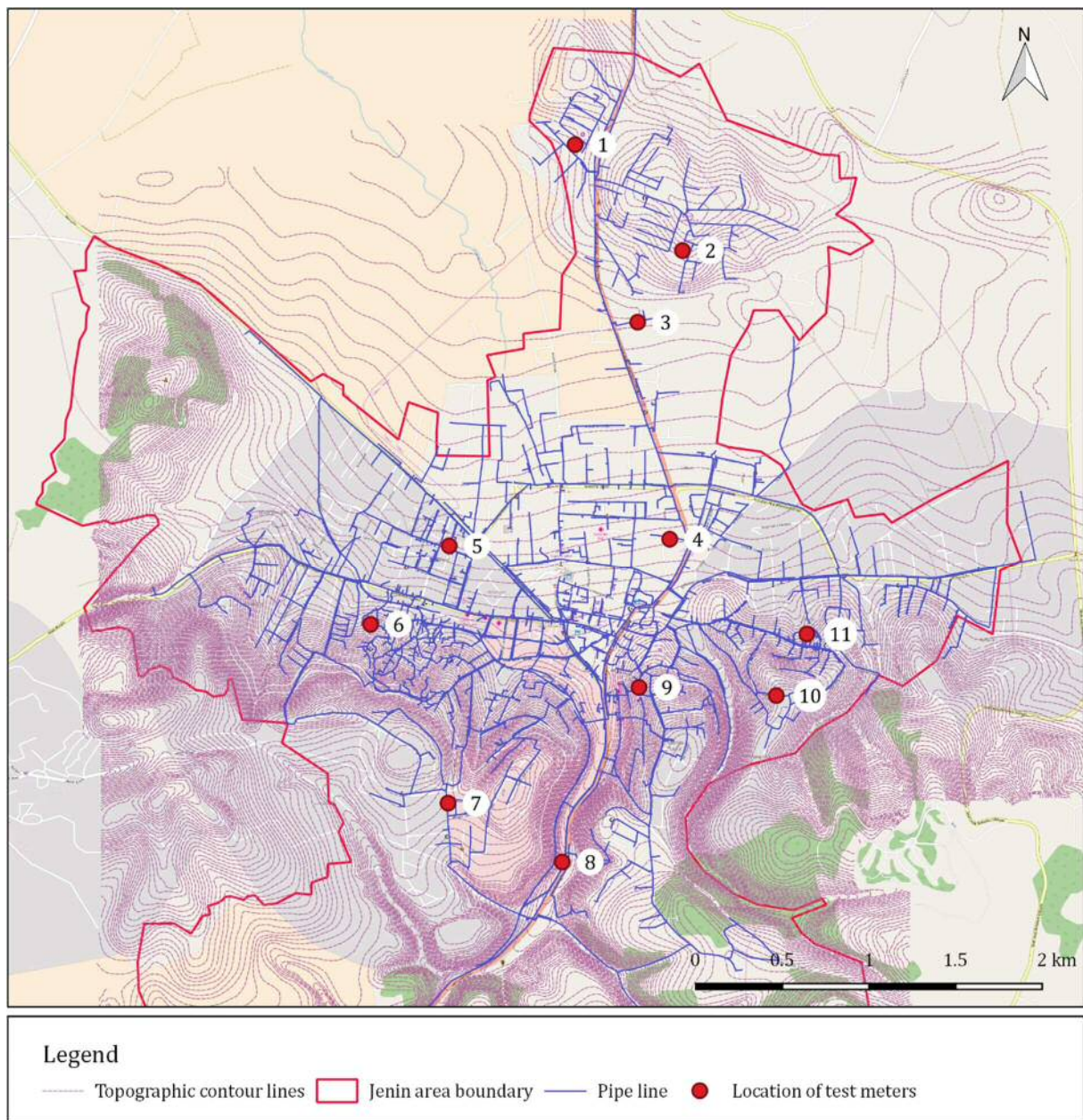


Figure 1: Location of test meters

4. Type and details of existing meters

Details of existing meters are shown in the following table.

Table 2: Type and detail of existing meters

I D	Location Name	Pressure Max (bar)	Air valve	Existing meter			Approx Age (years)
				Size	Type	Brand	
1	Sabah Al Kher	3.5	✗	1/2"	Velocity	Arad	7.5+16.2*
2	Kharoube	1.0	✓	1/2"	(Older one) Velocity, Class B	Arad	> 15 (exact record not available)
					(Newer one) Volumetric; R=200, Not working	Baylan	1.75
3	Nasra Street	2.4	✗	1/2"	Velocity, Class B	Arad	7.5+11*
4	WWD office	7.4	✗	1"	Velocity, Class B	?	7.5+27.9*
5	Al Zahara	1.0	✗	1/2"	Velocity, Class B	Arad	7.5+7.7*
6	Jenin Camp	3.6	✗	20 mm	Velocity, Class B	Arad	3
7	Al Jabriyat	1.5	✓	20 mm	Velocity, Class B	Same as 4WWD	10
8	Nablus Street	6.5	✗	?	? ; Qn=2.5 m ³ /h	Arad	7.5+8.7*
9	Al Maraha	5.0	✓	1/2"	Volumetric; R=200	Baylan	4
10	Halima Al Sadia	0.0	✗	1/2"	Volumetric; R=200	Baylan	6
11	Sarkia	1.5	✗	?	Vel; Qn=2.5 m ³ /h	Arad	23

* Note: Ages of the meters were taken from records in Al Shamel database or sometimes directly from the owner. It is learnt that Al Shamel database was transferred to the new system in 2011. In this process, some of the data of older system were not transferred. Installation dates of the meters were not transferred. Thus, the installation dates for the meters installed before 2011 are not available in the current Al Shamel database. But the records of meter serial number and last readings were transferred and recorded. So for meters installed before 2011, their ages have been calculated as 7.5 years (from Jan 2011 to Jul 2018) plus the estimated years before 2011. The years before Jan 2011 were estimated by extrapolating the volumes recorded between Jan 2011 and Jul 2018 and the final readings on the meters just before Jan 2011.

5. Type and specification of new (test) meters

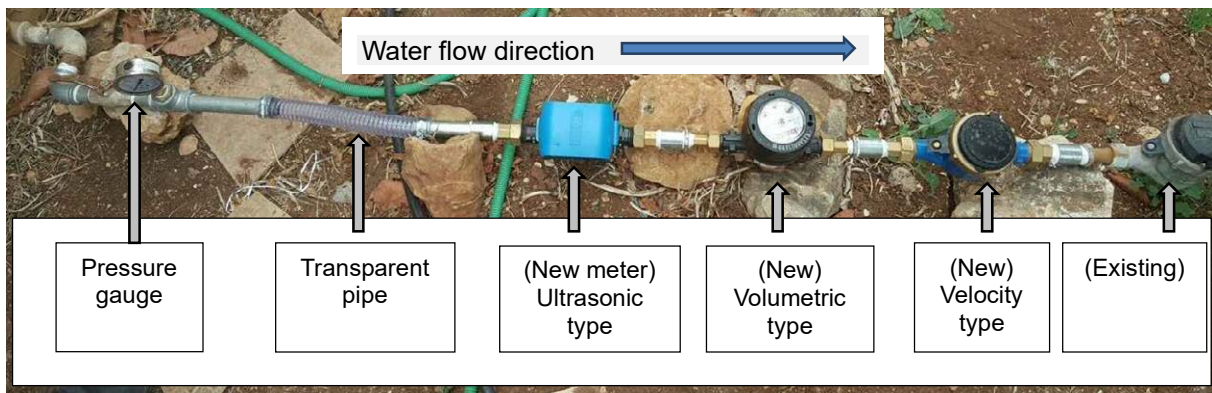
Type and specification of the test meters are as shown in Table 3.

Table 3: Type and detail of existing meters

Meter type	Brand Name	Starting flow	Q1 (Minimum flow)	Q3 (Permanent flow)
Ultrasonic	Arad brand, Sonata 20 model	2 L/h	5 L/h	2,500 L/h
Volumetric	Arad brand, Gladiator model	2 L/h	6.25 L/h	2,500 L/h
Velocity	Arad brand	Not known	25 L/h	2,500 L/h
Existing	Some velocity, some volumetric as already shown above	-	-	-

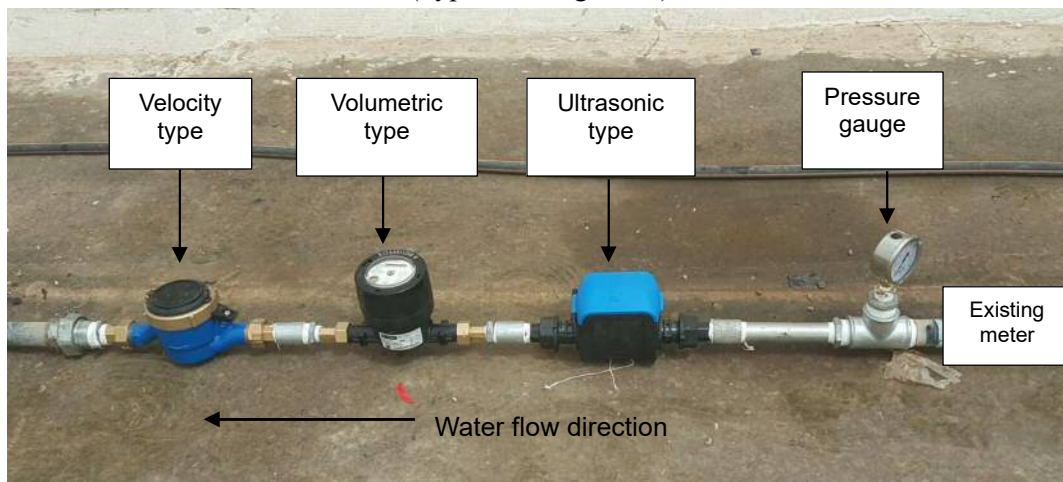
6. Methodology

The methodology of the test is briefly described in the following section.



Picture 1: Arrangement of meters at Location 2

(Typical arrangement)



Picture 2: Arrangement of meters at Location 4 (This location is exception)

(Existing meter is at the upstream side, it is not visible in this picture)

- (1) Three types of new meters (ultrasonic, volumetric, and velocity) have been installed in series with the existing (old) meter on the existing house connection line on each location. Typical

arrangements are shown in Pictures 1 and 2. Existing meter is kept at the most downstream side except in one location (Location 4),

- (2) A pressure gauge has been installed at the most upstream side on each location to monitor supply pressure,
- (3) A portion of pipe line (GI pipe) has been replaced with transparent plastic pipe (example Picture 1) in order to check if the pipe is running full, and if any air is present in the water. This has been done in three locations.
- (4) If the existing connection has already an air valve, the valve has been kept as it is. It has been brought to the beginning (most upstream side). If the existing connection did not have any air valve, then no new air valve has been installed. This is to reflect the real supply condition,
- (5) Meter readings of all the meters are being taken on daily or weekly basis,
- (6) For some of the locations, performance of meters at the beginning of supply (when air and air-water-mix passes through the meters) is being monitored and recorded.

7. Result (as of 28th July 2018)

Summary (excluding Location No. 10 Halima Al Shadia)

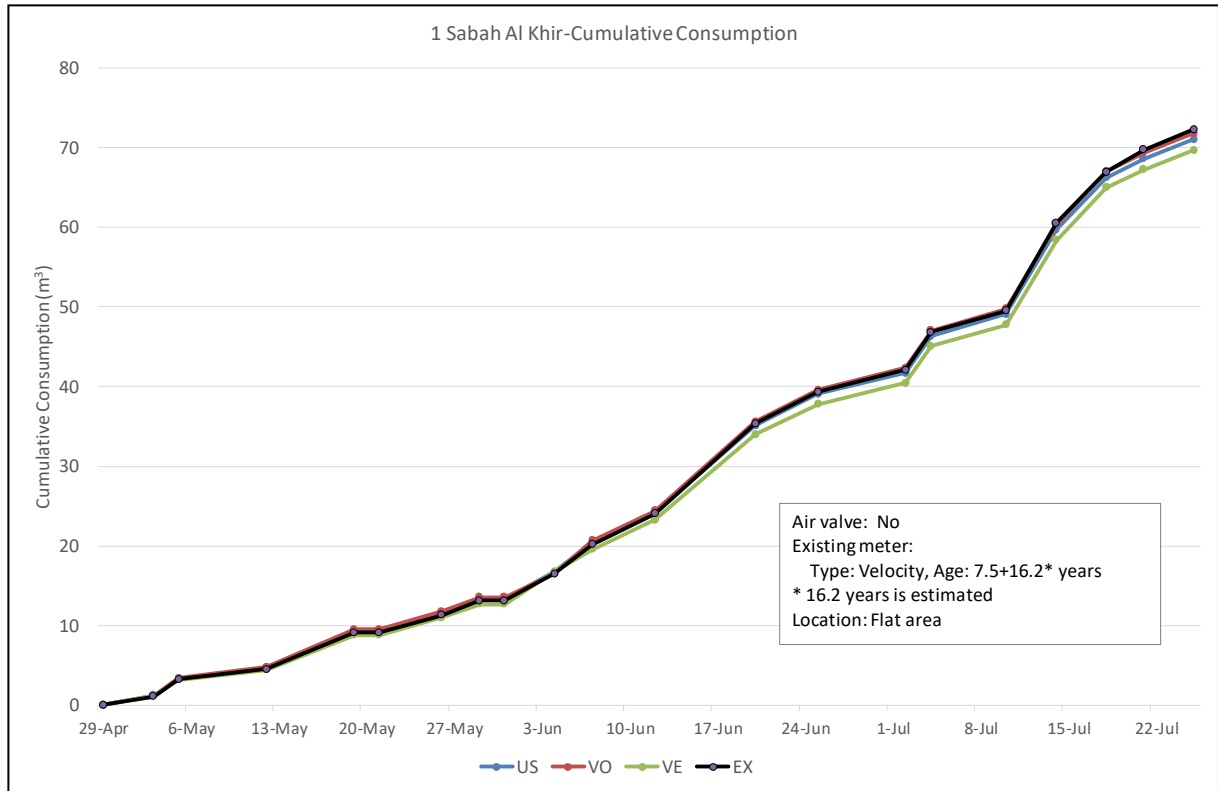
Description	Ultrasonic	Vol.	Vel.	Ex.
Recorded cumulative volume in 10 locations (m ³)	621.1	615.1	596.9	562.4
Relative % compared to volumetric	0.99%	0.00%	-2.96%	-8.56%

Overall result for all 11 locations

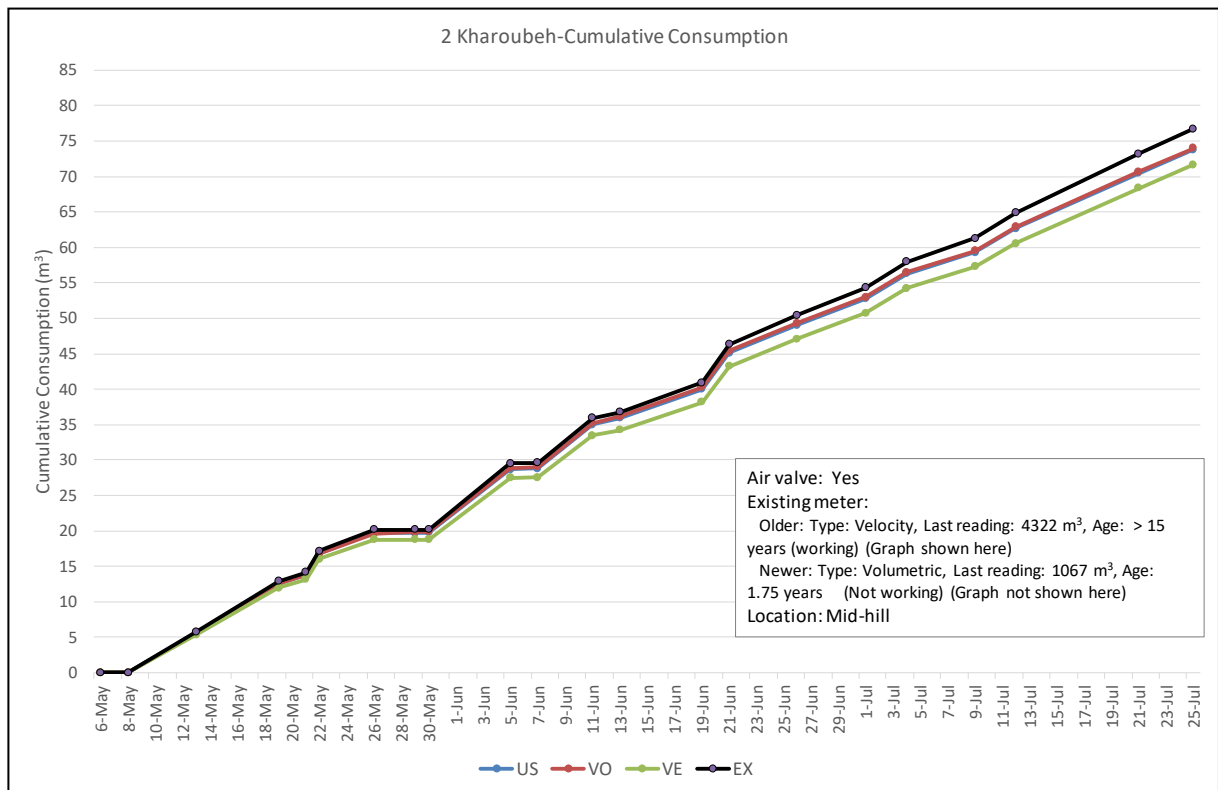
Description	Ultrasonic (US)	Volumetric (VO)	Velocity (VE)	Existing (EX)
Recorded cumulative (m ³)	623.0	624.4	605.7	564.2
Relative % compared to volumetric type	-0.24%	0.00%	-3.01%	-9.65%

B. Result of individual locations

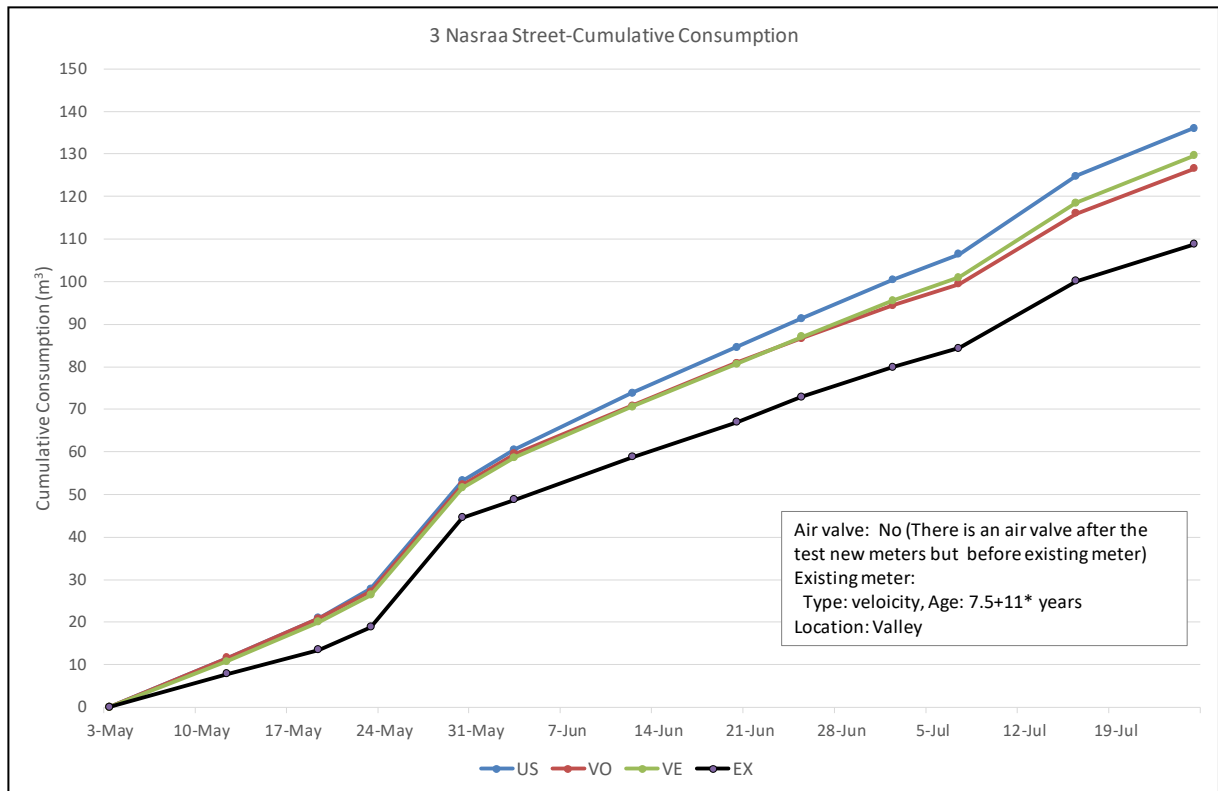
Location 1



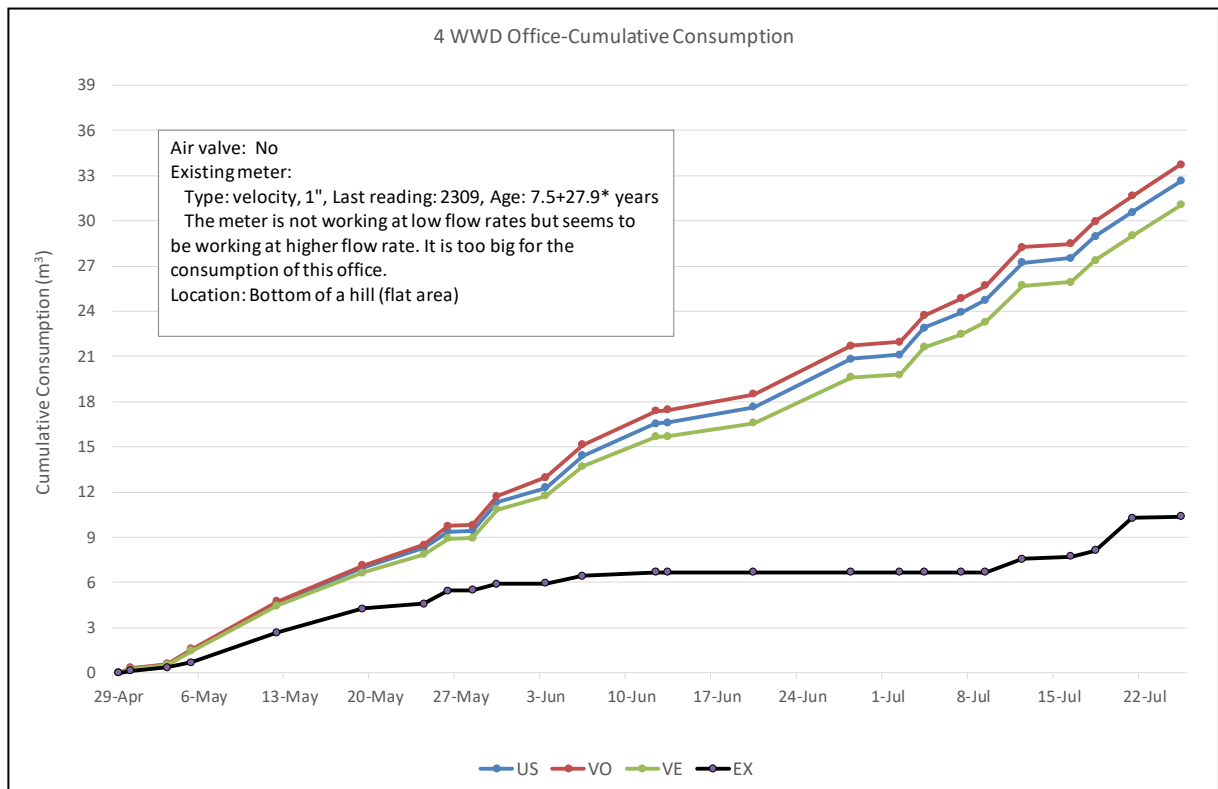
Location 2



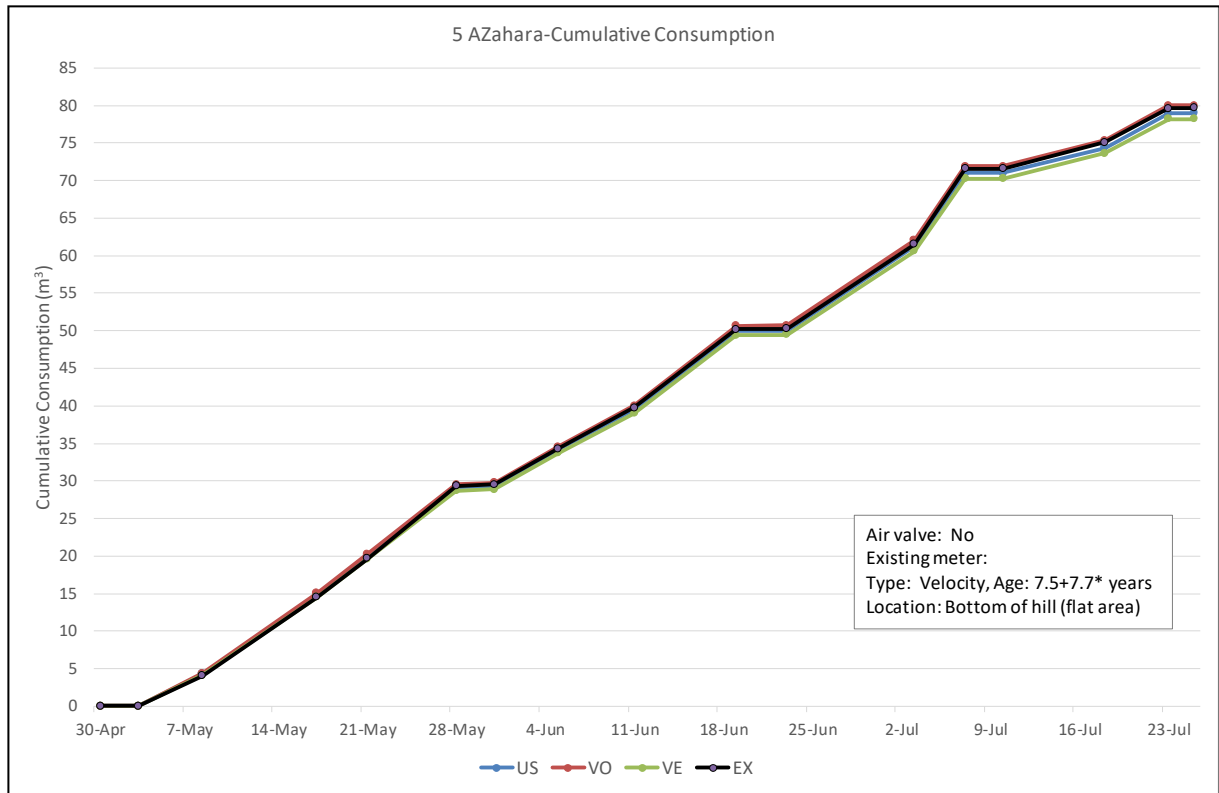
Location 3



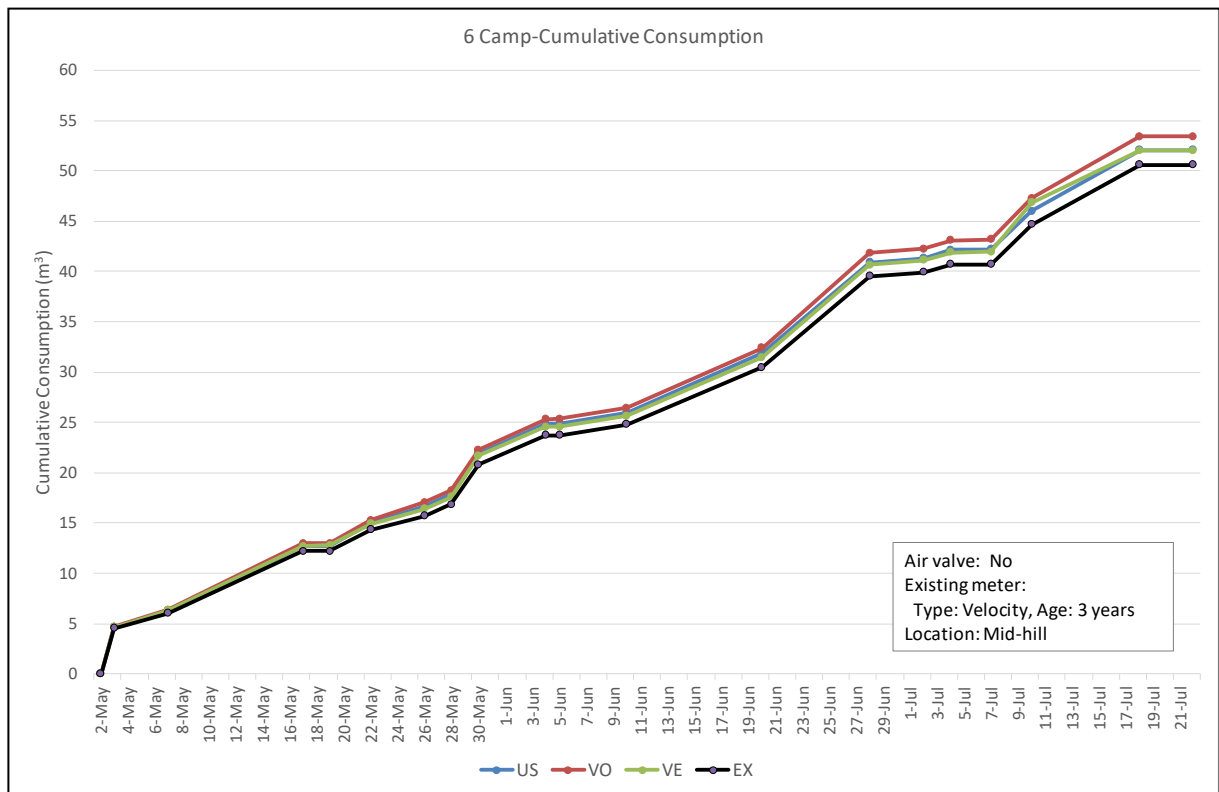
Location 4



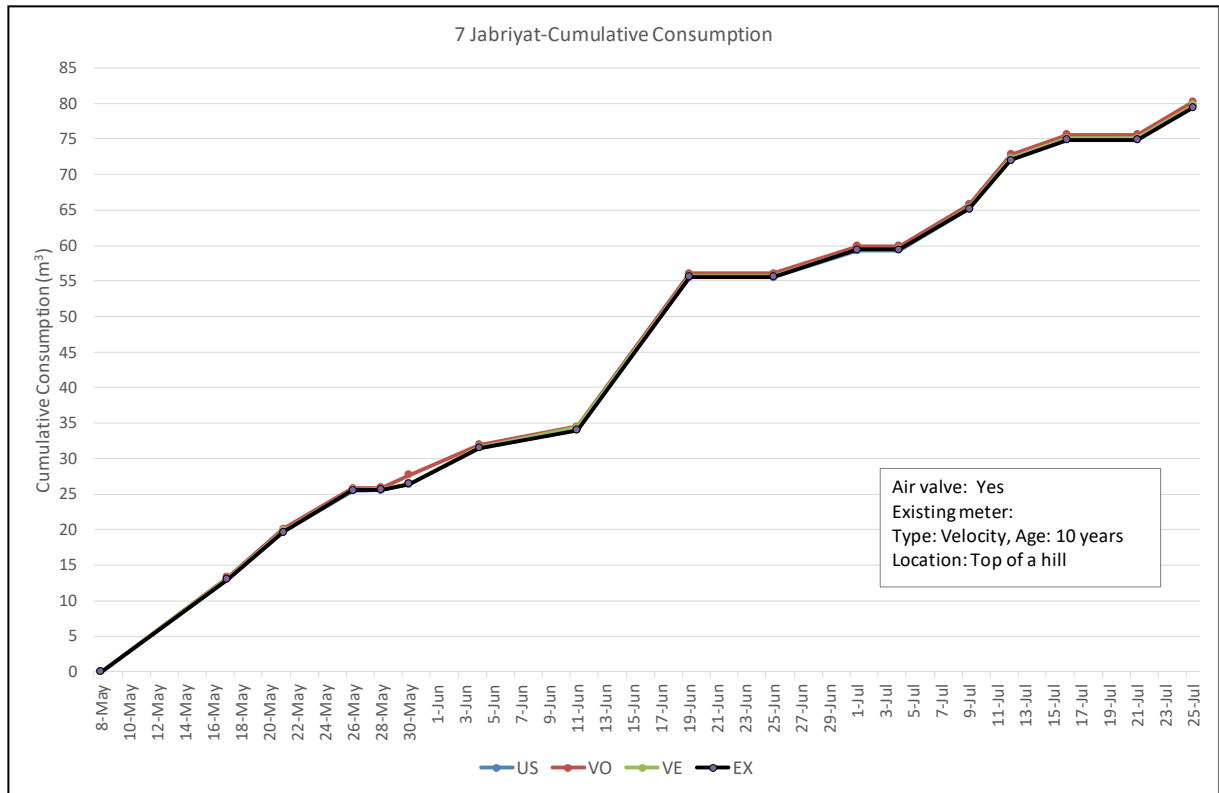
Location 5



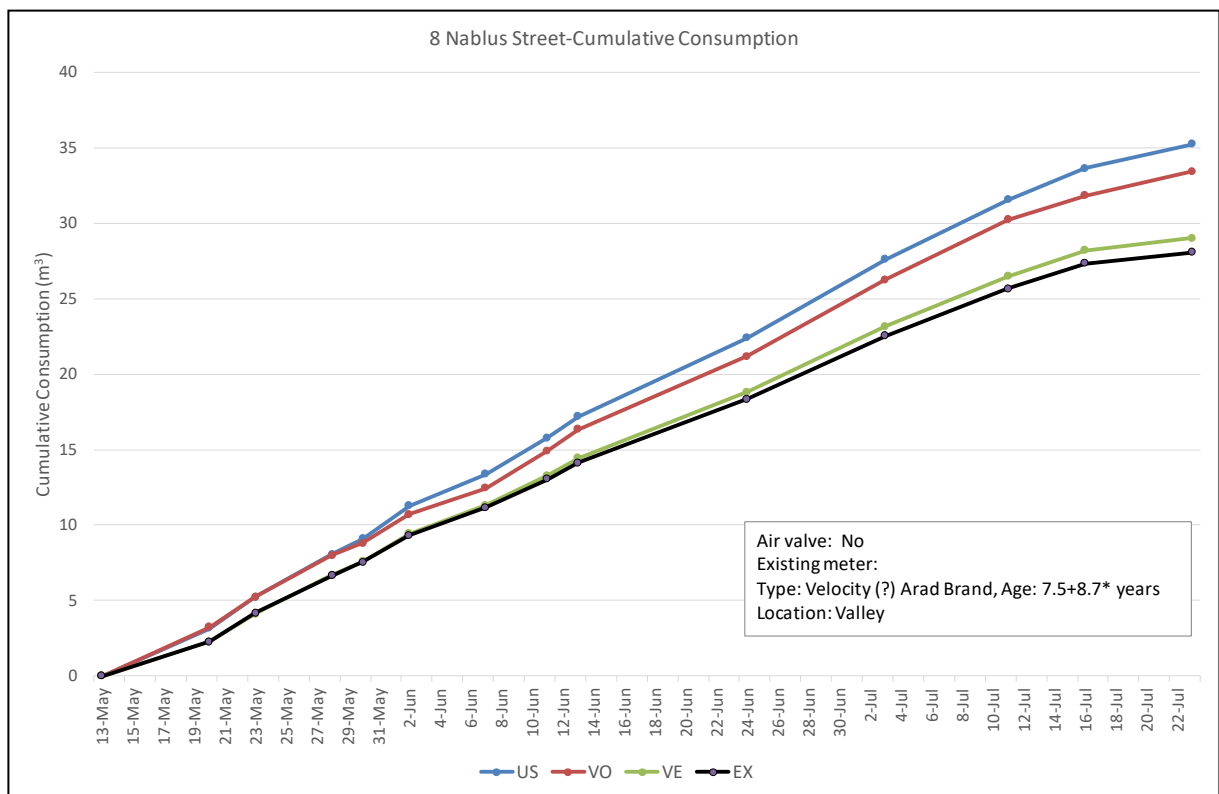
Location 6



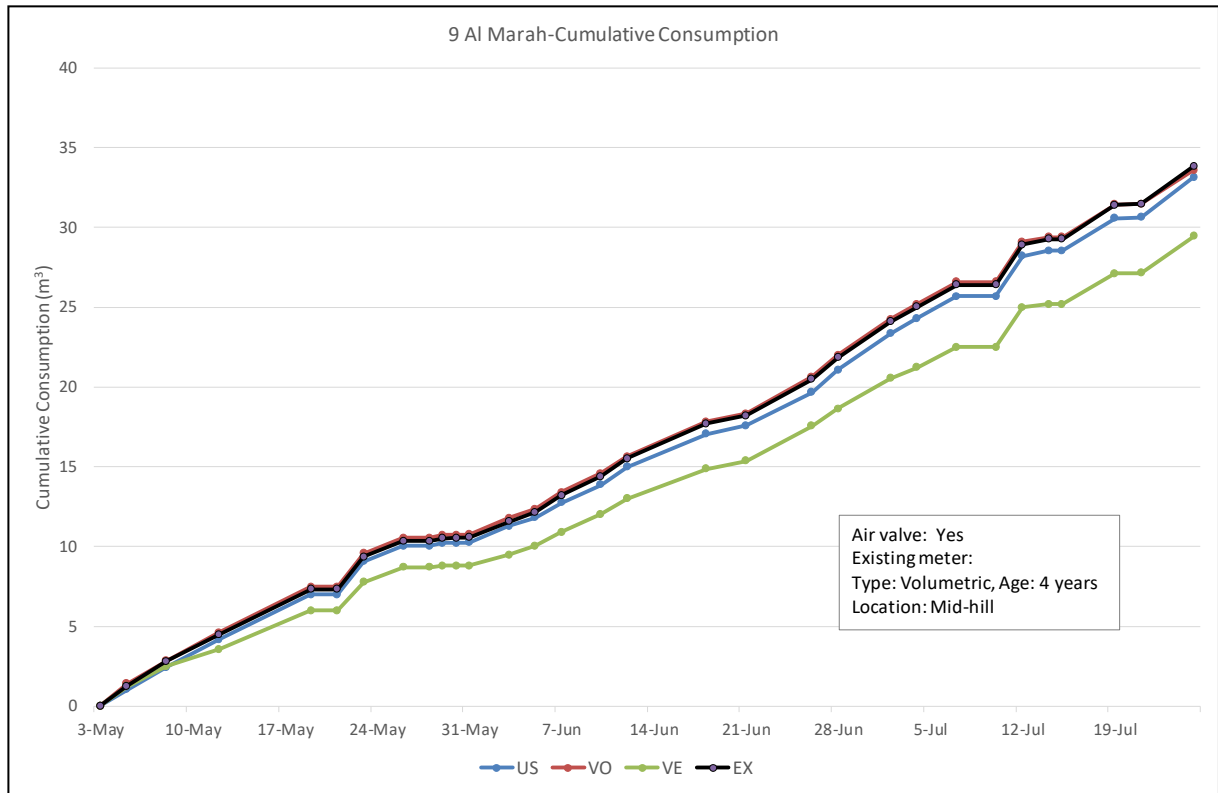
Location 7



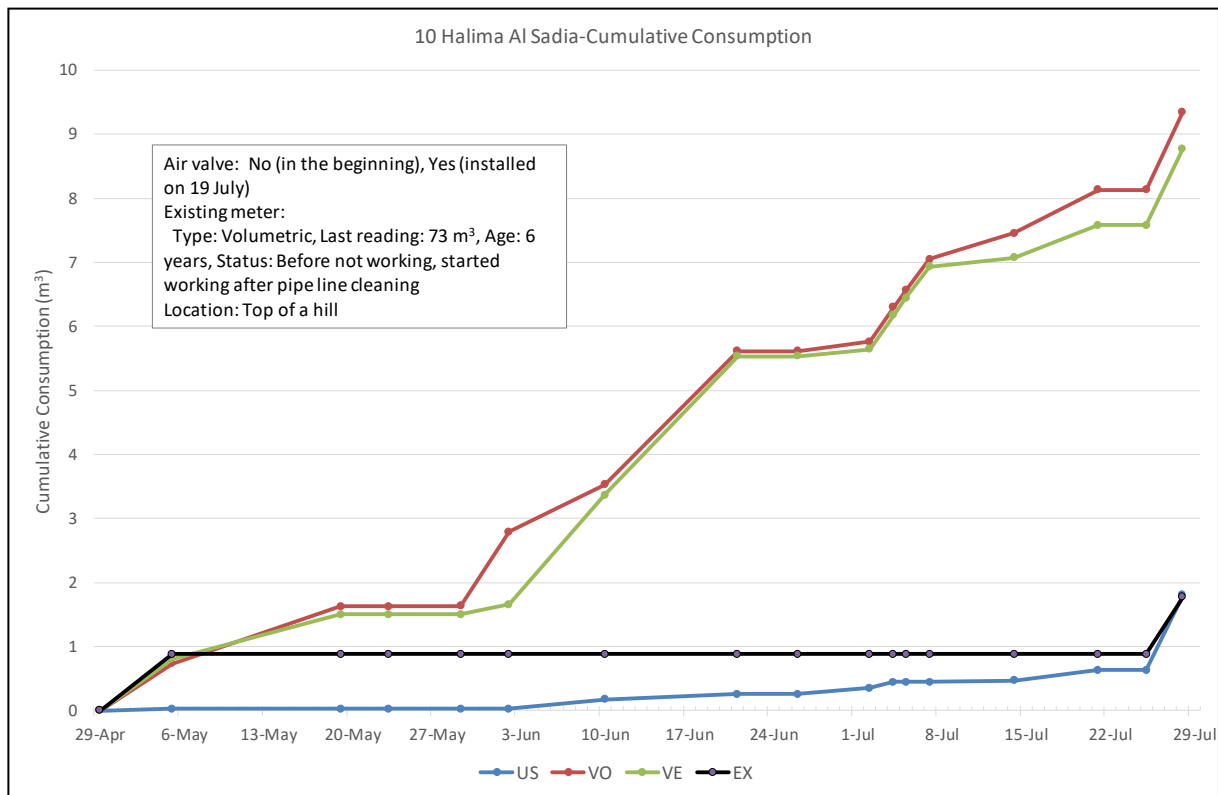
Location 8



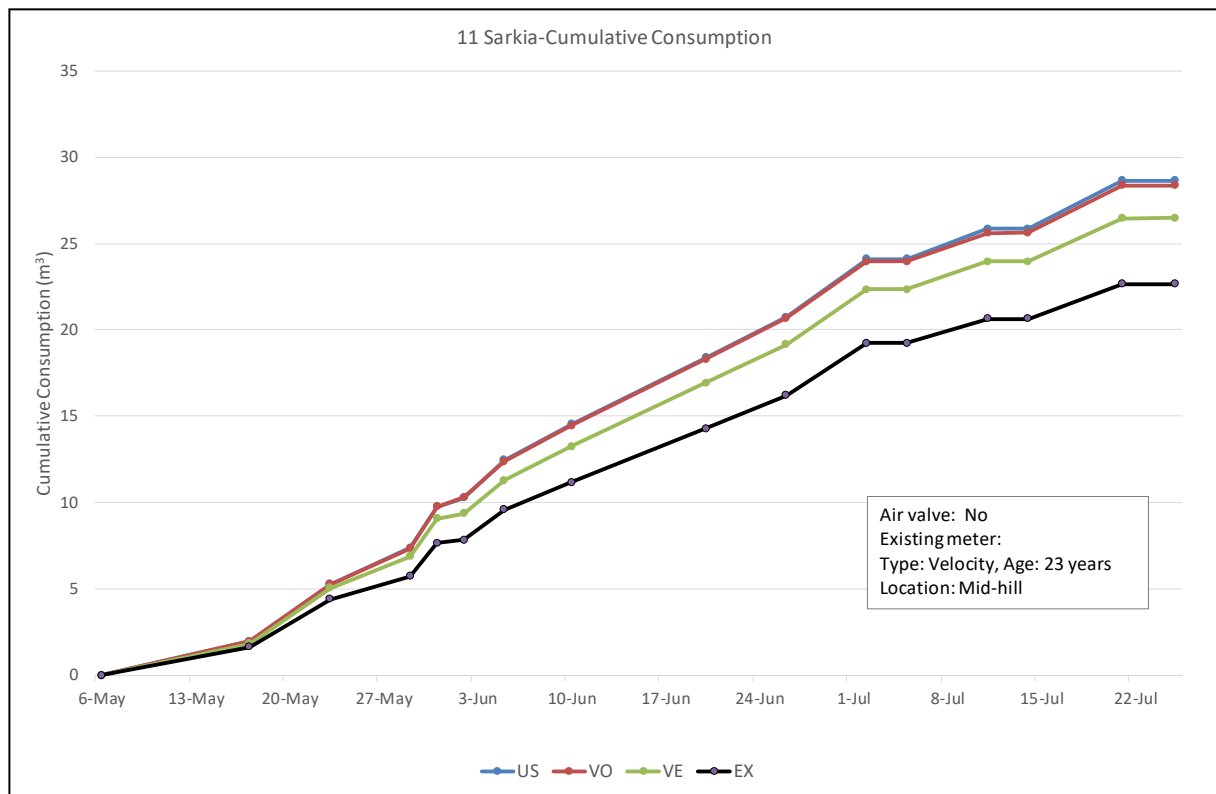
Location 9



Location 10



Location 11



C. Interpretation of the result obtained

- (1) In overall, the volumes shown by the volumetric type is the highest among all.
- (2) Measurement of ultrasonic type performed same as volumetric type and velocity type in different water supply conditions except at No.10, which has supply problem. Ultrasonic type can be utilized as a residential meter in Jenin.
- (3) Compared to volumetric, the reading of ultrasonic is 0.24% lower, reading of velocity is 3.01% lower and reading of existing meters is 9.65% lower when data of all 11 locations are considered. The respective differences are 0.99%, -2.96%, and -8.56% when Location No. 10 is excluded as this location had supply problems and always water pressure is 0 bar.
- (4) From the visual observations it is found that ultrasonic type stops (does not work) when the flow in pipe is not full, or when only air passes, or when the water is mixed with air bubbles.
- (5) In contrast to ultrasonic type, volumetric and velocity types still run (record flow) even when the flow in pipe is not full or when there is only air or air mixed water is running in pipe.
- (6) The difference in volumes of ultrasonic and volumetric types is not significant.
- (7) Both volumetric and ultrasonic types seem to be equally good in accuracy.
- (8) Velocity meters used in this experiment have higher minimum flow rate (lower accuracy at lower flow rate), so their recorded volume is lower than the other two types.
- (9) The existing meters at two locations (newer meter at No. 2 and No. 10) are relatively new, volumetric type. They are not working properly now.

(10) Ultrasonic type is less likely to be blocked by any dirt or sand particles and can be utilized for a residential meter in a condition that water supply is intermittent and the dirt such as rust, sand, and calcium potentially contains in water.

Appendix 2:

2-2 Causes of meter malfunction observed at Ajja meter maintenance center

A. Background notes

1. Arraba municipality is using volumetric type Elektromed PPWM (installed in 2013).
2. Elektromed service center receives about 10-15 meters/ Week for doing maintenance. The total numbers installed there is 1000 Elektromed (about 5 years ago) & 1480 BAYLAN (newly installed this year).
3. The main problems of **volumetric** type PPWM as explained by the maintenance staff, are:
 - rust
 - sand
 - calcification
 - prepaid unit motor, prepaid unit valve
 - battery
4. The problem with the volumetric meters is worst at Arraba.
5. The main problems of **velocity** type PPWM as explained by the maintenance staff, are:
 - prepaid unit motor
 - electronic transfer part from meter body to pre-paid control unit
6. The maintenance centre is able to repair and send back all received broken meters to Arraba municipality.
7. Other PPWM users are:
 - a. Jab'a municipality: volumetric type, they have about 700 PPWM from 1800 subscribers (about 4 years old).
 - The municipality pays around 3\$/yr for maintenance service contract.
 - About 8 meters/month being sent for maintenance.
 - The problems in the PPWM are: batteries, emergency credit exceeds the programmed limits, when the water cut off and back again the meter stops working even if it still has credit.
 - b. Ras Karkar village: volumetric type, 11 meters were repaired in the last 7 months out of total installed 1000PPWM Elektromed (around 2 years old; relatively younger meters).
 - c. Kafr Aldek: Velocity type, 4-5 meters repaired/week out of total installed 1000 Elektromed (around 2 years old; relatively younger meters)
 - The problems in the PPWM are: batteries, emergency credit exceeds the programmed limits, when the water cut off and back again the meter stops working even if it still has credit.
 - d. Bait Leqia Municipality: Volumetric type / BAYLAN.
 - Around 50 PPWM were sent to repairing during the last 8 months.

- The problems were in the prepaid unit and caused due to the illegal use by the customers.
8. The case of Qabatia municipality
- Large numbers of PPWM were noticed laying in the service center store. When enquired about this issue we were replied that those PPWMs were installed in Qabatia municipality (around 500 pieces) as a pilot project using some categorization for selected customers (not area by area), the customers refused them and the municipality was compelled to remove them and go back to the post-paid meters.

B. Observation during maintenance of meters at the center

1. Volumetric type PPWM

Two pre-paid malfunctioned meters which were brought from Arraba site were opened.

- A lot of dirt was attached in the strainer and also accumulated at the bottom of meter body.
- The dirt was composed of pipe rust, dried flakes of calcium deposit, and sand particles (Photos 1 to 6).
- Even though 3 strainer/filters are placed in a meter, the dirt is entered in meter measurement parts. The large quantity of the dirt affects the measurement and accuracy.

2. Velocity type meter

Two pre-paid malfunctioned meters were opened.

- Their inner parts were clean, there was no dirt accumulated or scale formation (Photos 7 to 12).
- Malfunction of the meters was said to be due to problems with electronic parts; mainly pre-paid unit motor and valve.
- These meters are relatively young. There is a possibility that hardware problems may increase according to more time passed.

C. Conclusion

1. Volumetric type meters are more susceptible to jamming and chocking of the filters by loosened pipe lining material, dirt or sand particles. The problem becomes more serious at places where the supply system is intermittent, the source of water is untreated ground water, and distribution network is old and rusted.
2. Calcium deposition is seen on meter body of volumetric meter and bottom of meter.
3. Velocity type meters do not generally have problem of jamming as dirt or smaller particles can easily pass through the impellers of the meter. However, these meters are young so that hardware problems may be seen in a few years more.

		
<p>Photo 1: Malfunctioned volumetric meter (No. 1)</p>	<p>Photo 2: Strainer and inside situation of No. 1 volumetric meter</p>	<p>Photo 3: Development of scale in No. 2 volumetric meter</p>
		
<p>Photo 4: Deposition of dirt on filer of No. 2 volumetric meter</p>	<p>Photo 5: The dirt accumulated inside situation of No. 2 volumetric meter</p>	<p>Photo 6: The dirt accumulated inside No. 2 volumetric meter</p>
		
<p>Photo 7: Malfunctioned velocity type meter (No. 1)</p>	<p>Photo 8: Condition of impeller of No. 1 velocity type meter</p>	<p>Photo 9: Condition of strainer and inside chamber of No. 1</p>
		
<p>Photo 10: No. 2 velocity type meter</p>	<p>Photo 11: Condition of impeller of No. 2 velocity type meter</p>	<p>Photo 12: Condition of strainer of No. 2 velocity type meter</p>

Appendix- 3: The number of bids for procurement of PPWM

Condition: Now JICA has secured the budget to procure all PPWMs of 1,940.

The procurement period based on JICA fiscal year (April to March)

Item	Case 1: Two separate bids	Case 2: One combined bid	Evaluation
Procurement conditions	<ul style="list-style-type: none"> 820 nos. PPWM by the end of March 2019 1,120 nos. PPWM by the end of March 2020 	<ul style="list-style-type: none"> Procurement of 1,940 nos. PPWM should be completed by the end of March 2019 	
Number of bids	Two times I different fiscal year of Japan.	One time. Fewer bids are better.	One bid is better.
Completion of procurement by Mar. 2019	Yes, for the 1 st bid	Yes	Same
Guarantee period	820 PPWM: Start Mar 2019 and end Feb 2021 1,120 PPWM: Start Mar 2020 and end Feb 2022	Start Mar 2019 and end Feb 2021 After Mar. 2021, After Sales Service contract cover the maintenance. .	Two bids is better
The potential numbers of PPWM brand/manufacture	<ul style="list-style-type: none"> There is possibility that the second bid brand is different from the first bid brand. Two brand systems should be set up and operated. If it is same brand in the first and second bids, main server and software will be procured twice. There is duplication of system for procurement. It needs some measure to avoid duplication. 	Only one brand is selected and one system is installed and operated during the project period. There is no need to deal with 2 suppliers, less laborious.	One bid is much better.
Completion of installation within the project period	Installation of the second bid PPWM would start installation from Mar. 2020. It is difficult to install all 1,120 nos. PPWM in the project time and evaluate the system.	Installation of PPWM could be seamlessly carried out after PA-1 pilot implementation.	One bid is much better.
Evaluation			One bid

別冊資料 CD 1.14

PPWM Booklet – for Customers

別冊資料 CD 1.14.1 English Version

Prepaid Water Meter (PPWM) in Jenin

For pilot areas



READ ABOUT:

1. PPWM in Jenin
2. PPWM Benefits
3. Type of PPWM in PA Areas and How It Works
4. Water Fee and Credit Charges
5. Where to Purchase Credit for Your PPWM Smart Card (charging your card)
6. Customers Responsibility on Their PPWM
7. How to Maintain the PPWM from Damages or Misuse
8. Where to Report If Notice Any Damages in the PPWM or Misfunction
9. Installation Timetable
10. PPWM Screen Notifications

Additional information:

11. Location of Tested PPWMs in Pilot Areas
12. Results of Accuracy Test of Three Types of Water Meters
13. Other Activities by the Project

“Let’s pay for our water usage and support the water department at Jenin Municipality to improve and provide better services.”

1. PPWM in Jenin

(Ultrasonic) PPWM in Jenin

With financial and technical assistance from the Japanese Government and in cooperation with the Palestinian Water Authority (PWA), the Jenin Municipality (JM) is installing 1,850 prepaid water meters in some pilot areas within the City as a part of the Jenin water service improvement project ([J-WaSIP](#)).

The areas selected as pilot areas (3 pilot areas) are 1) Sabah al-Khair, Kharuba and Nazareth street, 2) Al-Zahra neighborhood and new Jenin camp, and 3) eastern neighborhood and Halima Saadi (see section 11 for a map). The project began in October 2017, and JM has started to install the PPWM from March 2019 after studying the situation and PPWMs carefully. This new system of prepaid helps JM collect cost of the water services from the users and utilize the collected fees towards improving its water supply and maintain good services for the customers. As of now, JM has not available fund to introduce PPWM to all customers. However, JM hopes that from the lessons learnt from the pilot areas, it will provide PPWM to all customers in the future.

With technical support of the Japanese team as part of this project, JM has tested three types of water meters, and analyzed the results. The result helped JM select the most reliable PPWM in the market to be installed for customers. The test results were as follow:

1. for Velocity meters: a. With mechanical parts, it can be damaged, b. The accuracy is reduced according to age, c. Air is counted even though it does not likely affect the consumption counting, d. It is, however, cheaper.
2. for Volumetric meters: a. Dirt problems are severe, b. Air is counted even though it does not likely affect the consumption counting, c. It is, however, cheaper.
3. for Ultrasonic meters: a. Air and water with air bubble is not counted, b. It does not have mechanical parts and therefore it has a longer life, c. It is less likely to be blocked by any dirt or sand particles, d. It is, however, a little expensive than others.

The JM has selected to install prepaid **Ultrasonic water meters** for its water subscribers as the best option. Refer to **section 12** for details.

2. PPWM Benefits

- No need to pay for the PPWM device. It's free for existing customers in only pilot areas.
- No need to read your water meter. Read the balance on your PPWM by yourself. Or, see a warning on your PPWM monitor when the credit (balance) is low.
- If you notice that your card's credit balance is used faster than you expect, you may check any leakages within your property and repair and save money.
- Don't pay for air; Ultrasonic water meter does not count air.
- Pay off your water debt (if any), gradually without financial pressure.
- Help Jenin Municipality to improve water demand management, reduce administration costs, detect illegal connections and leakages, and recover debts from unpaying customers.
- Be in control of how much water you use and how often.
- No need to worry about building up water debt.

“No more meter readers at our doors. No more bills. Pay in advance!”

3. Type of PPWM and How It Works

A) **Type of PPWM:** Ultrasonic PPWM Ak-411 DN-20 from Baylan, a well-known Turkish producer of PPWM.

B) **Benefits of the Installed Ultrasonic PPWM:**

- The meter which used, is the best of the types of meters (Ultrasonic) in the market and does not measure air.
- Without mechanical parts, it has a longer life.
- The PPWM devices is less likely to be blocked by any dirt or sand particles.
- There is no error when calculating the value of water consumption, unlike the mechanical meters.
- It can be installed in any positions without problems in function.

C) **How It Works?**

It works with a prepaid smart card. You need to 1) Charge credit for your PPWM's smart card at a charging center, 2) Touch the card on your PPWM device, 3) Use the water (if water is available on that day.)

The system is based on the principle that the consumers are charged in advance for their water consumptions. Consumers use the charged credit at the vending stations by loading the credit to water meters via smart cards. The water meter cuts off the water by closing its valve when the credit ends, but when the consumer re-loads the spare credit in smart card to the water meter, the valve will re-open. The spare credits allow you to use the remaining water quantity until the charging card as soon as possible.

The PPWM water has an electronic display. The electronic display shows information about loaded credit, total credit, total water consumption, water tariff, the battery level, etc.. Each water meter has its own smartcard which may only be operated on the specific assigned meter and cannot be used on other meters.

(✘ see section 10: PPWM Screen Notification for details)

“With PPWM, everybody pays for water they use. It's fair!”



Ultrasonic PPWM for Jenin/PA area

D) PPWM Card

All the customer specific information such as customer subscription number and water meter number are stored to the PPWM card. When the water meter reads the card, all this information is downloaded to the water meter. The PPWM card is the connection between the Municipality customer database system and your water meter. After charging your card with credit at the Municipality's vending stations, the purchased credit is transferred to your water meter by touching your card on the PPWM surface.



E) Your PPWM Smart Card

- 1) Each customer gets a card for his/her PPWM and must keep it.
- 2) The card must be kept because it is the link between the provider and the customer
- 3) Each card is for a specific meter and only one customer, so don't try to put it in another meter is not for you
- 4) Transfer your purchased credit to the meter by touching your smart card on the meter and press the white button once.
- 5) Illegal use of the meter will stop the meter automatically and you may be panelized.
- 6) Don't play with other meter parts. It may result in automatic closed, and any purposely damage for meter, maybe put you under legal procedures.

4. Water Tariff and Credit Charges on Smart Card

A) The Jenin Municipality Water Tariff *

* There is 0.5 NIS as sewage fees for each used cubic meter.

Consumption	Basic Tariff	Maintenance Fee	Total
0 m ³ - 50 m ³	4.34 NIS for each m ³	6.2 NIS	Depends on consumption
More than 50 m ³	6.2 NIS for each m ³	6.2 NIS	Depends on consumption

“With PPWM, high user consumers control their water use. This means more water in the network for others to use.”

B) What You Need to Know about Charging Your Smart Card with Credit

- 1) If the card is lost or damaged, you can get a new one through JM by 30 NIS.
- 2) The card cannot be credited (charged) for less than 50 NIS. This is the minimum credit.
- 3) The monthly maintenance fee of 7.2 NIS is only deducted in your first charge of the month.
- 4) The water meter has a backup system of 10% of the total exiting credit as the backup credit. For example, when you charge your card for 100 NIS, at first touch, the PPWM will be loaded by 90 NIS and 10 NIS will remain in your card as a backup credit. When your consumption reaches to 89 NIS and only 1 NIS is left, your PPWM will give you a warning notification on the screen saying your credit is too low. You will then need to touch your card again to use the 10 NIS. Please remember to re-charge your card before the 10 NIS is used. After (or even before) you start using the backup credit, you should go to a vending station in your area to charge your card with credit. Please note that:
 - When you press the button on your PPWM, you can see the used credit in NIS, the remaining balance in NIS, your subscription ID number, tariff and warning, if any.
- 5) If you have any debt on water bill, the municipality deducts 10% from each charge. For example, if you charge 100 NIS, 10 NIS will be deducted for your debt and you have only 90 NIS of credit to use water.
 - Note: the deduction starts immediately after installation of the PPWM in your property.

- 6) On the same day when the PPWM is installed in your property your smart card comes with 7.2 NIS. It is equivalent to about 2 m³ of water use so you can have access to water from first day till you change your card (if water is available that day).
- 7) Unlike the mechanical water meter customers, the PPWM customers don't need to pay minimum tariff.

5. Where to Purchase Credit for Your PPWM Smart Card

Charging your card

You can purchase credits on your card at the following vending locations.

Note: Vending places will increase in the future as the PPWM customers increase.

- 1) Aljaleel supermarket. 2) Bill payment center at Water and Waste Water Dept. 3) Bill payment center at city center.
- 4) Althaher supermarket. 5) AbuAlia supermarket. 6) Suhail mobile. 7) Taiba center. 8) Alsadi supermarket. 9) AMadina supermarket. 10) Reda supermarket.

Note: All these points will be available from 8:00 am – 10pm except the bill payment center from 8:00am – 2:00pm.



(1)



(2)



(3)

6. Customers' Responsibility on Their PPWM

The PPWM installed in your property is owned by the Jenin Municipality.

1) Jenin Municipality's responsibility:

- a. PPWM and the installation is free of charge for the existing customers in the PA areas.
- b. JM will maintain the customers' PPWMs if there are manufactured problems.

2) Customer's responsibility:

- a. Customers must use the water meter properly.
- b. Customers must not play with the meter parts. It may result in automatic closed, and any purposely damage for meter maybe put you under legal procedures.
- c. There are penalties for damage, misconduct, and illegal use of the meter as follow below:
 - Any illegal case is 5,000 NIS and estimated consumption during the illegal use.
 - If customer damages the meter, he/she will be fined 3,000 NIS for minor parts and 5000NIS for main part of meter.
 - If customer has illegal use of the meter and the pipe connected before the meter or playing with meter system and consumption will be fined 5000 NIS.
 - If customer sells municipal water to others will be fined 10,000 NIS.
 - If the customer installs pump directly to the network will be fined 2,000 NIS and also the pump will be removed and taken to the Jenin Municipality.

7. How to Protect Your PPWM from Damages

- 1) Please keep the PPWM’s box closed to protect the meter from accidental damage, rain, dust, or sun.
- 2) Please don’t let children play with the PPWM and pressing the digital buttons.
- 3) If need for any constructions around the meter, please protect it from any accidental damages. Contact the Municipality if you need a relocation of the meter due to the new constructions.
- 4) Please don’t burn anything like trash near the water meter.
- 5) Please don’t put anything on the water meter’s box.
- 6) Your PPWM is sealed with the Baylan sticker on both sides. Please don’t try to remove it or damage it. PPWMs without seals or damaged seals are out of warranty.
- 7) Only the outer surface and the monitor can be cleaned by using wet cloth. Please do not wipe with gasoline, thinner, or similar solvents.
- 8) Please contact the Municipality of any damages to the PPWM.

8. Where to Report If Noticed Any Damages in the PPWM or Malfunction

When you notice any damages of misfunctions in the PPWM, it is your responsibility to report at any of the following places as soon as possible. You can call, chat, or fill out a form at the Municipality website at <https://www.jenin.city/>

- 1) The Municipality of Jenin, Public Customer Service Center, TEL: 04-2436422, AM-2 PM
- 2) WWD, 8 AM – 2 PM
- 3) Collection office at the city center, 8 AM – 2 PM
- 4) The Municipality’s website at <https://www.jenin.city/> Live Chat, 8 AM-2 PM
- 5) The Municipality’s website/Complaint, 24 hours <http://jenin.city/?app=support.open>
- 6) The Municipality’s Facebook page

When you contact, please provide your name, address, phone number, water meter number, and explain the issue of damage or malfunction.



9. Installation Timetable

Pilot Areas for PPWM installation	Total Number of Prepaid Water Meters	Installation Period (tentative)	Current Status
PA1: Sabah Alkheir, Kharoubeh, Nazareth Street	~ 714	March-April 2019	Installation started
PA 2: Al-Zahra neighborhood and new Jenin camp,	~ 620	To be decided	Under study
PA 3: Eastern neighborhood and Halima Saadi	~ 460	To be decided	Under study

10. PPWM LCD Screen Notifications

The PPWM has an LDE screen display where you can see information such as your meter number, consumer number, consumption amount, loaded credit, total credit, remained credit, etc. To view this information, you need to press the white button, repeatedly, to see the related display screen.

Important note:

Every time you charge your PPWM card, please note that when you touch it on your PPWM, you must press the white button once to transfer the credit to your water meter.



(A) Basic data of the screen, without inserting the card

(1) 1st press

- “opened valve “will appear on the screen, which means that water is flowing.
- E2: Means water flow.
- Warning notification: indicates that the credit is low.
- The sign of the up arrow: means that the valve is opened and water is flowing.

(2) 2nd press

- “closed valve “will appear on the screen, which means that water is not flowing.

(3) 3rd press

- Indicates customer’s water consumption quantity.

(4) 4th press

- Indicates customer’s total credit.

(5) 5th press

- Shows the date of the last charge in the card.
- Shows the recent credit of the card.

(6) 6th press

- Percentage: means the price of water cubic meter.

(7) 7th press

- Step 1 means the categorization of the tariff. (Domestic Users)

(8) 8th press

- It means that the credit is low, and the charge is low too.

(9) 9th press

- Meter’s details: Meter diameter, Temperature.
- Date, Meter version.

(10) 10th press

- It will show the total credit of the card.

(11) 11th press

- The daily period: means the daily water consumption period in the meter.

(12) 12th press

- Municipality: means to which municipality does customer belong.



(1)



(2)



(3)



(4)



(5)



(6)



(7)



(8)



(9)



(10)



(11)



(12)

(13) 13th press

- Meter number

(14) 14th press

- Customer's number

(15) 15th press

- Customer's type: Domestic or Industrial



(13)



(15)



(14)



Important Note:

In case of fire if you are out of credit and/or your water tank is empty, you should press the white button more than few seconds till you see Fire Mode on the screen. This will automatically give you credit to use water immediately in emergency case for 180 minutes. Please note that after this you will need to go to the Municipality to re-activate your charging card. You will be charged for the water used during the Fire Mode.

(B) How to charge the PPWM:

The card shall be put on a specified place on the upper part of the meter, and when pressing the middle white button the following data will appear:

- If the card has credit, the word "loaded" will appear on the screen.
- If the card has no credit, "zero-loaded" will appear on the screen.

(C) Others:

There are some other signs that may appear on the screen:



LoRa
LCD icons
The terms displayed on LCD

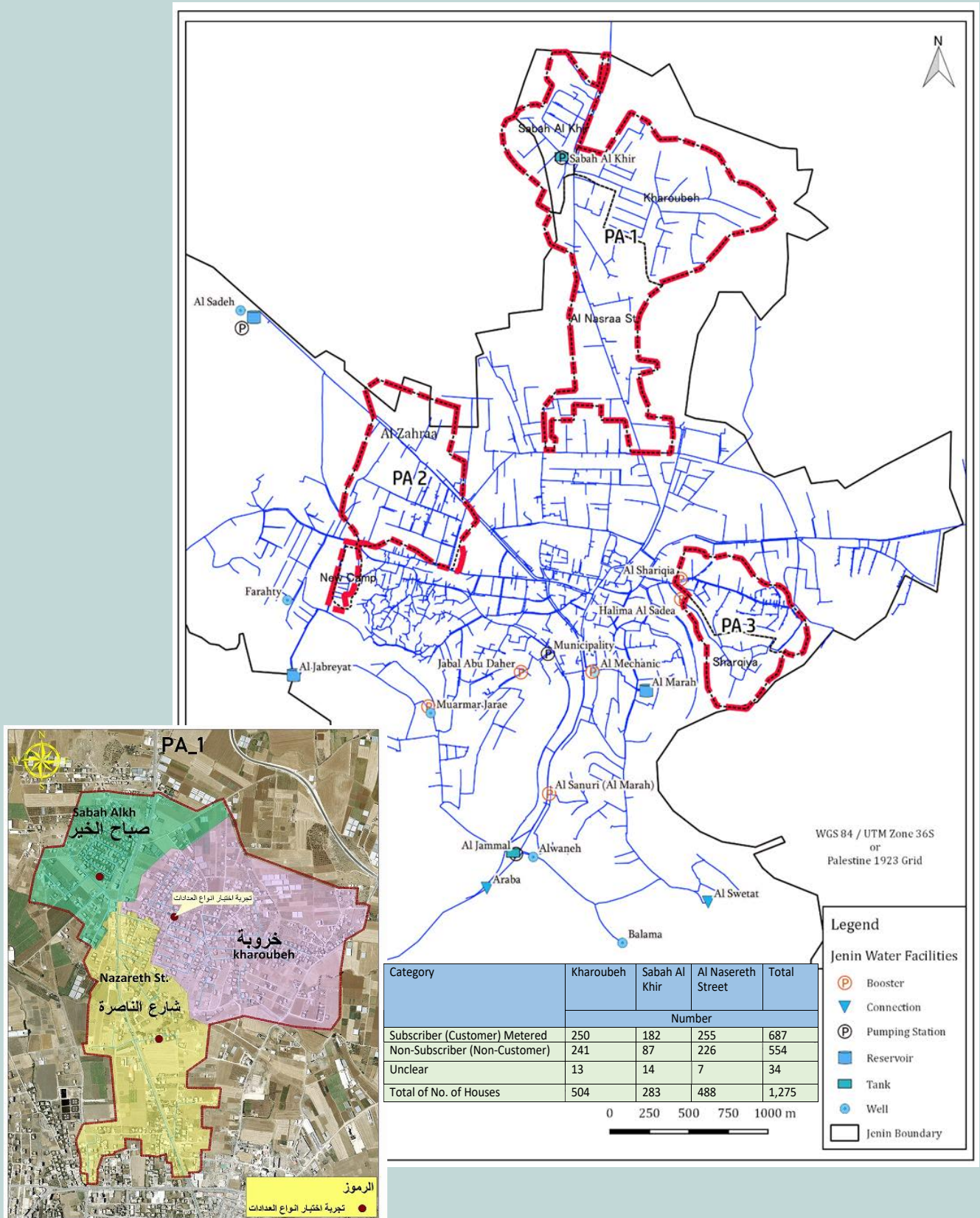
- Flow direction
- Valve shut off icon (Activated when the valve is in closed state)
- Battery Level icon (The icon shows the charge level of the battery)
- Warning icon (Displayed when an exception or warning is active)
- Key icon (Displayed in case of any detected defect)
- Displays (The icons that the date time of of water meter is displayed.)
- TL Activated when the unit price is displayed on the screen.
- m³ Activated when the consumption is displayed on the screen. (cubic meter)

The information displayed on LCD screen are as follows:

1. Valve Status
2. Consumption
3. Total Credit
4. Loaded Credit
5. Current Tariff
6. Current Step
7. Warnings if existing
8. Exceptions if existing
9. Version



11. Location of the Three Pilot Areas

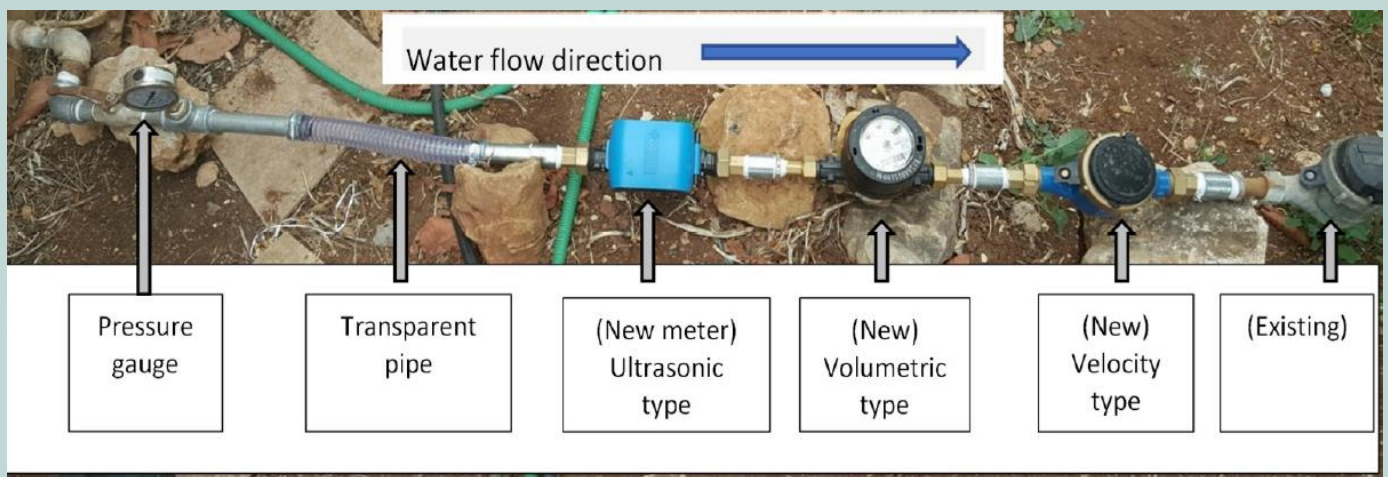


12. Results of Accuracy Test of Three Types of Water Meters

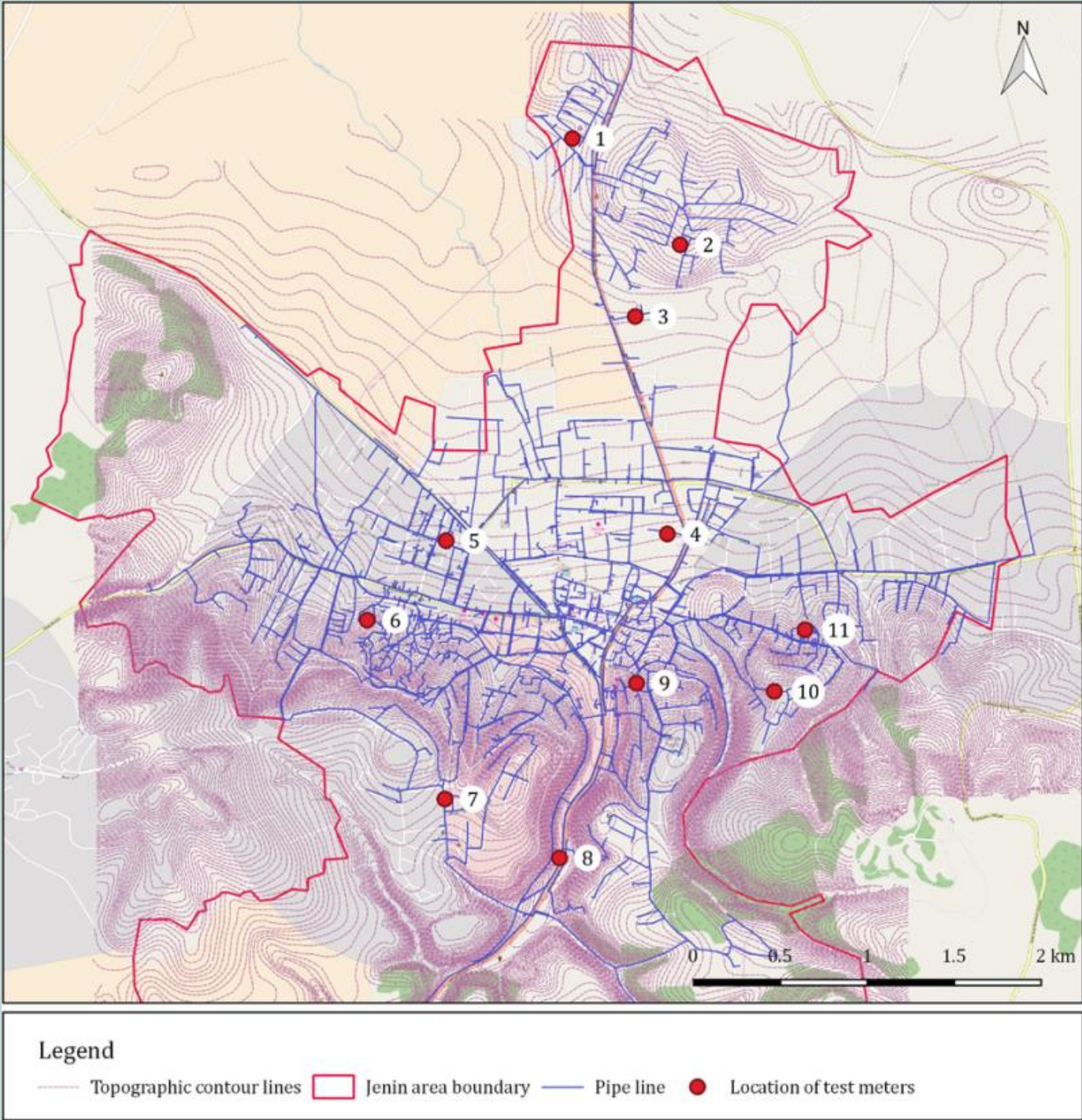
The Municipality of Jenin had tested the three major types of water meters in the market: Velocity, Volumetric, and Ultrasonic. JM also reviewed the existing study test results. The purpose was to test the meter functions and evaluate which was the best for Jenin City based on the situation.

There were 11 locations in which the 3 types of water meter were installed next to the existing water meters. The results are indicated in the table below for each meter. Also, the locations of the experiments are presented in the map below.

Type	Velocity	Volumetric	Ultrasonic
Results of experiment meters	<ul style="list-style-type: none"> • Smallest quantity: 3 % less than volumetric flow meter. • Velocity types still run even when the flow in pipe is not full or when there is only air or air mixed water is running in pipe. But the quantity is less than ultrasonic, so that air problem may be negligible in Jenin. 	<ul style="list-style-type: none"> • Largest quantity but difference is small. • Two of existing volumetric meters are not functioned, probably choked by debris. • Volumetric types still run even when the flow in pipe is not full or when there is only air or air mixed water is running in pipe. But the quantity is almost same as ultrasonic, which does not count air, so that air problem may be negligible in Jenin. 	<ul style="list-style-type: none"> • Lower than volumetric flow rate but the difference is almost null: 0.23 % less than volumetric volume. • From the visual observations it is found that ultrasonic type stops when the flow in pipe is not full, or when only air passes, or when the water is mixed with air bubbles. • However, it is minimal difference between volumetric and ultrasonic in Jenin.
Evaluation	<ul style="list-style-type: none"> • Low flow accuracy is low. • With mechanical parts, it can be damaged. • Count air 	<ul style="list-style-type: none"> • Malfunction by particle and calcification. • Air is counted but it does not affect so much measurement. 	<ul style="list-style-type: none"> • No experience of ultrasonic with prepaid unit in its use in actual conditions. • 11 meters without prepaid unit were tested for about 3 months and show good results. • Water with air and air bubble is not measured. • Without mechanical parts, life is long.



Location of the 11 Tested PPWMs (2017-2018)



13. Other Activities by Project

The project is for three years and seeks to a) **reduce NRW*** and b) **increase bill collection ratio** at Jenin Municipality. In addition to the PPWM, the project includes other works to improve the water services for the customer:

- 1) Identify leakage sites to be repaired,
- 2) Install water pressure measuring devices to understand water supply conditions and follow up water sources and calculate non-revenue.
- 3) Rehabilitate two collection offices in the city center and in Haifa Street,
- 4) Update the subscriber data through field surveys,
- 5) Enhance managerial skills and tools for each section related to water sector in the Municipality,
- 6) Financial analysis of water revenues,
- 7) Study the challenges facing collectors and readers,
- 8) Develop long-term business plan for water department,
- 9) Training of technical staff in the water department on different technical aspects including detection of leakage in the network and repair,
- 10) Use of PalPay system for easier payments for customers,
- 11) Study use of Mobile Billing System for reading meters and billing on the spot,
- 12) Redesign of the JM website with Live Chat and online Complaint forms for customers,
- 13) Improve/update the existing DAMAS system for paperless and easy procedures for customers to apply for water services,
- 14) Conduct social surveys and questionnaire to obtain more information from customers,
- 15) Public awareness activities.

Non-revenue water (NRW) is water that has been produced and is "lost" before it reaches the customer. Losses can be real losses (through leaks) or apparent losses (for example through theft/illegal connections or metering and billing inaccuracies).



Summary: Q/A

Topic	Question	Answer
1. Water tariff?	<ul style="list-style-type: none"> Will the tariff rates be changed? 	<ul style="list-style-type: none"> No. Same tariff rates will be applied. Unlike the mechanical meters, there is no minimum tariff for PPWM subscriptions.
Water tariff and payment	<ul style="list-style-type: none"> How do we pay the water tariff for PPWM system beforehand? 	<ul style="list-style-type: none"> By pre-paid card. Customer purchases the credit at JM vending stations. After charging, customer touching the card on the PPWM surface, the credit will be transferred.
2. Pre-paid card charging	<ul style="list-style-type: none"> Where can customer charge the credit for PPWM smart card? 	<p>1) Aljaleel supermarket. 2) Bill payment center at Water and Waste Water Dept. 3) Bill payment center at city center. 4) Althaher supermarket. 5) AbuAlia supermarket. 6) Suhail mobile. 7) Taiba cnter. 8) Alsadi supermarket. 9) Almadina supermarket. 10) Reda supermarket.</p>
Pre-paid card lost	<ul style="list-style-type: none"> If customer lost the pre-paid card, what should he/she do? 	<ul style="list-style-type: none"> If the card is lost or damaged, customer can get a new one from JM with a fee
Pre-paid card remaining charge	<ul style="list-style-type: none"> How does customer check the remaining credit? 	<ul style="list-style-type: none"> You can know the remaining credit by pressing the button of PPWM 4 times
Pre-paid card debt	<ul style="list-style-type: none"> If customer has debt on water bill, can they receive water supply? 	<ul style="list-style-type: none"> Yes, customer can receive water However, JM will deduct 10% from each charge amount for clearing the debt
3. PPWM benefits Note: Please refer to page 2 for more details.	<ul style="list-style-type: none"> What are the benefits of PPWM? 	<ul style="list-style-type: none"> Meter will be more accurate (no counting air/ air bubbles) No mechanical parts inside of meter. Less damage. Lifetime will be long. Contribute to reduce admi. costs of JM Contribute to detect illegal connection, and leakages, control water supply efficiently Contribute to increase collection ratio of water tariff, etc.
PPWM connection fee	<ul style="list-style-type: none"> Do we need to pay the connection fee this time? 	<ul style="list-style-type: none"> No. Customer in the PA areas is not required to pay connection fee including PPWM cost
PPWM ultrasonic	<ul style="list-style-type: none"> Why did JM choose Ultrasonic PPWM? 	<ul style="list-style-type: none"> Accuracy test done by JM Best type of PPWM, which <ol style="list-style-type: none"> No count air/ air bubbles Less blocked by dirt/ sand particles More accurate measurement than mechanical meters Can be installed any positions
PPWM life time	<ul style="list-style-type: none"> What is the life time of PPWM? 	<ul style="list-style-type: none"> Lifetime of battery is 10 years by the manufacturing company If the device condition is good, we can use more than 10 years
PPWM malfunction	<ul style="list-style-type: none"> What should customer to do in case of malfunction? 	<ul style="list-style-type: none"> Customer needs to notice it to JM Contact numbers are indicated in the handout
PPWM malfunction	<ul style="list-style-type: none"> How much is the repair costs for malfunction? 	<ul style="list-style-type: none"> In case of malfunction, maintenance fee covers repair and replace spare parts. No additional payment by customer.
PPWM water stop	<ul style="list-style-type: none"> In what occasion, water will be stopped automatically due to low credit? 	<ul style="list-style-type: none"> When customer used all credit, main credit and backup mode
4. Customer responsibility	<ul style="list-style-type: none"> Will customer responsibility be changed from before? 	<ul style="list-style-type: none"> Ownership of meter is transferred to JM.
5. Penalty	<ul style="list-style-type: none"> If customer damages the meter, how much does customer need to pay? 	<ul style="list-style-type: none"> Fined 3,000 NIS for minor part Fined 5,000 NIS for main part

The Municipality of Jenin appreciates your cooperation!

Please contact the Municipality's water department
at 04-2502023 if you need more information about
this project and PPWM.





▲ نقطة ربط - دائرة مياه الضفة الغربية (4) Connection Point to WBWD's Water Source
● بئر بلدية (3) Municipal Well
● بئر خاص (11) Private Well
■ تنتكات (19) Tanks
✱ Booster
— الخط الدقل Main Transmission
— الخط الرئيسي Main Distribution
— الخط الفرعي Distribution Line
— حدود البلدية City Boundary
— خطوط الكنتور Contour Lines

Map prepared for the JICA-funded 'Project for Strengthening the Capacity of Water Service Management in Jenin Municipality' (2017-2020)
 مشروع تحسين ادارة خدمة المياه في بلدية جنين 2017-2020

 Last updated on April 27, 2021.

Water Supply Map of Jenin City (as of April 2021)

別冊資料 CD 1.14

PPWM Booklet – for Customers

別冊資料 CD 1.14.2 Arabic Version



مشروع تحسين خدمة المياه في بلدية جنين

بتمويل من مؤسسة جايكا

Sep 2017-Feb 2022

عداد الدفع المسبق للمياه في جنين (PPWM)

المرحلة الاولى

إقرأ عن :

1. عداد الدفع المسبق في جنين
2. فوائد عداد الدفع المسبق
3. انواع عدادات الدفع المسبق للمياه وكيف تعمل
4. رسوم المياه وشحن الرصيد
5. من أي تشتري الرصيد لكروت العداد (شحن الكروت)
6. مسؤولية المشتركين تجاه عدادات الدفع المسبق
7. كيفية الحفاظ على العداد من الكسر اوسوء الاستخدام
8. أين تبلغ اذا لاحظت أي كسور في العداد او خلل
9. الجدول الزمني للتركيب
10. إشعارات شاشة العداد

معلومات اضافية :

11. أماكن تجارب العدادات في المناطق الاولى
12. نتائج الفحص لدقة الثلاث عدادات المياه
13. أنشطة المشروع الاخرى

دعونا ندفع مقابل استخدامنا للمياه
ودعم دائرة المياه في بلدية جنين
لتحسين وتقديم أفضل الخدمات.

1- (الالتراسونيك) عداد الدفع المسبق للمياه في جنين
بمساعدة مالية وفنية من الحكومة اليابانية وبالتعاون مع سلطة
المياه الفلسطينية تقوم بلدية جنين بتركيب 1850 عداد دفع
مسبق في بعض المناطق في مدينة جنين كجزء من مشروع تحسين
خدمة المياه في المدينة (J.WaSIP) .

تم اختيار ثلاث مناطق وهي 1. صباح الخير ، خروبة ، شارع
الناصره 2. حي الزهراء والمخيم الجديد 3. الحي الشرقي وحليمة
السعدية (شاهد رقم 11 من الخارطة) وبدأ المشروع منذ تشرين
ثاني 2017 وباشرت بلدية جنين بتركيب عدادات الدفع المسبق
منذ شهر اذار 2019 بعد دراسة الوضع الحالي وعدادات الدفع
المسبق بعناية ، هذا النظام الجديد للدفع المسبق يساعد بلدية
جنين من جمع تكاليف خدمة المياه المقدمة واستخدام الرسوم
التي يتم جمعها لتحسين خدمة التزود بالمياه والحفاظ على خدمة
جيدة للمشاركين ، وحاليا لا تمتلك بلدية جنين تمويلا لتركيب
عدادات دفع مسبق لكافة المشتركين ، اذا تأمل البلدية الاستفادة
من التجربة وتعلم الدروس من المناطق التجريبية ومن ثم تزويد
كافة المشتركين بالدفع المسبق مستقبلا .

وبدعم فني من الفريق الياباني كجزء من هذا المشروع اختبرت
بلدية جنين ثلاثة انواع من العدادات وحللت النتائج وساعد ذلك
باختيار العداد الاكثر ثقة بالسوق ليتم تركيبه للمشاركين ، وجاءت
نتيجة الاختبارات كالتالي :

1. **عداد السرعة** : ا. يوجد فيه اجزاء ميكانيكية ومن الممكن
ان تتحطم ب. دقة العداد تقل مع التقدم بالمرح .
يحتسب الهواء مع انه من غير المحتمل ان يؤثر على
احتساب الاستهلاك د. رخيص الثمن .
2. **العداد الحجمي** : ا. مشاكل الاوساخ كبيرة ب. يحتسب
الهواء مع انه من غير المحتمل ان يؤثر على احتساب
الاستهلاك ج. رخيص الثمن .
3. **عداد الالتراسونيك** : ا. لا يحتسب الهواء ولا حتى الهواء
اذا كان مخلوطا بالماء ب. لا يوجد فيه اجزاء ميكانيكية
لذلك عمره الافتراضي اطول ج. أقل احتمالا من ان يغلق
بسبب الاوساخ وجزيئات الرمل د. اغلى بقليل من
الانواع الاخرى من العدادات .

واختارت بلدية جنين عداد الالتراسونيك لتركيبه للمشاركين
كأفضل الخيارات * لمزيد من التفاصيل راجع قسم 12.

2. فوائد عداد الدفع المسبق

- لا حاجة لدفع ثمن العداد فهو مجاني للمشترين الحاليين في المناطق التجريبية .
- لا حاجة لقراءة العداد، إقرأ رصيدك بنفسك وتستطيع ان ترى التحذير من ان رصيدك منخفض من خلال شاشة العداد .
- اذا لاحظت ان رصيدك ينفذ بسرعة، قد يكون هناك تسربا داخليا عليك التحقق من ذلك وإصلاحه لتوفر مزيد من الاموال.
- لا يوجد دفع مقابل الهواء، فعداد الالتراسونيك لا يحتسب الهواء .
- تسديد الديون اذا كانت موجودة تدريجيا بدون ضغوطات مالية .
- مساعدة بلدية جنين لتحسين ادارة الطلب على المياه ، تقليل التكاليف الادارية ، الكشف عن السرقات والوصلات الغير شرعية والتسربات ، واستعادة الديون من المشركين الذين لا يدفعون التحكم في كمية المياه التي تستخدمها وعدد المرات.
- لا داعي للقلق بشأن تراكم ديون المياه.

3. نوع عداد الدفع المسبق للمياه وكيف يعمل

ا. نوع العداد : الالتراسونيك AK411 DN-20 من بايلان، شركة تصنيع عدادات دفع مسبق تركية معروفة

ب. فوائد تركيب عداد الالتراسونيك للدفع المسبق

- العداد المستخدم (الالتراسونيك) افضل انواع العدادات الموجودة بالسوق ولا تحتسب الهواء
- لا يوجد اجزاء ميكانيكية وعمره الافتراضي اطول
- الاحتمال قليل بان يغلق العداد بالاوساخ وجزيئات الرمل
- لا يوجد خطأ عند احتساب قيمة استهلاك المياه عكس العدادات الميكانيكية
- يمكن تركيبه باية وضعية دون خلل بالوظائف

ج. كيف يعمل ؟

يعمل العداد من خلال الكرت الذي ، وتحتاج الى 1. شحن الكرت للعداد في محطة الشحن القريبة من منطقتك 2. لمس الكرت بالعداد 3. استخدام المياه اذا كان متوفرا في ذلك اليوم، نظام الدفع المسبق يعتمد على الشحن مقدما لاستهلاك المياه، والمستهلك يستخدم الرصيد الذي اشتراه بعد اضافته الى العداد من خلال وضع الكرت الذي على العداد بالمكان المخصص (فقط وضعه على العداد). العداد يقطع المياه من خلال اغلاق المحبس عندما ينتهي الرصيد، ولكن عندما يستخدم المشترك الرصيد الاحتياطي الموجود بالكرت ويحملة للعداد يتم اعادة فتح المحبس تلقائيا، والكمية الاحتياطية تسمح لك باستخدام كمية المياه المتبقية حتى تتمكن من اعادة شحن الكرت من جديد في اقرب وقت ممكن .

لعداد المياه مسبق الدفع شاشة الكترونية تظهر معلومات مختلفة منها الرصيد المحمل الى العداد وإجمالي الرصيد وكمية الاستهلاك وسعر التعرفة وحالة البطارية .. الخ ، وكل عداد لديه كرت خاص يستخدم له فقط ولا يمكن استخدامه لعداد اخر .

لا حاجة لقراءة
العدادات ولا حاجة
للفواتير... الدفع
سيكون مقدما

شاهد قسم 10 : تفاصيل دليل استخدام عداد الدفع المسبق

مع العداد مسبق الدفع للمياه، كل شخص يقوم
بدفع ثمن المياه التي يستهلكها فقط. وهذا
عادل!



د. البطاقة الذكية (الكرت)

يتم نسخ جميع المعلومات الخاصة بالمشارك مثل التعريفات والشحنة الاحتياطية إلى بطاقة المشترك. عندما يقرأ عداد المياه البطاقة، يتم تنزيل كل هذه المعلومات إلى عداد المياه. ويعتبر الكرت نقطة الوصل بين قاعدة معلومات المشتركين في البلدية والعداد الخاص بالمشارك، بعد شحن الكرت بالرصيد بمحطات الشحن التابعة للبلدية تنقل الكمية التي اشترها المشترك إلى العداد من خلال وضع الكرت على العداد ومن ثم الضغط على الزر الأبيض لمرة واحدة عند كل شحنة جديدة



هـ) بطاقة العداد مسبق الدفع الذكية الخاصة بك

- 1) يحصل كل مشترك على بطاقة عداد مسبق الدفع ويجب عليه الاحتفاظ بها.
- 2) يجب الاحتفاظ بالبطاقة لأنها الرابط بين المزود (البلدية) والمشارك
- 3) كل بطاقة هي لعداد معين ولمشارك واحد فقط، لذلك لا تحاول وضعها في عداد آخر ليس لك.
- 4) قم بنقل رصيدك المشحون على البطاقة إلى العداد عن طريق لمس بطاقتك الذكية في العداد ومن ثم الضغط لمرة واحدة على الزر الأبيض
- 5) سيؤدي استخدام العداد بطريقة غير قانونية إلى إيقاف العداد بشكل تلقائي.
- 6) لا تعبث بأجزاء العداد الأخرى. قد يؤدي ذلك إلى إغلاق تلقائي، وأي ضرر عن عمد للعداد سيقوم بوضعك تحت الإجراءات القانونية.

من خلال عداد الدفع المسبق للمياه يتحكم المستهلكون باستخدام لمياه بشكل عالي، وهذا يعني مياه أكثر في الشبكة يستفيد منها الآخرون.

4. تعرفه المياه وشحن رصيد البطاقة

أ. تعرفه المياه في بلدية جنين... هناك 0.5 شيكل رسوم صرف لكل متر مكعب

المجموع الكلي	رسوم الصيانة الشهرية	التعرفة الرئيسية	الاستهلاك
يعتمد على الاستهلاك	6.2 شيكل	4.34 شيكل لكل m^3	$0 m^3 - 50 m^3$
يعتمد على الاستهلاك	6.2 شيكل	6.2 شيكل لكل m^3	أكثر من $50 m^3$

ب) ما تحتاج إلى معرفته حول شحن بطاقتك الذكية مع تفاصيل عملية الشحن

- 1) في حالة فقدان البطاقة أو تلفها، يمكنك الحصول على بطاقة جديدة من خلال بلدية جنين مقابل رسوم 30 شيكل.
 - 2) لا يمكن شحن البطاقة بأقل من 50 شيكل. هذا هو الحد الأدنى للشحن.
 - 3) يتم اقتطاع رسوم الصيانة الشهرية البالغة 6.2 شيكل فقط في أول شحنة لك في الشهر.
 - 4) يعمل العداد بنظام الرصيد الاحتياطي بنسبة 10% من الرصيد الكلي للشحنة، مثال، إذا شحنت كرتك بـ 100 شيكل في اللمسة الأولى يأخذ العداد 90 شيكل وتبقى 10 شيكل بالكرت كرصيد احتياطي، عندما يصل استهلاكك إلى 89 وبقي شيكل واحد، يظهر لك على شاشة العداد تحذير بأن الرصيد منخفض، حينها بإمكانك وضع الكرت مرة أخرى على العداد واستخدام الرصيد الاحتياطي، وتذكر دائماً شحن رصيدك قبل استخدام العشرة شواقل، بعد أو حتى قبل استخدام الرصيد الاحتياطي، فعليك الذهاب إلى محطة الشحن القريبة في منطقتك لإعادة شحن الرصيد.
- يرجى ملاحظة ما يلي:
- * عند الضغط على الزر الموجود في العداد مسبق الدفع، يمكنك رؤية الرصيد المستخدم في الشيك، والرصيد المتبقي في الشيك، ورقم اشتراكك، والتعريفات والتحذير، إن وجد.
 - * إذا كان رصيدك أقل من 1 شيكل، ستظهر رسالة على الشاشة تشير إلى انخفاض الرصيد. يجب عليك إذن استخدام الكمية الاحتياطية أو القيام بشحن رصيد جديد على بطاقتك.
 - 5) إذا كان لديك أي دين على فاتورة المياه، فإن البلدية تخصص 10% من كل شحنة. على سبيل المثال، إذا كنت قد قمت بشحن 100 شيكل، سيتم خصم 10 شيكل من دينك، ولن يكون لديك سوى 90 شيكل من رصيدك لاستخدام المياه.
- ملاحظة: يبدأ الخصم مباشرة بعد تركيب العداد مسبق الدفع في منزلك.

6) في نفس اليوم الذي سيتم فيه تركيب العداد في منزلك، يكون الكرت مشحون برصيد 7 شيكل. وهو يعادل حوالي 2 متر مكعب وذلك حتى تتمكن من استخدام المياه في اليوم الأول حتى تقوم بشحن بطاقتك (إذا كانت المياه متوفرة في ذلك اليوم) (7) لا يوجد حد أدنى في عداد الدفع المسبق على عكس العداد العادي .

5. أين يمكنك شحن بطاقة العداد مسبق الدفع الخاص بك ؟
شحن بطاقة العداد مسبق الدفع

* سوف تزداد محطات الشحن في المستقبل مع زيادة مشترك نظام العدادات مسبق الدفع.
1) سوبرماركت الجليل (2) مكتب جباية دائرة المياه (3) مكتب جباية وسط المدينة (4) سوبرماركت المدينة (5) سوبرماركت الظاهر (6) مركز طيبة (7) سهيل موبايل (8) سوبرماركت السعدي (9) سوبرماركت الرضا (10) سوبرماركت أبو عليا.



(3)



(2)



(1)

6. مسؤولية المشتركين تجاه عداداتهم مسبق الدفع

تعود ملكية العداد مسبق الدفع الموجود في منزلك إلى بلدية جنين.

1) مسؤولية بلدية جنين:

أ. تركيب العداد مسبق الدفع للمشاركين الحاليين في المناطق التجريبية.

ب. تتحمل البلدية مسؤولية صيانة العداد اذا كان الخلل مصنعي او وظيفي وليس ناتج عن كسر او عطل متعمد

2) مسؤولية المشترك:

أ. يجب على المشترك استخدام عداد المياه بشكل صحيح.

ب. يجب على المشتركين عدم اللعب بأجزاء العداد. لأن ذلك قد يؤدي ذلك إلى إغلاق تلقائي، وقد يؤدي أي ضرر مقصود للعداد إلى وضعك تحت المسؤولية القانونية.

ج. هناك غرامات على الأضرار وسوء الاستخدام الغير قانوني للعداد كما يلي:

• أية حالة استخدام غير شرعي للمياه (سرقة) يدفع المشترك 5000 شيكل كغرامة بالإضافة الى تقدير الاستهلاك خلال الاستخدام غير المشروع.

• إذا تم إلحاق الضرر بالعداد من قبل المشترك ، فسيتم تغريمه 3000 شيكل للأجزاء الصغيرة و 5000 شيكل للجزء الرئيسي من العداد.

• إذا ثبت أن المشترك يستخدم العداد بشكل غير قانوني أو قام بتمديد وصلة قبل العداد أو ثبت أنه قد تلاعب بنظام العداد والاستهلاك فسيتم تغريمه ب 5000 شيكل.

• إذا قام المشترك ببيع مياه البلدية للآخرين سيتم تغريمه 10,000 شيكل.

• في حالة قيام المشترك بتركيب المضخة بشكل مباشر على الشبكة سيتم تغريمه 2000 شيكل وسيتم أيضاً إزالة المضخة ونقلها إلى بلدية جنين.

7. كيف تحمي العداد مسبق الدفع الخاص بك

- 1) يرجى إبقاء صندوق العداد مغلقاً لحماية العداد من التلف العرضي أو المطر أو الشمس أو الغبار.
- 2) يرجى عدم السماح للأطفال باللعب بالعداد أو الضغط على الأزرار الرقمية.
- 3) إذا كانت هناك حاجة إلى أي أعمال انشائية حول العداد، يرجى حمايته من أي أضرار. اتصل بالبلدية إذا كنت بحاجة إلى نقل العداد بسبب هذه الإنشاءات الجديدة.
- 4) من فضلك لا تحرق أي شيء مثل القمامة بالقرب من عداد المياه ولا تضع أي شيء على صندوق عداد المياه.
- 5) عدادك مسبق الدفع مختوم بلاصق شركة بايلان من الجانبين ، لا تحاول إزالته أو خلعه ، فالعداد بدون الختم او ختم غير واضح سيكون العداد خارج الضمان من قبل الشركة المزودة
- 7) تنظيف السطح الخارجي وشاشة العداد فقط باستخدام قطعة قماش مبللة بالمياه. وعدم المسح بمواد مذيبة او لها تأثير سلبي على العداد
- 8) يرجى الاتصال بالبلدية في حال حدوث أي ضرر للعداد.

8. اين تبلغ اذا لاحظت أي خلل أو تلف في العداد مسبق الدفع

- عندما تلاحظ أي ضرر أو خلل في نظام العداد، تقع على عاتقك مسؤولية الإبلاغ عنه بأسرع وقت ممكن، يمكنك الإبلاغ عن ذلك من خلال الاتصال أو المراسلة الكتابية أو ملء نموذج الشكاوى في موقع البلدية www.jenin.city.
- 1) بلدية جنين - مركز خدمة الجمهور – هاتف 2436422 -04 من 8 صباحاً - 2 مساءً
 - 2) مكتب دائرة المياه والصرف الصحي ، من 8 صباحاً وحتى 2 بعد الظهر
 - 3) مكتب جباية وسط المدينة 8 صباحاً - 2 مساءً
 - 4) موقع البلدية الإلكتروني التابع للبلدية على العنوان www.jenin.city، عن طريق المحادثة المباشرة من 8 صباحاً - 2 مساءً
 - 5) الموقع الإلكتروني للبلدية على العنوان www.jenin.city والضغط على زر الشكاوى في أي وقت 24 ساعة
 - 6) صفحة الفيسبوك الخاصة بالبلدية على العنوان "بلدية جنين Jenin Municipality"
- عند الاتصال، يرجى تقديم اسمك وعنوانك ورقم هاتفك ورقم عداد المياه وشرح مشكلة الضرر أو الخلل.



9. الجدول الزمني للتركيب

مناطق الدراسة لتركيب العدادات مسبقة الدفع	العدد الكلي للعدادات التي سيتم تركيبها	فترة التركيب (مؤقتا)	الحالة
صباح الخير، خروبة، شارع الناصرة PA1	~ 714	اذار - إبريل 2019	بدأ التركيب
حي الزهراء، المخيم الجديد PA 2	~ 620	لم يحدد	تحت الدراسة
الحي الشرقي، حليمة السعدية PA 3	~ 460	لم يحدد	تحت الدراسة



10. إشارات شاشة لعداد الدفع المسبق

يملك عداد الدفع المسبق شاشة عالية الدقة؛ تعرض معلوماتٍ مختلفة مثل رقم العداد ، رقم المشترك ، مقدار الاستهلاك ، الرصيد المحمل ، الرصيد الكلي ، الرصيد المتبقي ..إلخ . ولعرض هذه المعلومات على الشاشة ؛ يجب ضغط الزر الأبيض بشكلٍ متتالي .

(A) معلومات الشاشة الأساسية ؛ دون وضع الكرت

(1) الضغطة الأولى

- يعطي اشعار بأن الصمام مفتوح و هذا يعني أن المياه تتدفق
- E2: تعني تدفق المياه
- إشارة التحذير (مثلث بداخله علامة!) : تعني يوجد تحذير على العداد اي أن الرصيد منخفض
- إشارة السهم إلى أعلى تعني أن الصمام مفتوح ويُدخّل مياه

(2) الضغطة الثانية

- يعطي اشعار بأن الصمام مغلق وهذا يعني أن المياه لا تتدفق
- (3) الضغطة الثالثة
- تُشير إلى كمية استهلاك المياه لدى المشترك

(4) الضغطة الرابعة

- تبين الرصيد الكلي لدى المشترك.

(5) الضغطة الخامسة

- تبين تاريخ اخر مرة تم تحميل رصيد في كرت الشحن
- وتعطي الرصيد الحالي لكرت الشحن

(6) الضغطة السادسة

- النسبة : تعني سعر كوب المياه .

(7) الضغطة السابعة.

- الخطوة 1 تعني تدرج التعرفة

(8) الضغطة الثامنة

- رصيد منخفض و تعني ان مبلغ الشحن منخفض أيضاً.

(9) الضغطة التاسعة.

- تفاصيل العداد: قطر العداد, درجة الحرارة

- التاريخ ونسخة العداد

(10) الضغطة العاشرة

- تعطي الرصيد الكلي لكرت الشحن

(11) الضغطة الحادية عشرة

- الفترة اليومية : فترة الاستهلاك اليومية للمياه في عداد المياه

(12) الضغطة الثانية عشرة

- البلدية : لاي بلدية يتبع المشترك



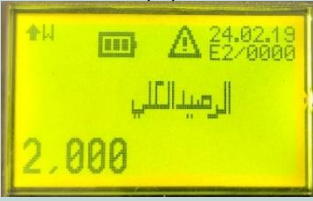
(1)



(2)



(3)



(4)



(5)



(6)



(7)



(8)



(9)



(10)



(11)



(12)



(13)



(15)



(14)

- (13) الضغطة الثالثة عشر : رقم العداد.
 (14) الضغطة الرابعة عشر: رقم المشترك
 (15) الضغطة الخامسة عشرة : نوع المشترك منزلي أو صناعي

ملاحظة مهمة

في حالة نشوب حريق ولا يوجد لديك مياه بالخزان ولا رصيد بالعداد، يمكنك استخدام نظام الحريق من خلال الضغط لعدة ثوان على الزر الابيض حتى ترى وضعية نظام الحريق على الشاشة ، وذلك يتيح لك استخدام كميات المياه لمدة 180 دقيقة ، وبعد استخدامك لنظام الحريق وحتى يمكنك استخدامه مرة اخرى عليك مراجعة البلدية لإعادة تفعيله مرة اخرى ، كما يتم خصم الكمية المستهلكة من خلال هذا النظام في الشحنة القادمة .








(ب) كيفية شحن عداد الدفع المسبق:

يتم وضع كرت الشحن على الجزء المخصص في الجزء العلوي من العداد وعند الضغط على الزر الموجود في الوسط تظهر الخيارات التالية :
 - في حال وجود رصيد في الكرت يعطي تم التحميل
 - في حال لا يوجد رصيد يعطي تم التحميل صفر.

(ج) اخرى

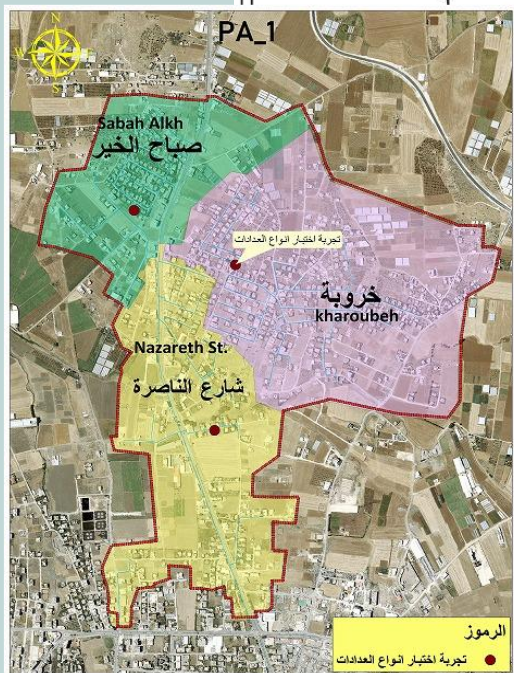
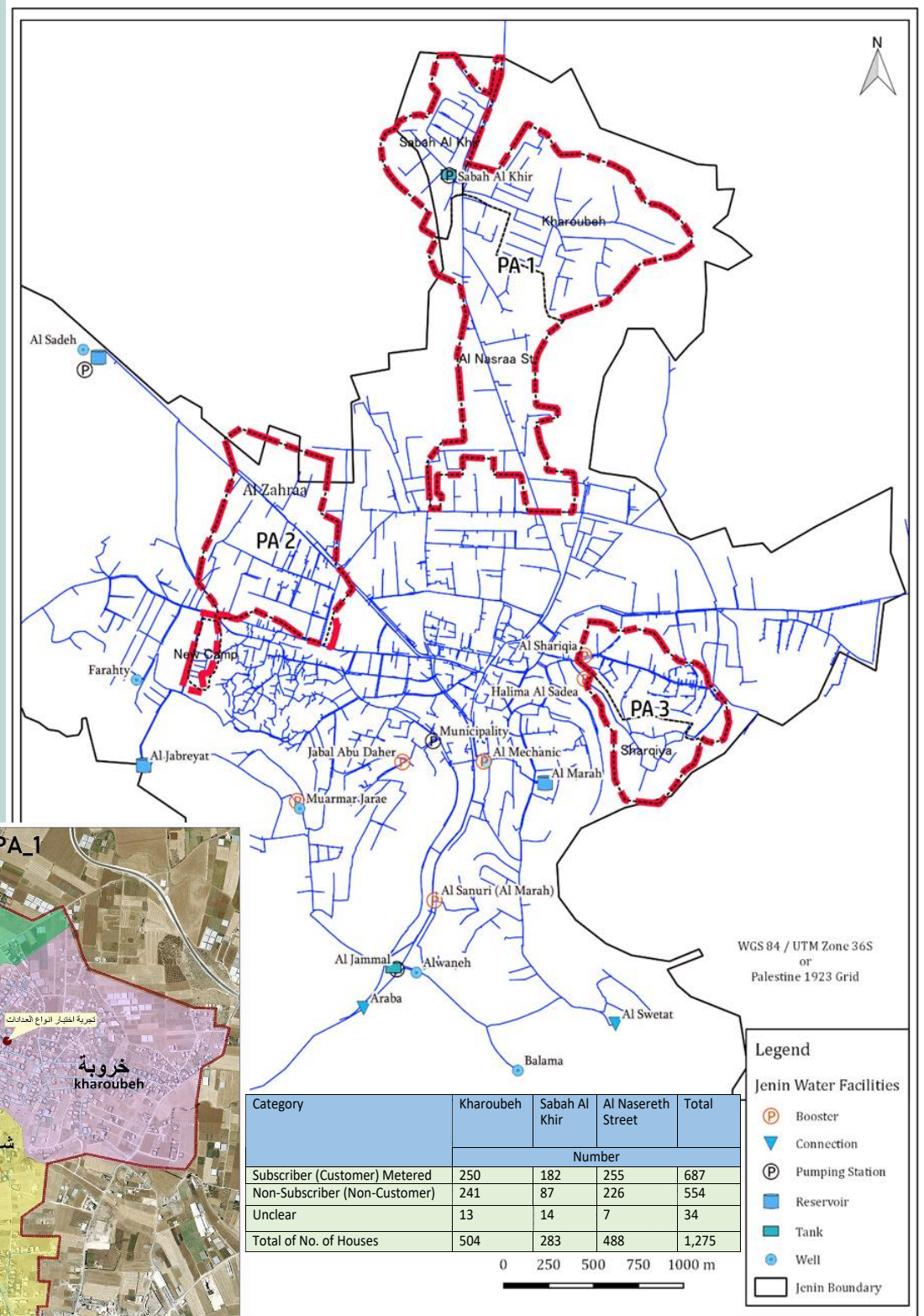
هناك بعض الاشارات الأخرى التي قد تظهر على الشاشة



-  اتجاه التدفق
-  الصمام مغلق (يتم تفعيله عند اغلاق الصمام)
-  مستوى البطارية (تظهر مستوى الشحن المتبقي بالبطارية)
-  تحذير (تظهر عند وجود تحذير نشط)
-  رمز المفتاح (يظهر في حال وجود أي خلل)
-  يتم تفعيلها عند ظهور سعر الوحدة (سعر المتر المكعب) على الشاشة
-  يتم عرضها عند ظهور كمية الإستهلاك على الشاشة (متر مكعب)



11. مواقع المناطق التجريبية الثلاث



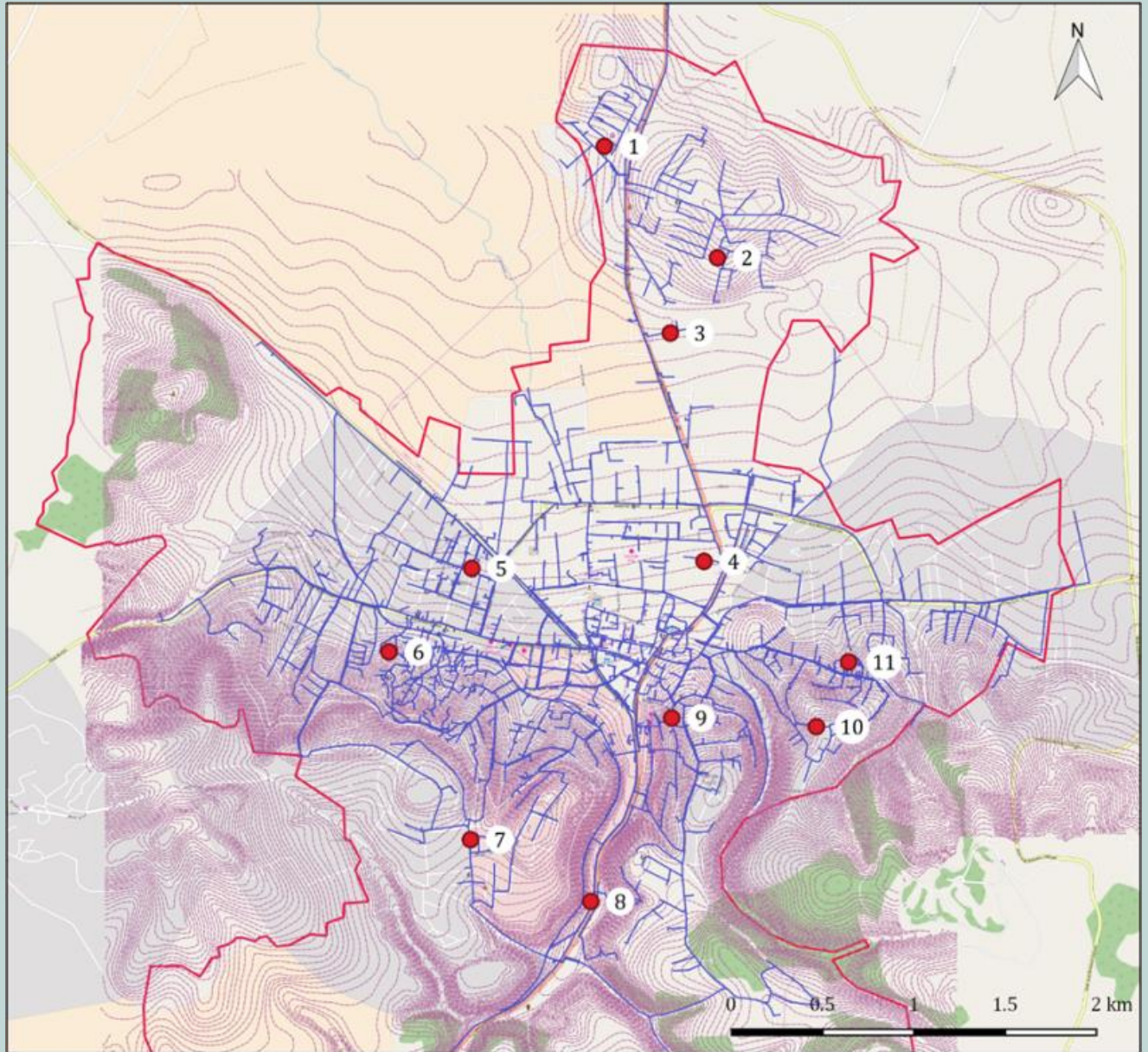
12. نتائج اختبار الدقة لثلاثة أنواع من عدادات المياه والمُتَّفَذ

أجرت بلدية جنين اختباراً لثلاثة أنواع رئيسية من عدادات المياه وهي : عداد السرعة ، العداد الحجمي ، عداد الأتراسونيك . وكان الهدف اختبار وظائف العدادات وتقييم أيها الأفضل لمدينة جنين استناداً إلى وضع المياه الراهن. إضافة لمراجعة الدراسات الأخرى في هذا المجال. بحيث تُضمّن الاختبار إحدى عشر (11) موقعاً؛ تم فيها تركيب ثلاثة (3) أنواع من عدادات المياه بجوار عدادات المياه الموجودة. يُوضّح الجدول أدناه نتائج كل عداد ؛ وأيضاً تُظهر الخريطة المُرفقة لاحقاً مواقع التجارب.

نوع العداد	سرعة (ميكانيكي)	حجمي (ميكانيكي)	أتراسونيك
النتائج	<ul style="list-style-type: none"> • يقيس كمية أقل من المياه ؛ أقل من العداد الحجمي بنسبة 3%. • يستمر عداد السرعة بالاحتساب حتى إذا كان الأنبوب مملوء بالمياه بشكل غير كامل وكذلك إذا احتوت الماسورة على الهواء فقط أو إذا كانت المياه مخلوطة بالهواء. ولكن الكمية التي يقيسها أقل من عداد الأتراسونيك ؛ لذلك من الممكن تفادي مشكلة الهواء في مدينة جنين. 	<ul style="list-style-type: none"> • يقيس كمية أكبر؛ لكن الفرق أقل . • تعطل عدادين حجميين موجوديين عن العمل ،نتيجة وجود أوساخ أو ترسبات بداخلها. • يستمر العداد الحجمي بالقياس حتى إذا كان الأنبوب مملوء بالمياه بشكل غير كامل وكذلك إذا احتوت الماسورة على الهواء فقط أو إذا كانت المياه مخلوطة بالهواء. ولكن الكمية التي يقيسها تكاد تكون مماثلة للكمية التي يقيسها عداد الأتراسونيك الذي لا يحتسب الهواء ؛ لذلك من الممكن تفادي مشكلة الهواء في مدينة جنين. 	<ul style="list-style-type: none"> • أقل من الكمية الكلية التي يقيسها العداد الحجمي ولكن الفرق لا يكاد يذكر: 0.23 % . • من خلال المعاينة النظرية وُجد أن عداد الأتراسونيك يتوقف عن العد إذا كان الأنبوب مملوء بالمياه بشكل غير كامل وكذلك إذا احتوت الماسورة على الهواء فقط ، أو إذا كانت المياه مخلوطة بالهواء. مع ذلك ؛ فإن الفرق قليل بين عداد الأتراسونيك والحجمي.
التقييم	<ul style="list-style-type: none"> • غير دقيق عند التدفق المنخفض في الشبكة بوجود الأجزاء الميكانيكية يُمكن أن يتعطل العداد. • يحسب الهواء. 	<ul style="list-style-type: none"> • يتعطل نتيجة التلکسات والترسبات . • يتم احتساب الهواء ولكنه لا يؤثر كثيراً على دقة القياس. 	<ul style="list-style-type: none"> • تم تجربة العداد على ارض الواقع تم اختبار 11 عداد لفترة 3 أشهر وكانت النتائج جيدة. • لا يحسب المياه المخلوطة مع الهواء أو الهواء على حد السواء. • بدون الأجزاء الميكانيكية فإن عمر العداد أطول.



مواقع تجربة 11 عداد دفع مسبق (2017-2018)



Legend

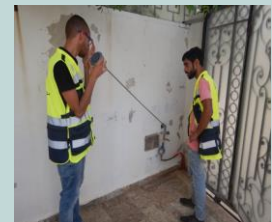
- Topographic contour lines
- Jenin area boundary
- Pipe line
- Location of test meters

13. أنشطة أخرى .

يمتد المشروع لمدة 3 سنوات ويهدف إلى (أ) تقليل الفاقد . (ب) زيادة نسبة تحصيل الفواتير في بلدية جنين. بالإضافة إلى إدخال عدادات الدفع المسبق ؛ يتخلل المشروع عدة أنشطة ؛ تهدف إلى تحسين خدمة المياه المقدمة إلى المشتركين:

فاقد المياه (NRW) : هي المياه التي يتم ضخها في الشبكة ثم خسارتها قبل وصولها الى المشترك ، ويمكن ان يكون الفاقد اما فاقد حقيقي ظاهر (من خلال التسرب) او فاقد غير ظاهر (مثل السرقات او الوصلات الغير شرعية أو عدم دقة العداد ، عدم دقة الفواتير

- (1) تحديد نقاط التسرب ليتم إصلاحها .
- (2) تركيب أجهزة قياس الضغط لفهم ظروف التّزود في المياه. ومتابعة مصادر مياه البلدية وحساب نسبة الفاقد ومحاولة تقليله.
- (3) إعادة تأهيل مكاتب جباية في وسط المدينة وشارع حيفا.
- (4) تحديث بيانات المشتركين من خلال المسوح الميدانية.
- (5) تعزيز المهارات والأدوات الإدارية لكل قسم مرتبط بدائرة المياه في البلدية.
- (6) التحليل المالي لإيرادات المياه.
- (7) دراسة التحديات التي تواجه الجباة والقراء.
- (8) تطوير خطة عمل طويلة الأمد لدائرة المياه والصرف الصحي.
- (9) تدريب فني دائرة المياه على شتى الجوانب الفنية بما في ذلك كشف التسرب في الشبكة وإصلاحه.
- (10) استخدام نظام ال Pal Pay لتسهيل عمليات الدفع.
- (11) دراسة استخدام نظام الفوترة المحمولة لقراءة العدادات واصدار الفواتير في الموقع مباشرة.
- (12) إعادة تصميم صفحة البلدية وإتاحة خاصية المراسلة المباشرة ونظام الشكاوي الإلكتروني للمشاركين.
- (13) تطوير/تحديث نظام DAMAS الحالي وذلك تفادياً للاستخدام الورقي وضمان سهولة الإجراءات التي يتوجب على المشتركين الالتزام بها عند التقديم لخدمات المياه .



ملخص (اسئلة وأجوبة)

الموضوع	السؤال	الإجابة
1- تعرفه المياه	هل تعرفه المياه ستتغير ؟	لا ... نفس التعرفة ستطبق ... لا يوجد حد أدنى في عداد الدفع المسبق على عكس العداد العادي
تعرفه المياه والدفع	كيف سندفع لنظام عداد الدفع المسبق مسبقا	من خلال بطاقة الدفع المسبق يشترى المشترك الرصيد من مراكز الشحن التابعة للبلدية ، ومن ثم وضع الكرت على ظهر العداد ثم ينتقل الرصيد الى العداد
2- بطاقة الدفع المسبق – الشحن	اين يستطيع المشترك شحن الرصيد لبطاقة عداد الدفع المسبق ؟	1) سوپرماركت الجليل 2) مكتب جباية دائرة المياه 3) مكتب جباية وسط المدينة 4) سوپرماركت المدينة 5) سوپرماركت الظاهر 6) مركز طيبة 7) سهيل موبايل 8) سوپرماركت السعدي 9) سوپرماركت الرضا 10) سوپرماركت أبو عليا
فقدان بطاقة العداد	إذا اضاع المشترك بطاقة العداد ماذا يفعل ؟	إذا تم فقدان البطاقة او كسرها بإمكان المشترك الحصول على واحدة جديدة بعد دفع الرسوم للبطاقة الجديدة
الرصيد المتبقي بالعداد	كيف يمكن للمشارك ان يفحص الرصيد المتبقي ؟	بإمكان المشترك معرفة الرصيد المتبقي من خلال الضغط على الزر الأبيض 4 مرات
ديون المياه السابقة	إذا كان المشترك لديه ديون سابقة هل بإمكانه التزود بالمياه ؟	نعم، المشترك يستطيع التزود بالمياه بشكل طبيعي ولكن ستقوم بلدية جنين بخصم 10% من كل قيمة شحنة حتى تسديد الديون كاملة
3- فوائد عداد الدفع المسبق "الرجاء مراجعة صفحة 2 في الدليل الارشادي "	ما هي فوائد عداد الدفع المسبق للمياه ؟	سيكون العداد أكثر دقة ولا يحتسب الهواء ولا الفقاعات المخلوطة بالمياه لا يوجد اجزاء ميكانيكية بالداخل واقل عرضة للكسر والعمر الافتراضي اطول المساهمة في تقليل المصاريف الادارية للبلدية و المساهمة بالكشف عن السرقات والتسريبات والسيطرة أكثر على استخدامات المياه المساهمة في رفع نسبة الجباية للمياه
رسوم عداد الدفع المسبق	هل هناك حاجة لدفع رسوم عداد الدفع المسبق للمياه ؟	لا ... المشتركين الحاليين في المناطق التجريبية لا يحتاجون لدفع رسوم العداد وتكاليفه
عداد الالتراسونيك	لماذا اختارت بلدية جنين عداد الالتراسونيك مسبق الدفع للمياه	تم عمل اختبار الدقة من قبل بلدية جنين، وهو من افضل العدادات للاسباب : o لا يحتسب الهواء ولا حتى فقاعات الهواء المخلوطة بالماء o احتمالية الانسداد ضئيلة بسبب جزيئات الرمل o أكثر دقة في القياس من العدادات الميكانيكية o يمكن تركيبه بابة وضعية
العمر الافتراضي للعداد	ما هو العمر الافتراضي للعداد ؟	العمر الافتراضي لبطارية العداد عشر سنوات إذا كانت ظروف العداد جيدة يمكن استخدام البطارية أكثر من عشر سنوات
عطل عداد الدفع المسبق للمياه	ماذا يمكن ان يفعل المشترك في حال حدث عطل بالعداد	إبلاغ البلدية والتواصل مع البلدية من خلال الارقام الهاتفية او الوسائل الاخرى في الدليل الارشادي
عطل عداد الدفع المسبق للمياه	ما هي تكاليف اصلاح الخلل المصنعي في عداد الدفع المسبق ؟	لا يوجد تكاليف اضافية على المشترك، رسوم الصيانة للأعطال المصنعية وتشمل استبدال القطع واصلاح الخلل ليس عليها رسوم
فصل المياه عن العداد	متى يتم فصل المياه تلقائيا عندما يكون الرصيد منخفض ؟	إذا استنفذ المشترك الرصيد الرئيسي والرصيد الاحتياطي .
4- مسؤولية المشترك	هل تغيرت مسؤولية المشترك عن الوضع السابق	ملكية العداد اصبحت للبلدية
الغرامات	في حال قام المشترك بكسر متعمد للعداد ما المبلغ المطلوب للدفع ؟	3000 شيكل للأجزاء الفرعية و 5000 شيكل للأجزاء الرئيسية

بلدية جنين تشكر وتتمن تعاونكم

الرجاء الاتصال على دائرة المياه اذا كنت بحاجة لمعلومات عن هذا المشروع وعدادات الدفع المسبق للمياه على الرقم: 04-2502023





	نقطة ربط - دائرة مياه الضفة الغربية (4) Connection Point to WBWD's Water Source		الخط النقل Main Transmission
	بئر بلدية (3) Municipal Well		الخط الرئيسي Main Distribution
	بئر خاص (11) Private Well		الخط الفرعي Distribution Line
	تنكات (19) Tanks		حدود البلدية City Boundary
	Booster		خطوط الكنتور Contour Lines

Map prepared for the JICA-funded 'Project for Strengthening the Capacity of Water Service Management in Jenin Municipality' (2017-2020)
مشروع تحسين ادارة خدمة المياه في بلدية جنين 2020-2017

Last updated on April 27, 2021.

別冊資料 CD 1.15

**Manual for Management of Prepaid Water Meter
System in Jenin Municipality**

別冊資料 CD 1.15.1 English Version



Project for Strengthening
the Capacity of Water Service Management in
Jenin Municipality

Manual for Management of Prepaid
Water Meter System in
Jenin Municipality

December 2021

JENIN MUNICIPALITY
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

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Appendix.

A-1 Standard Drawings for Installation of PPWMs

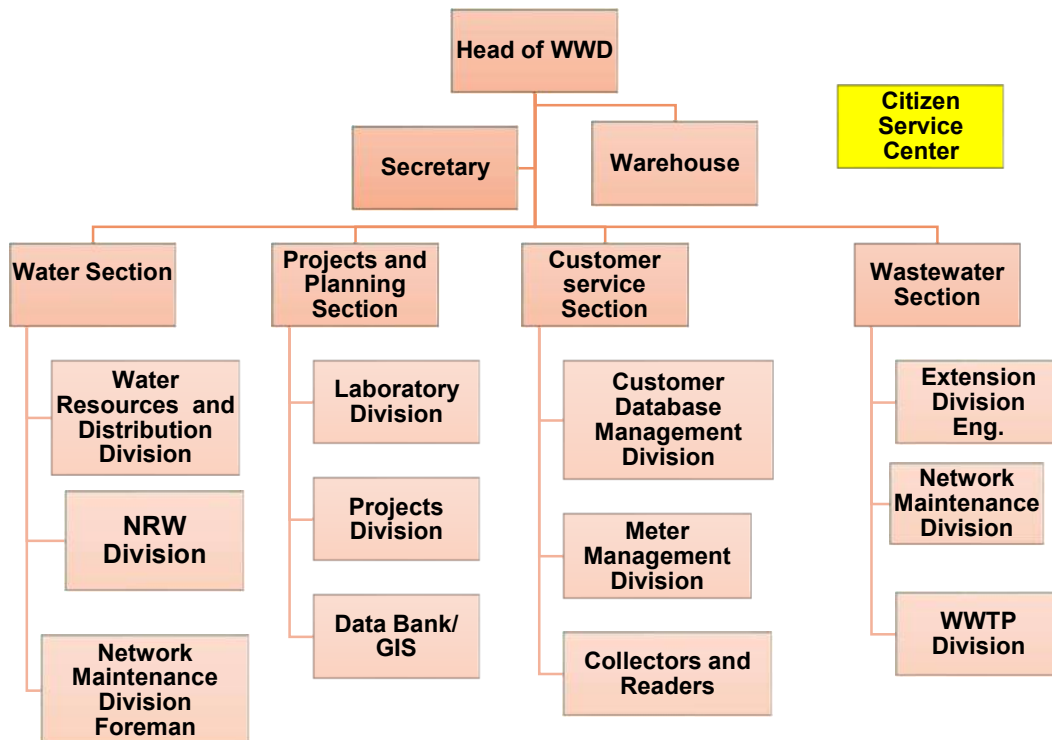
A-1-1 Ordinary house type

A-1-2 Apartment type

Abbreviations:

- Citizen Service Center (CSC)
- Customer Database Management Division (CDMD)
- Customer Database Survey (CDS)
- Customer Service Section (CSS)
- Gateway (GW)
- Meter Management Division (MMD)
- Prepaid Water Meter (PPWM)
- Project & Planning Section (PPS)
- Vending Station (VS)
- Water and Wastewater Department (WWD)
- Water Section (WS)

Organization of WWD:



CHAPTER 1. Introduction

This manual deals with all the activities for the management of Prepaid Water Meter (PPWM) system, and serves as a quick reference manual for the young staff and/or apprentices newly deployed from another department to Customer Service Section (CSS) of Water and Wastewater Department (WWD) in Jenin Municipality. For this reason, key staff of CSS took a leading part for preparing this manual, and all the activities to be done are based on the task sequence of Jenin Municipality's working system.

This manual consists of following 10 chapters and an appendix. Chapter 2 of this manual describes how the PPWM system works and outlines the essential features of each element of the system. Chapters 3 to 8 deal with various works for the house connection and related tasks. Chapter 9 and 10 detail day-to-day work for the whole system.

- Chapter 1. Introduction,
- Chapter 2. Fundamentals of the PPWM System,
- Chapter 3. Tasks for New Connection,
- Chapter 4. Tasks for Replacement with PPWMs in Bulk,
- Chapter 5. Disconnection and Transferring of PPWM,
- Chapter 6. Key Points for Installation Work,
- Chapter 7. Establishment of Vending Stations,
- Chapter 8. Gateway Installation,
- Chapter 9. Monitoring Work,
- Chapter 10. Troubleshooting Works, and
- Appendix.

The points to check or act, stated in the tasks, are based on the events which CSS faced at the site or office during the periods of installation and operation of PPWM. Troubleshooting is also based on the idea how the CSS staff tried to solve particular problems.

In addition, PPWM system has been connected with financial software "Al-shamel" of financial department through vending stations located at various private supermarkets. When the PPWM installation work progresses to the entire city, many troubles can be expected in each part of the system. For this reason, it is suggested to try to solve such troubles in cooperation with concerned parties including supplier and update this manual from time to time.

CHAPTER 2. Fundamentals of the PPWM System

2.1. Communication Flows

2.1.1. Communication flow of customers' daily information

Communication system of customers' daily information from PPWM to the server is shown in Fig. 2.1. The system can be divided into four elements: 1) Vending station, 2) PPWM, 3) Gateway, and 4) PPWM server. The Vending Station (VS) is needed for the customers when they need to charge credit. The PPWM is a smart meter with the function of a Prepaid function. A smart meter gives us customers' information by wireless network via Gateway. The Gateway is the device for relaying the customer's information from PPWM to the base station and/or relaying the orders from the base station to PPWM. The communication between the PPWM and Gateway is made by Low Power Long-Range Wireless (LoRa) system. The LoRa communication module is built in the PPWMs. From Gateway to the base station, the data transfer and communication is made by global system for mobile communications (GSM).

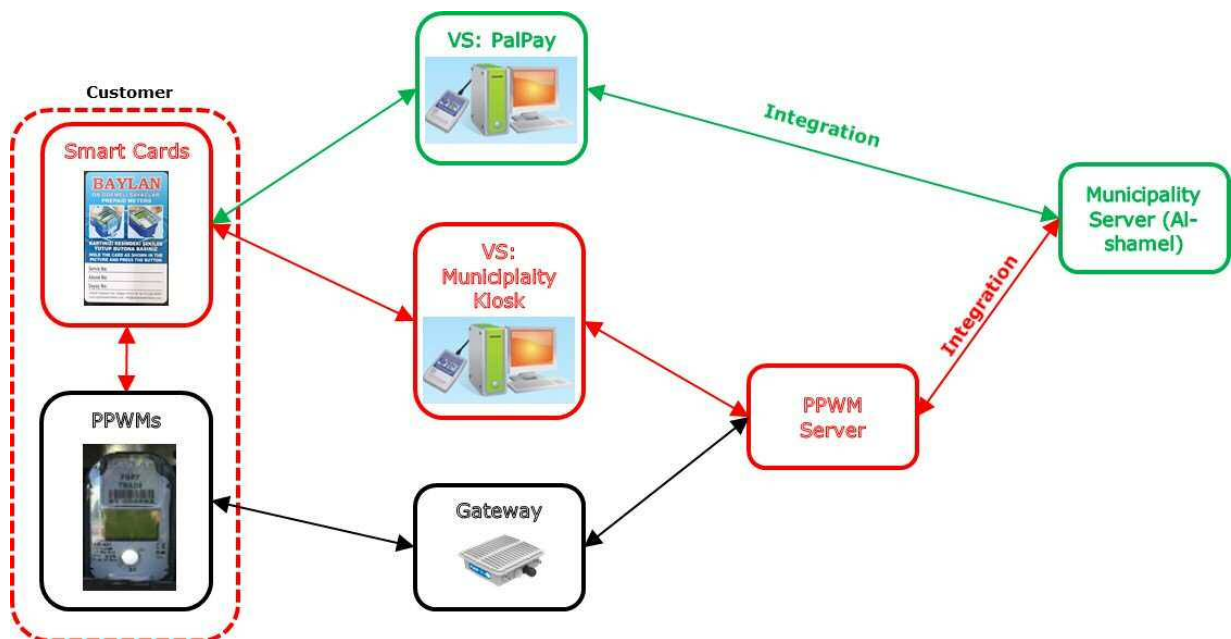


Fig2.1 The PPWM System

Key information of the system is as follows.

- The SMART system in a PPWM is active twice a day.
- Time for activation is randomly preset by the manufacturer.
- Customers' information such as current water consumption, battery status, remaining credit, etc. is summarized in a format and shown on the display.

- The staff in charge of monitoring can manage valve control (shut/open) remotely through SMART system.
- A Gateway can cover the area with the radius of 3 to 4 km on condition that there is no barrier between a PPWM and the gateway.
- A Gateway can receive the data from about 400 to 500 PPWMs at a time.

If a PPWM lies in an overlapped area of two gateways, PPWM server would receive two same data (See Fig.2.4).

2.1.2. Communication flow of Charging the Credit

Communication flow when customers charge credit at a certain VS is shown in Fig.2.2. Basic information of PPWM system is as follows.

- Operations for charging credit are made by customers via SMART card.
- Each water meter has its own smart card which operates only on assigned meter.
- When assigned, all the customer specific information such as tariffs, emergency credit, critical credit etc. are copied to the customer's card.
- Customers can charge credits at the Vending Stations (VS) located at Supermarkets (PalPay) and the Municipality's kiosks.
- The credit decreases according to water consumption, and PPWMs shut down stop valves when the credit finishes.
- For emergency cases (such as credit being finished at mid-night), some spare credits can be saved in the card and re-loaded when the regular credit finishes.



(Original Source: BAYLAN)

Fig.2.2 Communication flow of Charging Credit

2.2. PPWM

Model AK-411 of Baylan brand's PPWM was selected, and its key features are shown in the snapshot of its brochure below. The key parameters are DN 20, R=200 ($Q_3= 2500$ L/h, $Q_1=12.5$ L/h), initial flow $Q_i=3$ L/h, pressure rating=16 bar,

temperature rating=50°C, and battery life=10 years. The warranty period is three (3) years as shown in below snapshot.

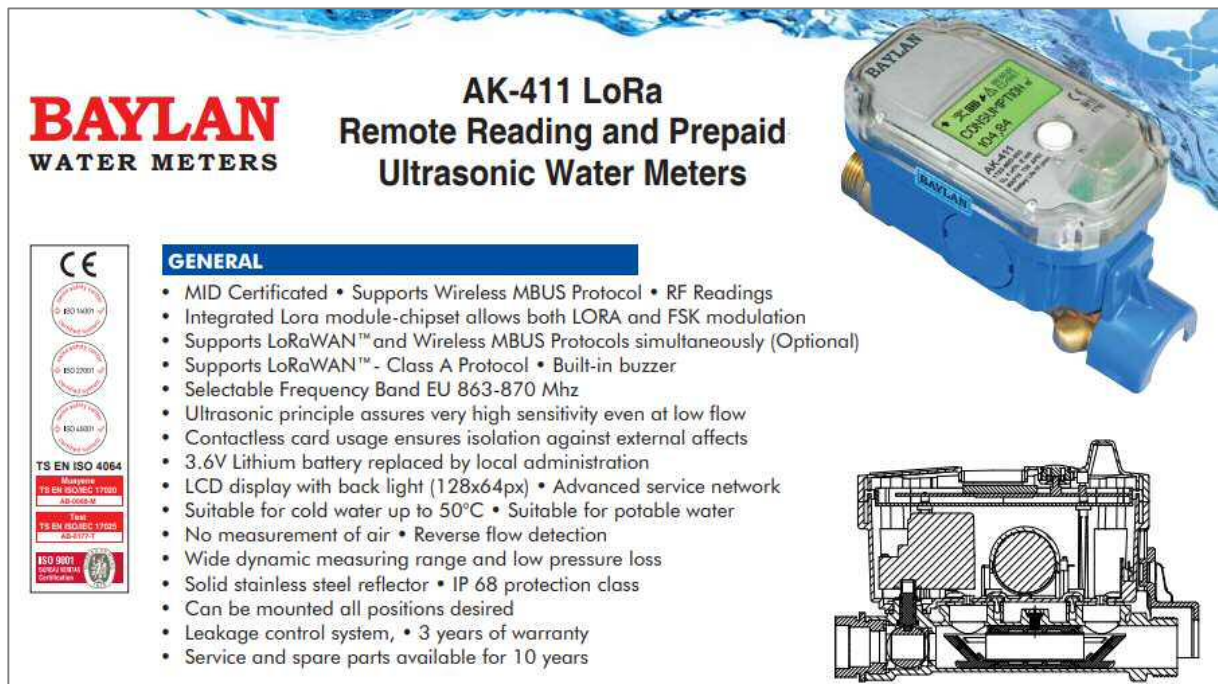


Fig. 2.3 Snapshot of Meter Manufacturer’s Brochure

2.3. Vending Station (VS), PPWM Server, and Main Server

Basic information on Vending Station, PPWM Server, and Main Server is as follows.

- Vending stations are established at the contracted supermarkets, municipality’s kiosks, and CSS office.
- One kit for vending station is provided to the staff in charge of charging credit. The kit consists of a PC, display, printer, backup battery, and a card reader.
- Operation training is conducted by CSS’s staff to the staff in charge.
- Some commission is given to the contracted supermarkets for operating the vending station.
- The PPWM server is installed at IT section in the Municipality, and the software in the PPWM server was integrated with the billing/financial software (AI-shamel) in the main server.
- The PPWM server, main server, and PPWM are interlinked. When customers charge water credit at the vending station, such data is saved in the vending station and sent to the Main server via PPWM server.

2.4. Master Card

The Master Card can reset the function of any PPWM when the valve is closed, and water supply is cut off due to an interference. For this reason, this Master Card remains under the control of the head of CSS or the head of WWD.

2.5. Gateway (LoRa system)

The Gateway (GW) is the device for relaying the customer's information from PPWM to the base station. The product of MultiTech brand was adopted into existing system. The features of a GW are as follows.

- One GW is capable of covering the area of about 4km in radius if there is no blockage like buildings between the PPWMs and GW.
- One GW is capable of receiving the data from about 400 PPWMs at the same time. (Basically, PPWMs are active twice a day for two seconds each. And the time to be active is pre-set by the manufacturer.)
- If covering areas of two (2) GWs are overlapped, PPWM server will receive two same data from each GW.

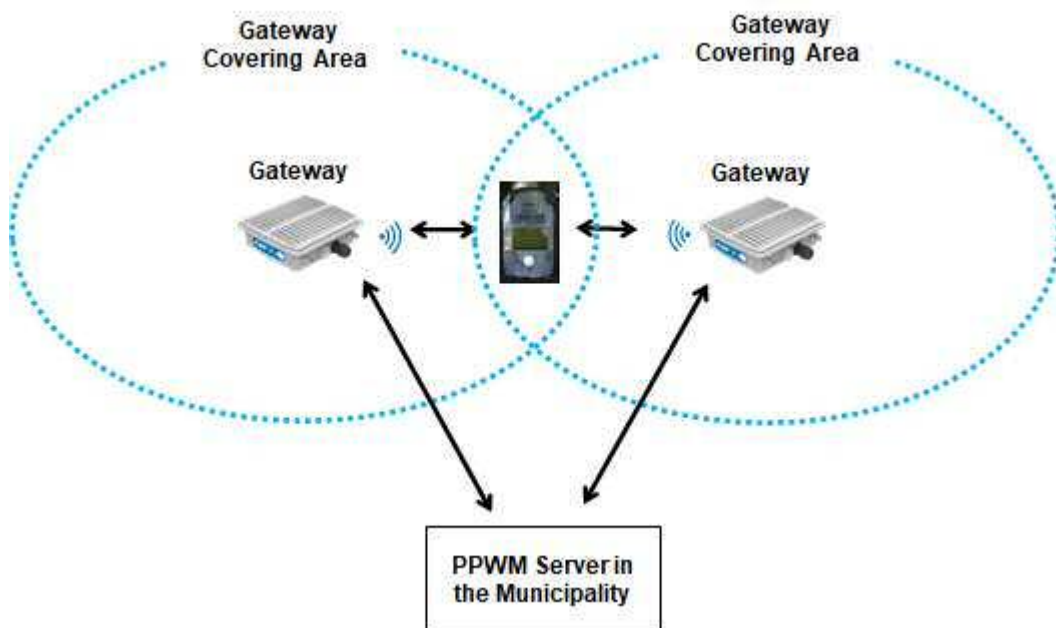


Fig.2.4 PPWM located in the overlapped area of two GWs

CHAPTER 3. Tasks for New Connection

3.1. Workflow of Major Tasks

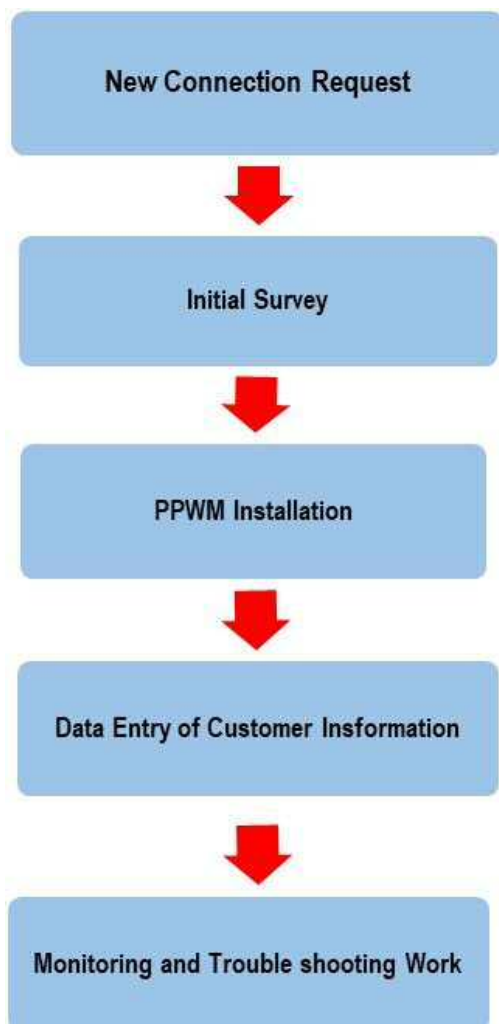


Fig. 3.1 Major task in sequence

Major tasks for the request of new connection are conducted according to the workflow shown in Fig. 3.1.

New Connection request is made by the customer at the Citizen Service Center (CSC) of the Municipality. When application form including settlement of payment is completed, it is sent to Customer Database Management Division (CDMD) of Customer Service Section (CSS) (See Fig.3.2).

Initial survey for checking location of existing distribution pipe, location of outlet pipe of the connection, etc. is conducted by the Water Section (WS) in response to the request of CSS. As a result, WS conducts installation of service pipe as shown in Photo 3.1 if there is no existing service pipe for new customer. WS then hands the information obtained in the initial survey to Meter Management Division (MMD).

PPWM installation starts after completion of the initial survey. The technician gives the customer a demonstration on how to use and how

the PPWM works. The technician takes "Work photo" and submits it to Project Division of Project & Planning Section (PPS). The Project Division summarizes "PPWM Installation Report" upon the receipt of "Work photo" from the technicians of MMD and archives it. The MMD enters the customer information into the smart card for the customer and gives information and demonstration on how to use PPWM to the new customer at the office.

Monitoring and troubleshooting works start after completion of the installation work. The staff in charge of monitoring conducts monitoring work, and the staff in charge of meter management handles the troubleshooting work. MMD takes actions for troubleshooting when something wrong happens.

State Of Palestine
Ministry of Local Government
Jenin Municipality
No. 04 ZSD006 Fax. 04 ZSD018



دولة فلسطين
وزارة الحكم المحلي
بلدية جنين
تلف: 04-11-006 فاكس: 04-11-018

اشتراك مياه جديد

بيانات الطلب الرئيسية:

تاريخ الطلب: 16/11/2021 10:29:29 صي رقم الطلب: 352 - 2021 - 11 - 11
 أرفقت تاريخي

بيانات المالك:

رقم المالك: 964122873 رقم البطاقة الشخصية: 964122873
 اسم المالك: محمد هويد توفيق عمارة
 العنوان: جنين

بيانات مقدم الطلب:

اسم مقدم الطلب: محمد هويد توفيق عمارة
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 رقم البطاقة الشخصية: 964122873 رقم الهاتف: *****
 رقم الحوالة: 0094541882 رقم الماكس: *****
 البريد الإلكتروني: *****

بيانات العقار:

رقم الحوصلة: أصغر الحوصلة:
 رقم الموقوف / الحد: أصغر الموقوف / الحد:
 رقم المنطقة: الشارع:
 رقم الوحدة: المدينة:

غاية استعمالات العقار: سكني
 ملاحظات: جنين / الشارع حيفا الشارع البرازيل قرب تالون حلا

بيانات رسوم الطلب:

المعبر	العملة	الكمية	النسبة	رقم الوصل	تاريخ الوصل
0	شكك	1	0		06/11/2006

بيانات رسوم الخدمة:

العملة	السم	الكمية	الوحدة	النسبة	هل الرسوم رأس
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المجموع:	شكك	1	دينار	0	دولار

التعليمات الاختيارية:

صورة ثوب
 بعبوض مؤسسة حكومية (كتاب رسون الرئيس البلدية من مدير المؤسسة بالعبوض وكتاب للعبوض بالنوف
 مراعاة ذمة سارية المعمول بأسم المشترك من المولج وأثناء المظنون لعدم العمدة فيه
 خارج حدود البلدية [صدر معناه من المكم المعلن = صورة ثوب فقط]



المنافع والردود

Fig.3.2 Request form for new connection



Photo 3.1 New service pipe installation

3.2. Task Breakdowns, Responsible Section, and Points to be Checked

Task breakdowns, responsible section by task, and points to be checked are summarized in Table 3.1.

Table 3.1 Installation work for New Customer

Major Task in Sequence	Task breakdowns	Responsible section	Points to be checked
1. Installation request	1.1 Prepare application form and send it to CDMD	CSC	<ul style="list-style-type: none"> Customer information such as name, ID number, telephone number, address, etc. (See Fig.3.2).
	1.2 Payment for new connection	CSC	<ul style="list-style-type: none"> Water ID No.
	1.3 Request to conduct initial survey to WS	CDMD	
2. Initial work	2.1 Make an arrangement for initial survey	WS	<ul style="list-style-type: none"> Who to contact, Where to go, When to visit, Distribution pipe data (material, diameter, location), Tools and devices necessary for site survey.
	2.2 Conduct site survey	WS	<ul style="list-style-type: none"> Potential PPWM location, Service pipe location, Tertiary pipe location, Pavement, Any blockage, Date to install.

Major Task in Sequence	Task breakdowns	Responsible section	Points to be checked
	2.3 Install service pipe, if necessary	WS	<ul style="list-style-type: none"> • Tapping for service pipe connection and installation of service pipe.
	2.4 Enter customer information data into PPWM management software	MMD	<ul style="list-style-type: none"> • Customer's name, Meter No., Water ID No., etc. (See Fig. 3.3)
3. PPWM installation	3.1 Make arrangement for PPWM installation	MMD	<ul style="list-style-type: none"> • PPWM, • Fittings, • Pipe material, • Tools, • Customer information.
	3.2 Install PPWM	MMD	<ul style="list-style-type: none"> • PPWM location convenient for access • Visual and physical checkup on PPWM performance, • "Work Photo."
4. Data entry of customer information	4.1 Prepare "PPWM Installation Report" and archive it	Project Division of PPS	<ul style="list-style-type: none"> • "Work Photo" from MMS, • Preparation of "PPWM Installation Report" (See Photo 3.2), • Archiving the report.
	4.3 Prepare smart card for the customer and give orientation to the customer	MMD	<ul style="list-style-type: none"> • Preparing smart card by inputting customer information (See Figures from 3.3 to 3.5), • Handing the smart card and pamphlet that shows PPWM, vending station, etc. to the customer, • Giving a demonstration on how to use smart card and PPWM to the customer.
5. Monitoring & troubleshooting work	5.1 Monitoring customers' water consumption	MMD (staff in charge of monitoring)	<ul style="list-style-type: none"> • Monitoring day-to-day customers' water consumption to find if there is anything wrong, • Informing the colleague in charge of meter management when something wrong occurs, • Preparing customers' water consumption report annually, • Submitting it to the head of CSS.
	5.2 Troubleshooting any cases related to water meter	MMD (staff in charge of meter management)	<ul style="list-style-type: none"> • Taking actions for solving the trouble according to his/her colleague's request,

Major Task in Sequence	Task breakdowns	Responsible section	Points to be checked
			<ul style="list-style-type: none"> • Finding out the cause of the trouble including 0-meter reading, • Requesting the maintenance center of the supplier about meter maintenance, if necessary, • Finding the solution with the supplier for meter trouble, • Taking actions for the customers' complaints.

The screenshot shows a software interface for creating a new consumer. The 'Consumer Information' tab is active, displaying various input fields. The 'Consumer No' field contains the value '0'. The 'Name' field is pre-filled with 'Enter first name' and the 'Last Name' field with 'Enter last name'. The 'Registration Date' is set to 'Sunday, November 21, 2011'. The 'Contract expiration Date' is set to 'Monday, November 21, 2011'. At the bottom, there are two checked checkboxes: 'Is Credit load allowed: Active' and 'Consumer Status: Active'. 'Save' and 'Cancel' buttons are located at the bottom right of the form.

Fig.3.3 Screenshot of New Customer Data Entry (Consumer Information)

Create New Consumer

Meter Information

Meter Type Meter No

Diameter 20 mm

Consumer Type RF Module No

Old Meter Number :

Consumer Information | Address Information | Communication Info

Building

Door Number

Flat Number

Floor Number

+

+

+

+

+

+

+

Address Text

Latitude

Longitude

Zone

Fig.3.4 Screenshot of New Customer Data Entry (Address Information)

Create New Consumer

Meter Information

Meter Type Meter No

Diameter 20 mm

Consumer Type RF Module No

Old Meter Number :

Consumer Information | Address Information | Communication Info

Home Phone

Mobile Phone

Work Phone

Fax

E-mail

Fig.3.5 Screenshot of New Customer Data Entry (Communication Information)



دولة فلسطين
State of Palestine
وزارة الحكم المحلي
Ministry of Local Government
الضفة الغربية
Jericho Municipality



Handwritten signature

PPWM Installation Report

Location Information: Date: 17/12/2024
 Name / الاسم: مديرية قطارات العاصمة
 Pilot Area 1 / Sub Area: / Block #: بيت ربح الناصرة
 House Connection ID / رقم الاثراك: W 5745
 New Customer / عميل جديد Replacement / استبدال Existing / غير عميل جديد DC. No. / رقم الرخصة

Fittings & Resources / القطع والموصلات المستخدمة:
 محمد بن محمد / محمد بن محمد / محمد بن محمد

JM Technicians / الفنيون: عمار JM Supervisors / المشرفون:

Meters Information: meter status
 Old Meter Readings / قراءة العداد القديم: 884.1 Photo / صورة
 SN: 549764
 PPWM Readings / قراءة العداد معن الفلج: 0.560980 Photo / صورة
 SN: 1404004

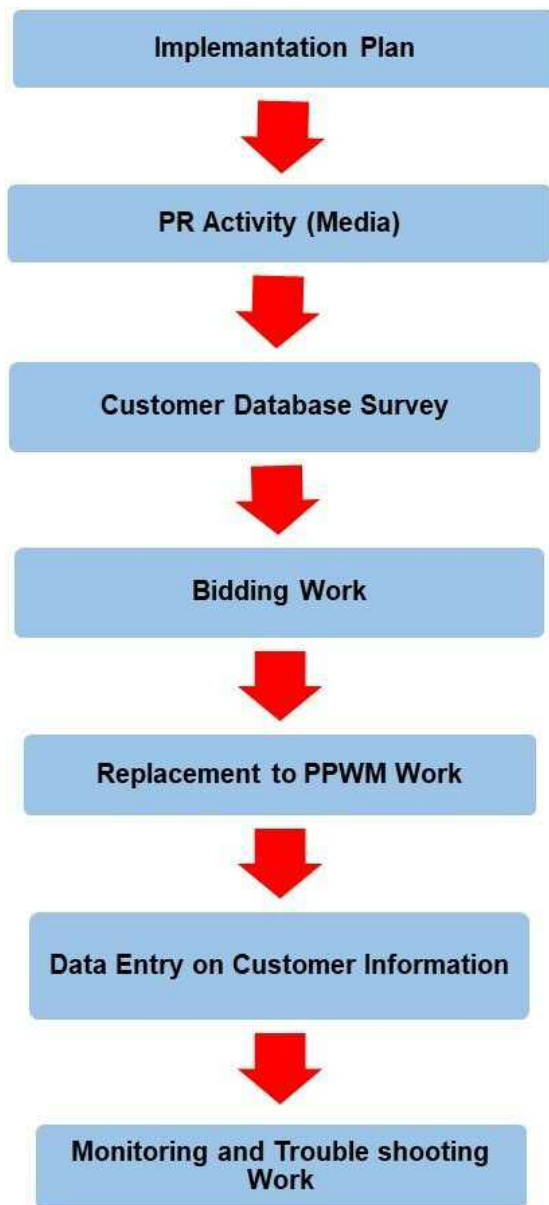


Water Section Comments: Signature:
 Customer Service Section Comments: Signature:
 JET Observer: Signature:

Photo 3.2 PPWM Installation Report

CHAPTER 4. Tasks for Replacement with PPWMs in Bulk

4.1. Workflow of Major Tasks



Replacement to PPWMs in Bulk does not happen frequently like the request of a new customer. When all the existing domestic meters in a specified area are required to be replaced with new meters, the replacement in bulk is required.

In case of the replacement of domestic meters in bulk, it is difficult for WWD to conduct all replacement works within a limited period. It shall be done by the local contractor from the viewpoint of the limited workforce of WWD. For this reason, the replacement work shall be outsourced. During the replacement period, the engineers and technicians of WS and CSS shall supervise the contractor's works.

PR activity shall be conducted prior to the replacement work. PR activity including door to door survey. This survey team shall fill a questionnaire of door to door survey shown in photo 4.1 and hand the PPWM booklet to customer and also demonstrate how a PPWM works. Public meeting (if necessary) shall be carried out to build consensus for the replacement work.

Customer Database Survey (CDS) shall be needed to update customer information as some customers might have left the town or passed away, or information of customers is old and current status of domestic meter, etc. are required.

Fig.4.1 Workflow of major tasks updated customer information shall be summarized as shown in Photo 4.2 CDS Report. At this moment, PR section is responsible for this survey. It is suggested to conduct the CDS at the intervals of about 10 years at least. The CDS could be outsourced.

Customer Database Survey - Surveyor Name: عبدالله Date: 10/12/2021

Plot Area No:	Locality Name: <u>ك. ٩</u>	
House NO: <u>٨٩/٢</u>	Owner's Name: <u>عبدالله بن محمد بن علي</u>	
House Status:	1. Registered <input checked="" type="checkbox"/>	2. Not Registered <input type="checkbox"/>
Family size: <u>١</u>	Storage tank number & total capacity:	
If the house owner answer "YES or Registered", please fill up below.		
IC ID No: <u>٤٧٧٨</u>	Water Meter NO:	
Reg. Category:	1. Residential 2. Commercial 3. Industrial 4. Agriculture	
Visible problem in water meter	Legal connection	Not horizontal / Not accessible / Not firmly fixed
	Gets water from	NM / Private with NMO / Open private network (PS) / Sewer from wastes (PT)
Comments: If you discover something, please write down below.		

Photo 4.2 CDS Report

Bidding work for procurement of the materials and installation work shall start after completion of CDS. Bill of quantities for the materials and target number of replacements shall be finalized by WS and PSS, based on CDS. After delivery of the required materials are made, and all arrangement of installation work is ready, the replacement work shall start.

Replacement work shall be conducted by the contractor under the supervision of MMD of CSS. The contractor shall hand the smart card to the customer after

completion of replacement. In addition, the contractor shall submit PPWM installation Report to the supervisor, and the supervisor shall comment on evaluation on contractor’s performance. The supervisor shall give necessary instructions to the contractor.

Data entry on customers information shall start when the replacement work starts. Customer Database Division of CSS is in charge of data entry and makes correction of customer data in AI-shamel.

Monitoring and troubleshooting works start after completion of data entry work. The staff in charge of monitoring conducts monitoring work, and the staff in charge of meter management handles troubleshooting work. MMD takes actions for troubleshooting when some problems occur.

4.2. Task Breakdowns, Responsible Section, and Points to be Checked

Task breakdowns, responsible section, and points to be checked are summarized in Table 4.1. Some of the tasks could be skipped to next task, depending on the situation.

Table 4.1 Task breakdowns, responsible section, and points to be checked

Major Task in Sequence	Task Breakdowns	Responsible Section	Points to be Checked
1. Implementation plan	1.1 Data collection (DMA or block nos., customers numbers in DMA, prioritizing DMAs for replacement, etc.)	PPS, WS and CSS	<ul style="list-style-type: none"> • Number of DMAs where meters are to be replaced, • Customers nos. by DMA, • Prioritizing DMAs for replacement purpose considering water supply circumstances.
	1.2 Making implementation plan including timeline	PPS, WS and CSS	<ul style="list-style-type: none"> • Available human resources for each work, • Required days for each work, • Linkage of the works, • Reasonable time span.
2. PR activity	2.1 Arrangement of promotional activity	PR Section	<ul style="list-style-type: none"> • Making PR plans (PR activities through media, public meeting, etc.,
	2.3 Commencement of promotional activity	PR Section	
3. Customer data survey (CDS)	3.1 Data collection of existing customers	PR Section	<ul style="list-style-type: none"> • Data on existing customers such as customers’ name, ID No., Water ID, telephone, address, etc.

Major Task in Sequence	Task Breakdowns	Responsible Section	Points to be Checked
	3.2 Conducting CDS including door-to-door survey	PR Section	<ul style="list-style-type: none"> • Customers' name, • ID No., • Water ID, • Telephone No., • Existing meter location, • Service pipe location, • Any blockage, • Small demonstration of PPWM, • Handing PPWM brochure and explanation to the customer, • Preparing CDS report.
	3.3 Update customer information in Al-shamel	Project division of PPS	<ul style="list-style-type: none"> • PR Section submits CDS report to Project division of PPS, • Project division of PPS archives CDS reports, • Project division of PPS requests IT section to modify customer data, if necessary.
4. Bidding work	4.1 Estimation of project cost	PPS and Procurement Dep't	<ul style="list-style-type: none"> • Bill of Quantities for PPWMs (including fittings) • Total No. of replacement work by DMA, • Listing up the contractors for the replacement work, • Estimation of project costs.
	4.2 Obtaining approval of Municipality council	Procurement Dep't	
	4.3 Preparing bidding document for the procurement of PPWMs (including fittings, pipe materials and consumables)	PPS and Procurement Dep't	<ul style="list-style-type: none"> • Technical specification, • Standard documents for bidding.
	4.4 Announcement on bidding notice for the procurement of PPWMs and installation work	PR Section	<ul style="list-style-type: none"> • Tender announcement through various media.
	4.5 Conducting bidding for procurement of PPWMs	Procurement Dep't and PPS	<ul style="list-style-type: none"> • Evaluation of bidding documents, • Negotiation with nominated bidder, • Tender award
	4.6 Conducting bidding for installation work	Procurement Dep't and PPS	<ul style="list-style-type: none"> • Evaluation of bidding documents, • Negotiation with nominated bidder, • Tender award

Major Task in Sequence	Task Breakdowns	Responsible Section	Points to be Checked
			<ul style="list-style-type: none"> • Modifying implementation plan (if necessary)
	4.7 Conducting inspection of PPWMs delivered by the supplier	Procurement Dep't, PPS and Warehouse	<ul style="list-style-type: none"> • Inspection of the delivered items from the aspect of conformity with technical specification and required quantity, • Entering information of the procured item into the stock inventory.
5. Data Entry work	5.1 Entry of customer information into PPWM software	MMD	<ul style="list-style-type: none"> • Entering customer information into PPWM software
	5.2 Preparing Smart Card in bulk to be distributed by the contractor	MMD	<ul style="list-style-type: none"> • Preparing smart card by inputting customers' information.
6. Replacement work	6.1 Replacement of existing meter with PPWM	Contractor, WS and CSS	<ul style="list-style-type: none"> • Closing the gate valves installed at distribution network, • Replacing existing meter with PPWM • Supervising contractor's work, • Evaluating contractor's performance.
	6.2 Distribution of Smart Cards to the customers	Contractor, WS and CSS	<ul style="list-style-type: none"> • Distributing prepared smart cards to the customer
	6.3 Door-to-Door survey (2 nd round)	PR section	<ul style="list-style-type: none"> • Giving the demonstrations to customers on how to use PPWM, if needed
	6.4 Starting water supply	WS and CSS	<ul style="list-style-type: none"> • Opening the gate valves
	6.5 Submission of "PPWM Installation Report" to Project Division of PPS	CSS and Project Division of PPS	<ul style="list-style-type: none"> • "PPWM Installation Report" to be prepared by the Contractor, • Evaluation of contractor's performance to be commented by the supervisor, • Summarizing customers' information in EXCEL sheet to be done by project division, • Archiving "PPWM Installation Report" (See Photo 3.2) to be done by Project division.
7. Monitoring & troubleshooting work	7.1 Monitoring customers' water consumption	MMD (staff in charge of monitoring)	<ul style="list-style-type: none"> • Monitoring day-to-day customers' water consumption to find if there is anything wrong, • Informing the colleague in charge of meter

Major Task in Sequence	Task Breakdowns	Responsible Section	Points to be Checked
			management when something wrong occurs, <ul style="list-style-type: none"> • Preparing customers' water consumption report annually, • Submitting it to the head of CSS.
	7.2 Troubleshooting cases related to water meter	MMD (staff in charge of the domestic meters)	<ul style="list-style-type: none"> • Taking actions to solve the problem according to his/her colleague's request, • Finding out the cause of the trouble including 0-meter reading, • Requesting the maintenance center of the supplier about meter maintenance, if necessary, • Finding the solution with the supplier for meter problem, • Taking actions for the customers' complaints.

CHAPTER 5. Disconnection and Transferring of PPWM

5.1. Disconnection and transferring

Disconnection of domestic water meter can be made upon the approval of disconnection request from the customer. Any disconnection without approval is forbidden. Transferring domestic meter shall be requested by the customer when the customer moves to another area in the same city.

5.2. Major tasks and task breakdowns for disconnection work

Major tasks in sequence and task breakdowns for disconnection is summarized in Table 5.1.

Table 5.1 Disconnection of PPWM

Major Task in Sequence	Task Breakdowns	Responsible Section	Points to be Checked
1. Disconnection request	1.1 Prepare application form and send it to CDMD	CSC	<ul style="list-style-type: none"> • Filling up information such as name, ID number, telephone number, address, etc.
	1.2 Check application and customers' information	CDMD	<ul style="list-style-type: none"> • Checking ID number, Water ID No., date of disconnection
	1.3 Request to conduct disconnection work to MMD	CDMD	
2. Disconnection work	2.1 Fetch customer information from PPWM software and GIS	MMD and Project Division of PPS	<ul style="list-style-type: none"> • Who to contact, • Where to go, • When to go, • Meter number
	2.2 Remove PPWM and plug pipe end	MMD	<ul style="list-style-type: none"> • Checking meter number, • Functional checking of the meter, • Plugging outlet of service pipe, • "Work Photo".
3. Desk work	3.1 Prepare "PPWM disconnection report"	Project Division of Project and Planning Section	<ul style="list-style-type: none"> • Preparing "PPWM disconnection report" • Archiving the report
	3.2 Arrange accuracy test to be done by the supplier	MMD	<ul style="list-style-type: none"> • Conducting accuracy test with portable test bench, • Requesting maintenance work, if needed

Major Task in Sequence	Task Breakdowns	Responsible Section	Points to be Checked
	3.3 Updating customer data in PPWM software	MMD and CDD	<ul style="list-style-type: none"> Updating customer information in PPWM software, upon a receipt of PPWM disconnection report,
	3.5 Receive checked PPWM from supplier	MMD and Warehouse manager	<ul style="list-style-type: none"> Requesting warehouse manager to stock repaired PPWM Requesting warehouse manager to delete meter No. from the property list, if not repairable.

5.3. Major tasks and task breakdowns for transferring

Major tasks in sequence and task breakdowns for transferring are summarized in Table 5.2.

Table 5.2 Transferring PPWM

Major Task in Sequence	Task Breakdowns	Responsible Section	Points to be Checked
1. Transfer request	1.1 Prepare application form and send it to CDMD	CSC	<ul style="list-style-type: none"> Same as disconnection request
	1.2 Check application and customers information	CDMD	<ul style="list-style-type: none"> ID number, Water ID No., New location
	1.3 Request to conduct disconnection work to MMD	CDMD	
2. Initial survey for new location	<ul style="list-style-type: none"> Conduct initial survey as mentioned in the case for new connection request, Check the existing PPWM's workability, Request new PPWM for replacement purpose, if needed 		
3. Disconnection work	<ul style="list-style-type: none"> Conduct disconnection work as mentioned in the case for disconnection request 		
4. Installation work	<ul style="list-style-type: none"> Conduct initial survey as mentioned in the case for new connection request 		
5. Desk work	<ul style="list-style-type: none"> Conduct disconnection work as mentioned in the case for disconnection request 		

CHAPTER 6. Key Points for Installation Work

6.1. Preparation prior to the Installation

6.1.1. A set of PPWM

When the technicians of CSS are requested to install or replace PPWM, they shall prepare a set of PPWM as shown below, to conduct the installation efficiently.

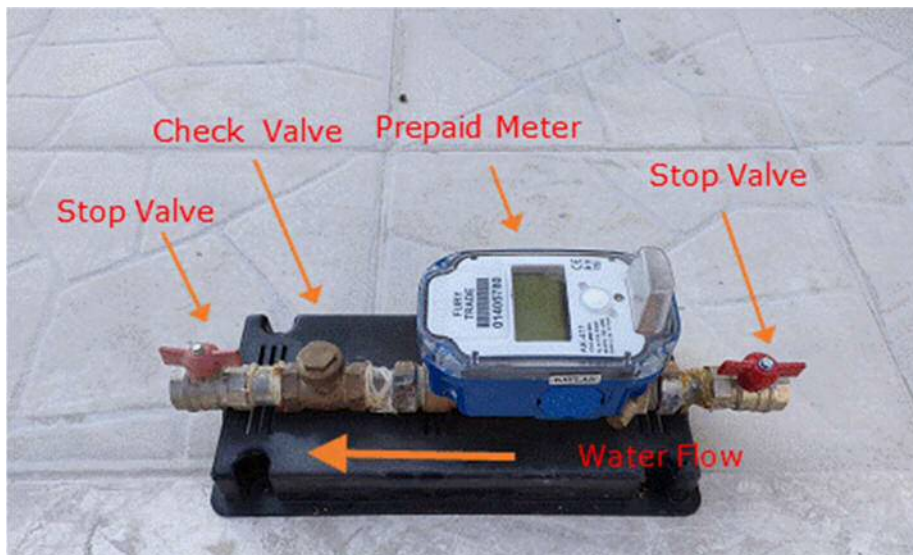


Photo 6.1 A set of PPWM

They shall collect a PPWM, two stop valves, and a check valve from warehouse through the official procedure and assemble them into a set of PPWM. They shall inform the staff for registration in the Customer Database Management Division (CDMD) of the meter number.

6.1.2. Tools, materials, etc. necessary for installation work

After assembling work, the technicians shall prepare tools, pipes (HDPE, DCIP, etc.), fittings and consumables for installation work. The staff for registration shall give customer's information such as ID number, address, etc.

6.2. Meter Location

Deciding the meter location is one of the most important issues. From the viewpoint of maintenance and accessibility, it is preferable to install PPWM as shown in Fig. 6.1 and Fig.6.2. Ultrasonic type PPWM can be set vertically or horizontally as shown in Photo 6.1 and Photo 6.2. Installation may be made on the basis of the technician's judgement, considering the existing conditions of the service pipe's outlet.

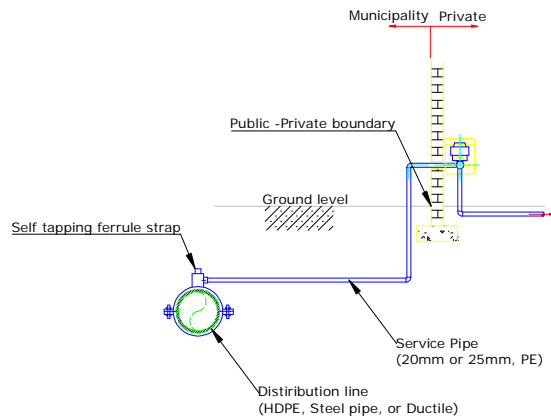


Fig.6.1 Cross-section view of service pipe route from distribution pipe to domestic water meter

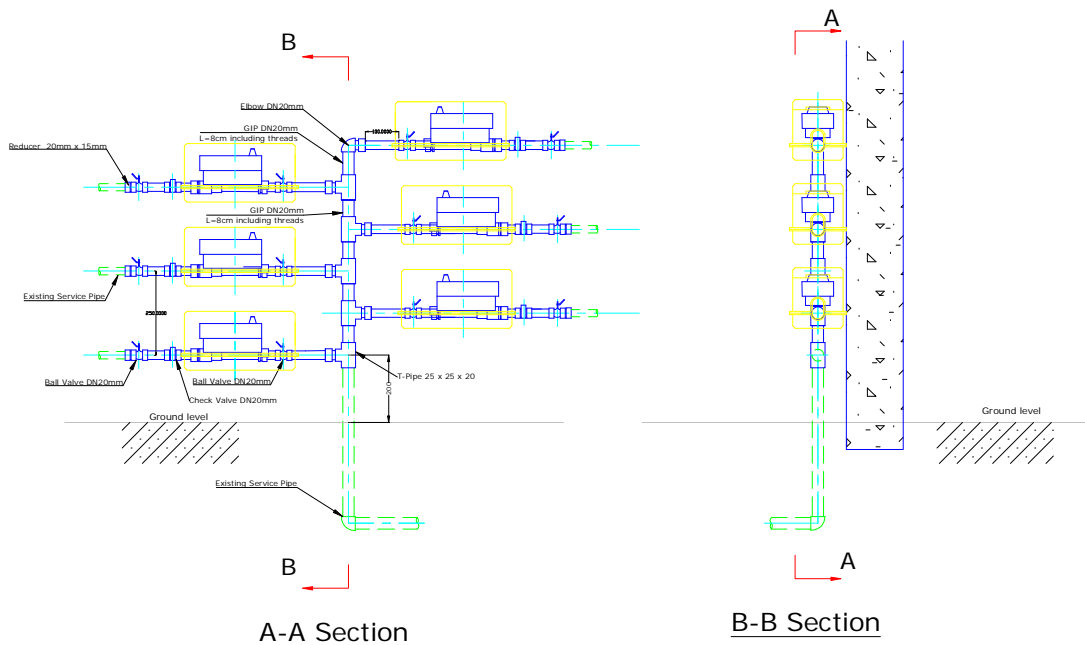


Fig.6.2 Recommended meter installation arrangement for the apartment

The technician may face a lot of difficult cases when he/she goes to the site. It is especially so for installation at the apartment. Two examples of the difficult cases are shown in photo 6.4 and Photo 6.5. In case of Photo 6.4, this is a good example for the apartment. Though the available space was limited, the meters have been well arranged by the technician's judgement.

On the other hands, in the case of Photo 6.5, the meter was installed below the ground level which is not recommended. From the maintenance viewpoint, the meter should be installed above ground level.



Photo 6.2 Vertical installation



Photo 6.3 Horizontal installation



Photo 6.4 PPWMs installed at the apartment



Photo 6.5 PPWM installed below ground level



Photo 6.6 No space for PPWMs



Photo 6.7 PPWMs installed in narrow space

The cases of Photo 6.6 and Photo 6.7 are the examples of most difficult cases. In case of Photo 6.6, the existing space was caved, and there was not enough space for installation of all the required number of PPWMs. Shifting outlet of the service pipe was needed. Photo 6.7 was the case where all the required number of PPWMs were installed by force in a limited space. In this case outlet pipes from PPWMs were entwines together like spaghetti. In this case also, relocation of the outlet of service pipe or rearrangement of service pipe and outlet pipes as well as PPWMs is required.

CHAPTER 7. Establishment of Vending Stations

7.1. Workflow for Creating Vending Station (VS)

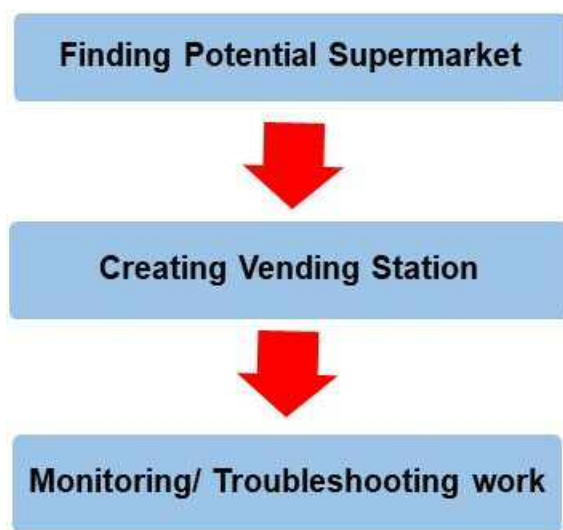


Fig. 7.1 Workflow of major task for creating a vending station

Vending Station (VS) is needed for the customers when they need to charge credit, and two options have been proposed from the aspect of accessibility of the customers: 1) supermarkets, and 2) municipality's own kiosks. Charging at supermarkets is made through PalPay system and charging at Municipality's kiosks is made on cash basis.

As of November 2021, there are 10 (ten) supermarkets that provide the service of charging credit, which are located at the convenient spot for the customers. There are two VS spots which are owned and operated by the municipality.

One of them have been in Municipality's kiosks in the city center, and the other one has been created in the office of WWD.

The workflow of major tasks for creating VS at supermarket is shown in Fig.7.1. Finding potential supermarket shall be done when creation of new VS is requested. Potential supermarket shall be selected from the aspect of customers' accessibility to VS. Once the supermarket accepts charging service, required arrangement such as provision of card reader, installation of software, training, etc. for creating VS shall be made by MMD of CSS. In the case of VS in the municipality kiosk, the process is as follows:

- 1) Setting up the equipment (PC, printer, and card reader) and installation of software, and
- 2) Training to the operator.

Monitoring and troubleshooting work for charging service starts after completion of the work of creating VS.

7.2. Task Breakdowns, Staff in Charge, and Points to be Checked

Task breakdowns of major work are described in Table 7.1.

Table 7.1 Task Breakdowns, Responsible Section, and Points to be Checked

Major Task in Sequence	Task Breakdowns	Responsible Section	Points to be Checked
1. Finding potential supermarket	1.1 Finding potential supermarkets	MMD of CSS	<ul style="list-style-type: none"> • Accessibility, • Recommending potential supermarkets to PalPay.
	1.2 Decision of the supermarket	PalPay	
2. Creating vending station	2.1 Checking minimum requirement of Supermarkets' own PC	MMD	<ul style="list-style-type: none"> • Checking minimum requirement for existing system.
	2.2 Setting up the system	MMD	<ul style="list-style-type: none"> • Providing and setting up a card reader, etc., • Installation of PPWM software.
	2.3 Configuration of the system	PPWM supplier	<ul style="list-style-type: none"> • Checking whether it works or not.
	2.4 Training to the employees	PPWM and/or MMD	
3. Monitoring & troubleshooting work	3.1 Monitoring customers' water consumption	MMD (staff in charge of monitoring)	<ul style="list-style-type: none"> • Monitoring day-to-day charging status to find if there is anything wrong, • Informing his/her colleagues if something wrong in any specific customer is found.
	3.2 Troubleshooting any cases related to VS	MMD (staff in charge of the domestic meters)	<ul style="list-style-type: none"> • Taking actions for trouble shooting when requested by his/her colleagues.



Photo 5-1 Setting up VS



Photo 5-2 Training

CHAPTER 8. Gateway Installation

8.1. Gateway Installation



Fig.8.1 Workflow of Major tasks for GW Installation

Gateway (GW) installation shall be made according to the workflow as shown in Fig. 8.1.

Finding potential site for GW shall be done at first when requested. Potential site requires high elevation spot. Ideally, there should be no obstacle between PPWM of the target customers and the GW. For this reason, it is suggested to install GW at the top of Mosque tower or tall building.

When the potential sites are selected, initial survey and negotiation with the owner shall be done. The most important points in

initial survey are 1) high elevated spot without any obstacle, and 2) availability of a power source.

Once the owner or responsible person accepts to install GW, the GW shall be installed. At that time, you need to check whether the signal could be sent from the PPWM of target customers to PC at office through GW. If the PC can receive data of the target PPWM, it means the installed GW works. If not, there must be some obstacle between the target PPWM and GW.

At this moment, three GWs have been installed at the mosque towers or high-rise apartment building as shown in Photo 8.1 and 8.2. Basically, the GW should be installed at high elevated place. The work for GW installation is summarized in Table 8.1.

Table 8.1 Task Breakdowns, Responsible Section, Points to be Checked

Major Task in Sequence	Task Breakdowns	Responsible Section	Points to be Checked
1. Selection of location	1.1 Location survey for GW	MMD	<ul style="list-style-type: none"> • High rise buildings, • Mosque towers.
2. Initial survey and negotiation	2.1 Negotiating for setting GW at building or mosque 2.2 Checking power source	MMD	<ul style="list-style-type: none"> • Power source
• 3. Installation and testing	• 2.1 Receiving GW set from the warehouse	• MMD and Warehouse manager	• Receiving GW set upon approval of CSS,

Major Task in Sequence	Task Breakdowns	Responsible Section	Points to be Checked
			<ul style="list-style-type: none"> Updating inventory list to be done by warehouse manager.
	2.2 Installation of GW at site	MMD	<ul style="list-style-type: none"> Checking signal reception at office PC, Relocating GW to 2nd potential site, if signal reception is not good enough.

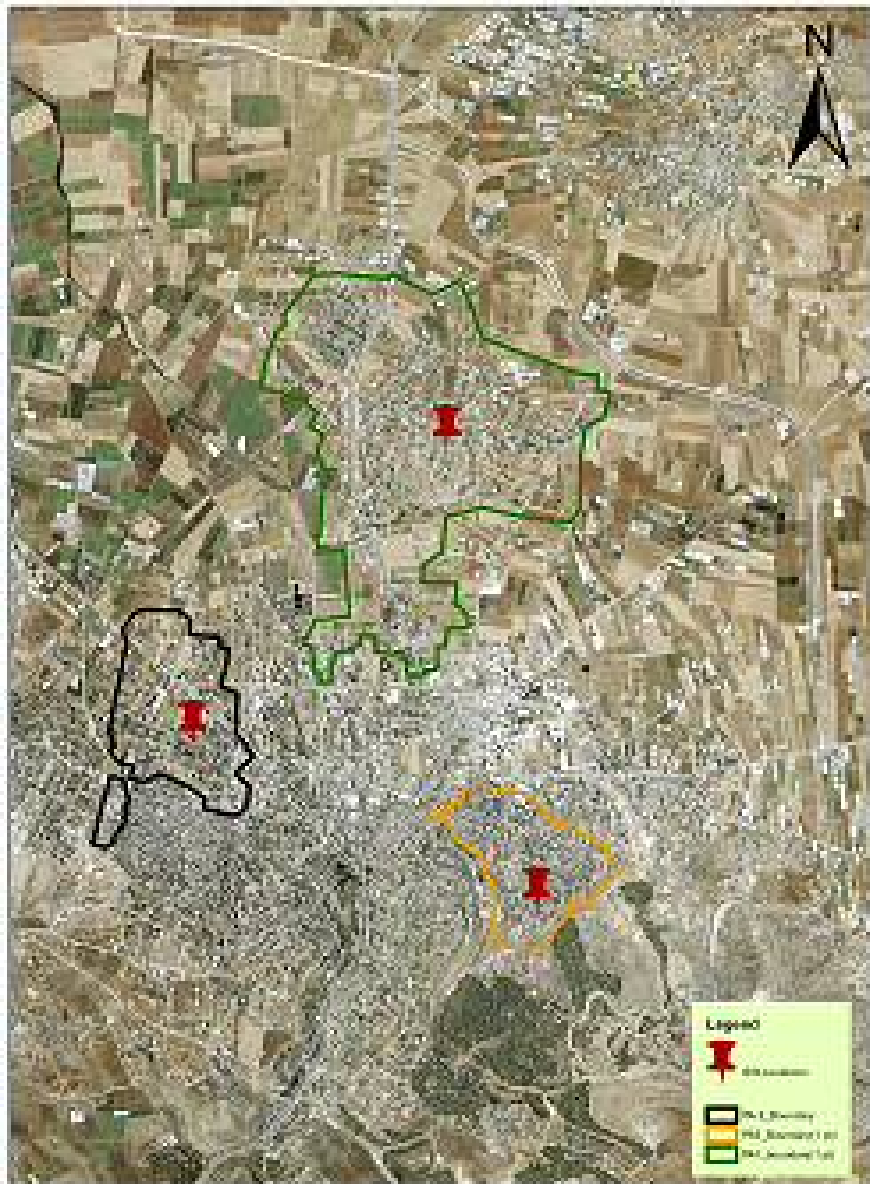


Fig.8.1 Location of Gateways in Jenin



Photo 6.1 GW installed at a Mosque tower



Photo 6.2 GW installed at the roof top of a building



Photo 6.3 Gateway set



Photo 6.4 Power source for GW

CHAPTER 9. Monitoring Work

Once all the systems (PPWMs, VS, and GW) start to run, monitoring starts. The purpose of the monitoring work is to find out if something is wrong in the whole system (PPWMs, vending stations, and Gateway) and to narrow down the causes of the problems/troubles if any occur. Basically, a notification including "Alarm" is displayed on the monitoring PC in red color twice a day, but the data transmission frequency in a day depends on circumstances of communication between PPWM and Gateway.

The staff in charge of monitoring work (monitoring staff) shall arrange to send the technician to the site when he/she finds "Notification" is a serious case that needs to be solved urgently. In case of a low-level notification or if the "Notification" is about something not that urgent, the staff shall track the case for a few days, and if deemed necessary, arrange to send a technician to check it at the site. Serious level of the "Notification" is summarized in Table 9.1, and the overview of the monitoring work is given in Table 9.2.

Table 9.1 Seriousness level of "Notification"

Notification type (displayed)	Seriousness level
1. Cover removed	High
2. Battery cover removed	High
3. Battery low	High
4. Fire mode	Low
5. Fitting removed	High
6. Valve malfunction	High
7. No change in consumption* ¹	Low
8. Credit level low	Low

*¹: 0-meter reading is included in this case.

Table 9.2 Overview of Monitoring Work

Tasks	Responsible staff	Action to be taken
1. Day-to-day work	Monitoring staff of MMD	<ol style="list-style-type: none"> 1) Monitoring staff shall check whether any notifications (Alarm) are displayed on monitoring PC (See Fig.9.1). 2) When he/she finds a certain notification, he/she shall track this case for a few days, especially for "0-meter reading". If such case is still as it is, he/she shall send a technician to check the situation of this meter. 3) According to technician's information, he/she shall request meter management

Tasks	Responsible staff	Action to be taken
		staff to find an appropriate measure such as meter replacement or pipe repair.
2.Weekly work	ditto	1) Monitoring staff shall arrange random meter check every two weeks, based on day-to-day tracking notifications. 2) Monitoring staff shall prepare weekly activity report on notifications and submit it to the head of CSS.
3.Monthly work	ditto	1) Monitoring staff shall prepare monthly information on PPWM and send it to the head of CSS.

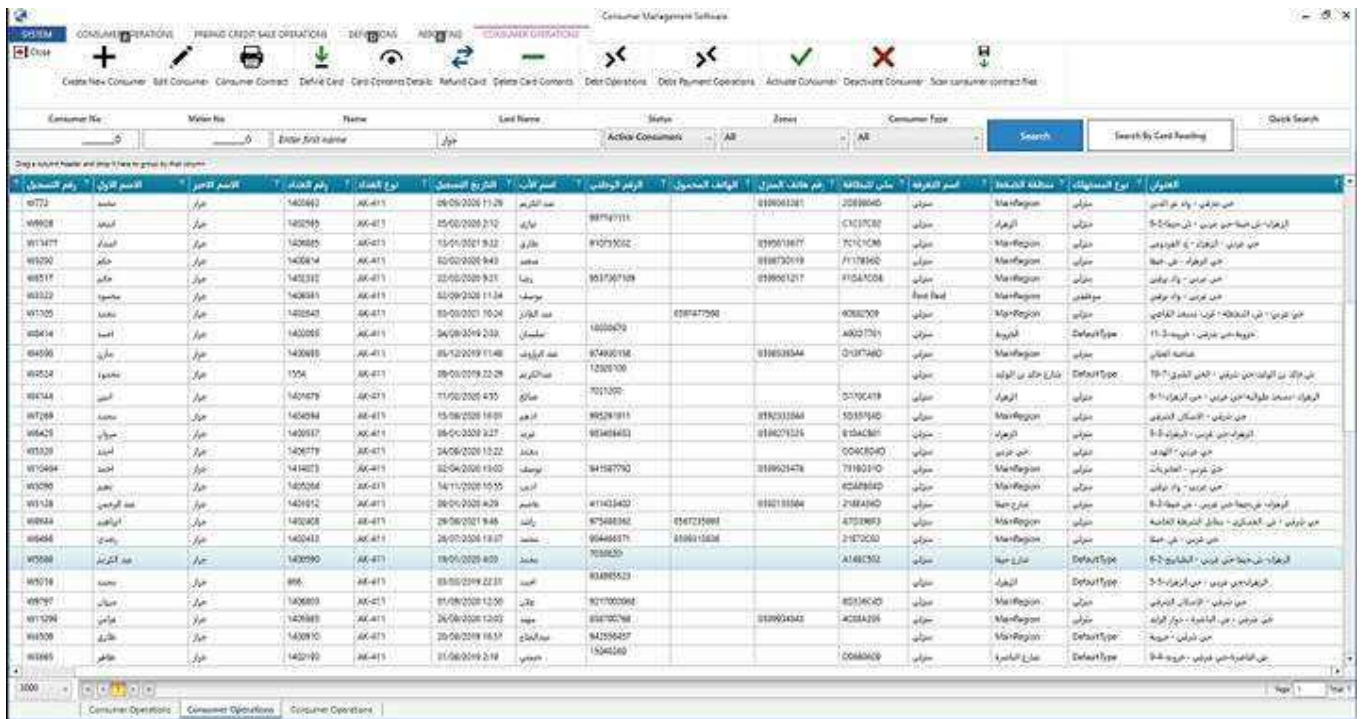


Fig.9.1 Customer operation main page of PPWM software in monitoring PC

CHAPTER 10. Troubleshooting Work

10.1. Troubles in PPWM System

Various troubles occur quite often in the water supply system and customer service management, especially when introducing a new system such as PPWM. The troubles are transferred or informed to MMD by several channels as shown below:

- 1) Municipality's complaint Website (See Fig 10.2 and 10.3),
- 2) Day-to-day monitoring work,
- 3) Sending trouble information by WhatsApp and/or telephone call, and
- 4) Directly coming to the office for complaint in person.

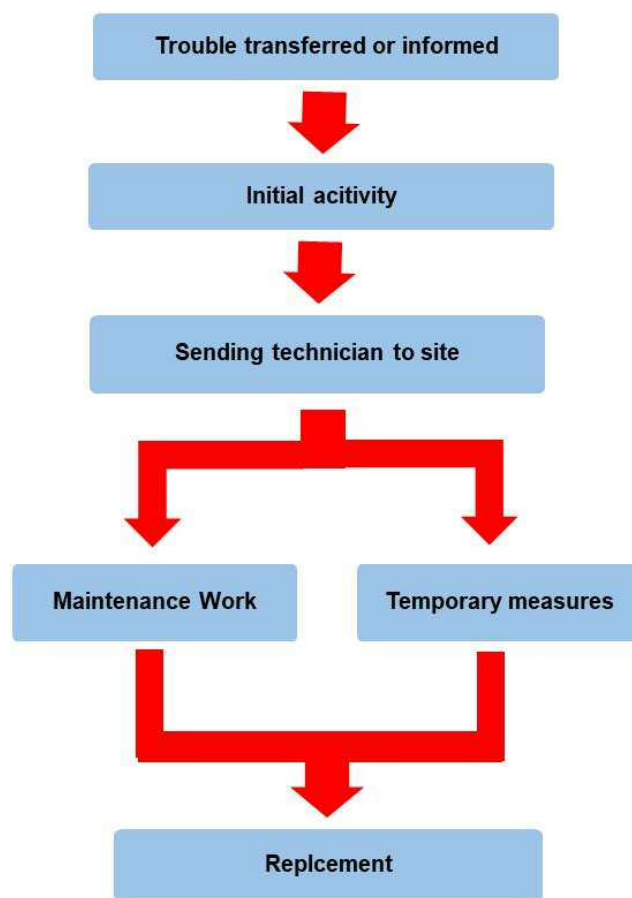


Fig. 10.1 Task in sequence for Troubleshooting

The tasks in sequence for troubleshooting for any case shall be carried out as shown in Fig.10.1. When MMD receives a complaint, the MMD contacts the customer to obtain the contents of complaint or trouble by telephone call. Or WWD directly asks the customer about the trouble when the customer comes to the office.

Then, MMD extracts necessary information from PPWM management system to find out the detail of the trouble of the customer. If MMD cannot solve it by resetting the entered data in the office, MMD sends a technician to the site.

The technician tries to solve the trouble at site, and he/she takes a temporary measure, if the trouble is beyond his/her capability.

He/she may replace existing troubled PPWM with new PPWM or mechanical meter as a temporary measure. Troubled PPWM is sent to the maintenance center of the supplier (In Jenin's case, the supplier is the Furry Trade Co.). When it gets repaired, the temporary meter is replaced by the repaired meter. In case the troubled PPWM is not repairable, the temporary meter is replaced with a new PPWM.



Fig. 10.2 Complaint Format of Municipality Web

#	التاريخ	الحالة	الوصف
14943	09-38 21/11/2021	معلقة	طلب تغيير عداد الغاز من عداد 1000 الى عداد 10000
14942	11-22 18/11/2021	معلقة	طلب تغيير عداد الغاز من عداد 1000 الى عداد 10000
14910	09-48 14/11/2021	معلقة	طلب تغيير عداد الغاز من عداد 1000 الى عداد 10000
14770	12-44 9/11/2021	معلقة	طلب تغيير عداد الغاز من عداد 1000 الى عداد 10000
14707	11-43 01/11/2021	معلقة	طلب تغيير عداد الغاز من عداد 1000 الى عداد 10000
14611	10-38 21/10/2021	معلقة	طلب تغيير عداد الغاز من عداد 1000 الى عداد 10000
14489	10-02 20/10/2021	معلقة	طلب تغيير عداد الغاز من عداد 1000 الى عداد 10000
14200	08-08 11/10/2021	معلقة	طلب تغيير عداد الغاز من عداد 1000 الى عداد 10000
14194	09-48 02/10/2021	معلقة	طلب تغيير عداد الغاز من عداد 1000 الى عداد 10000

Fig. 10.3 Complaint List of Municipality Web

10.2. Trouble Types

Customers' complaints can be categorized by type, as mentioned in Table 10.1., and in a period from December 2019 to October 2021, CSS has taken action for more than 700 trouble cases, which include just a request such as relocation of meter. Furthermore, the cases that are easily solved are not counted in these statistics. As commented in Remarks, these complaints listed in Table 10.1 came from the customers, as such the fact of trouble was not identified until inspection or further work was done.

Table 10.1 Type of Complaints

Type of Complaint	Total No. from December 2019 up to October 2021	Remarks
Leakage	78	This case can be divided into two types: 1) leakage in distribution main, and 2) leakage in service pipe. After CSS's site inspection, WS or CSS takes action.
Broken meter	108	This case can be divided into three types: 1) malfunction of PPWM, 2) customers' operation failure, and 3) customers' vandalism. The trouble contents could not be identified until CSS' site inspection is done.
Relocate	17	This is the meter relocation requested by customers.
Accuracy	75	This case can be divided into two types: 1) malfunction of PPWM, and 2) misunderstanding of the customers. In case the trouble is due to malfunction of PPWM, meter is checked and maintained by the contracted maintenance center.
Card Charging Issues /Card does not match	49	This case can be divided into two types: 1) card entry failure by human error, and 2)

Type of Complaint	Total No. from December 2019 up to October 2021	Remarks
with the PPWM number		operation failure after using card. This is solved by CSS.
Training Issues: Customer didn't know how to charge	28	This is due to the performance of promotional activities, such as "door-to-door survey", CDS, etc. at initial stage. If needed, CSS is able to solve this case.
No water (Valve was closed)	233	This case occurs suddenly when water supply starts. This case can be solved by CSS.
No water	80	This case can be divided into two types: 1) valve closed, and 2) just "No Water". In case of just "No Water", it is due to water supply schedule. This is beyond the control of CSS.
Request to activate the fire mode	45	This case can be divided into two types: 1) real "Fire Mode", and 2) malfunction of PPWM. Until so far, all of the cases were real "Fire Mode", due to misunderstanding of the customer.
Total	713	

Of these complaints, the troubles related to PPWM which occurred in 2021 was analyzed and summarized in Table 10.2. Concerning "Frequency level", "high" means that the trouble occurs frequently; "medium" means it occurs sometimes; and "low" means it occurs rarely.

Table 10.2 the troubles related to PPWM in 2021

Trouble type in PPWM	No.	Potential cause of the trouble	Frequency level
Valve closed (Failure)	39	Credit level, removed cover, or malfunction in sensor	high
Valve closed due to low battery charge	2	Defect in PPWM	low
Leakage (Water inside the meter)	39	Defect in PPWM or high water pressure	high
Leakage (Water inside the meter) & valve closed*1	3	ditto	low
Fire mode (turn on always)	3	Customer's mis operation or defect in PPWM	low
Battery (Broken)	3	Defect in PPWM	low
Problem in tariff	1	Defect in PPWM	low
Problem in serial number	1	Defect in PPWM	low
Reverse flow (Error in connection)	13	Wrong setting, check valve failure or wrong connection of internal sensors	medium
High or no consumption	3	Customer's misunderstanding or defect in PPWM	low

Trouble type in PPWM	No.	Potential cause of the trouble	Frequency level
Meter doesn't work	4	Defect in PPWM	low
Total	111	high	81
		medium	13
		low	17

*1: This case seems to be same as "Leakage" and is included in "high" frequency level.

The concrete examples of troubles are shown in Photos 10.1 to 10.4. Photos 10.1 and 10.2 show one of "high" cases, and the trouble is the leakage (water inside meter and display). The water leaked from the packing, and it is suspected that it is due to high water pressure more than working pressure of the device. Photo 10.3 was found during the patrol work, and this is the example of vandalism. Additional PR activity is needed to avoid this case. Photo 10.4 shows one of "low" cases which is due to operation failure in smart card. This case may happen sometimes. In this particular case, the customer's smart card was not active when it was charged. The customer requested CSS to rectify the smart card. This is not a serious case, but it is important from the aspect of customers' satisfaction.



Photo 10.1: Fogged PPWM display due to leakage



Photo 10.2: The part through which water leaked into PPWM



Photo 10.3: Burnt PPWM case



Photo 10.4: Operation failure in users' smart card

10.3. Troubleshooting

The potential causes and the expected events on PPWM trouble are summarized in Table 10.3, and actions to be taken for troubleshooting of the listed troubles are summarized in Table 10.4. In addition to these events and actions, when CSS faces with the troubles due to customer or other citizens' vandalism to PPWM, CSS shall warn the users for such vandalism.

Table 10.3 Potential causes and expected events on PPWM trouble

Trouble Type	Potential cause	Expected events or points to do
Valve closed	<ol style="list-style-type: none"> 1) Critical credit level 2) Removed cover or removed battery cover 3) Malfunction in sensor 	Valve closing and opening can be handled remotely, but as long as the technician verifies what happened to the PPWM at site, proper measure can be applied to PPWM, the customer, or other device. (Please see concrete actions to be taken shown in Table 10.4.)
Valve closed due to low battery	<ol style="list-style-type: none"> 1) Wrong setting 2) PPWM's defect 	<p>This is unusual case. Originally, a PPWM sends customer data twice a day. However, in the project period, one PPWM sent customer data 10 times a day. This may consume battery life much more. This is a matter of manufacture's guarantee. Thus, negotiation on warranty with the supplier is needed.</p> <p>If the alarm displayed on the meter screen or through Gateway shows 'Low battery', the meter valve is automatically closed in order to avoid shutting down the electronic part of the meter while the valve is still opened. The water flows continuously without counting or charging if the electronic part shuts down while keeping valve open due to sudden dead battery or PPWM's</p>

Trouble Type	Potential cause	Expected events or points to do
		defect.
Leakage (inside meter)	<ol style="list-style-type: none"> 1) Defect in PPWM 2) High water pressure more than meter's working pressure 	If water leaks inside meter, it might affect the electronic parts in the meter. And it causes inaccurate measurement of consumption, credit deduction or closure of the valve.
Fire mode	<ol style="list-style-type: none"> 1) Customers' misunderstanding 2) Low credit 3) Valve failure (Defect in PPWM) 	<p>There are three potential reasons for "Fire mode". In case of the reason related to the customer, those are not serious. But in case of valve malfunction, it is beyond the control of CSS.</p> <p>Fire mode may happen when the customer presses continuously on the meter's button by mistake. Once the fire mode is activated, the valve will be closed after maximum 1 day.</p>
Valve Failure	<ol style="list-style-type: none"> 1) Defect in PPWM (mechanical defect in internal valve) 2) Obstacles in water 	<p>If the alarm displayed on the meter screen, or through Gateway shows "Valve Failure", the valve is not working properly.</p> <p>This case may happen due to mechanical problem in valve, and the potential cause of the mechanical problem is resulted with defect in PPWM or obstacles in water.</p>
Battery (Not working)	<ol style="list-style-type: none"> 1) Defect in PPWM 	This case shall be verified when meter is installed.
Tariff	<ol style="list-style-type: none"> 1) Defect in PPWM 	In case monitoring staff or customer notices that the deducted credit does not match the consumed amount of water, a problem might have occurred while setting tariff.
Problem in Serial No.	<ol style="list-style-type: none"> 1) Defect in PPWM 	<ol style="list-style-type: none"> 1) Basically, the printed serial No. on the meter's body (External) must match the serial No. shown in the screen (programmed or internal) as well as the configured serial No. If not, the meter does not accept the card (Wrong Serial No.). 2) As long as wrong No. is not entered, the meter works. Thus, the technicians and/ or staff in charge of meter management shall check both internal and external serial Nos.
Reverse flow	<ol style="list-style-type: none"> 1) Wrong setting of PPWM set 2) Check valve failure 3) Wrong connection of internal sensors' wire 	When this alarm appears on meter's screen, that indicates wrong flow direction or other reason.
Meter doesn't work	<ol style="list-style-type: none"> 1) Defect in PPWM 	<ol style="list-style-type: none"> 1) This case means originally no power on the meter. The technician shall check whether it can be active or not before installing it at site. 2) This is a defect of PPWM itself, and

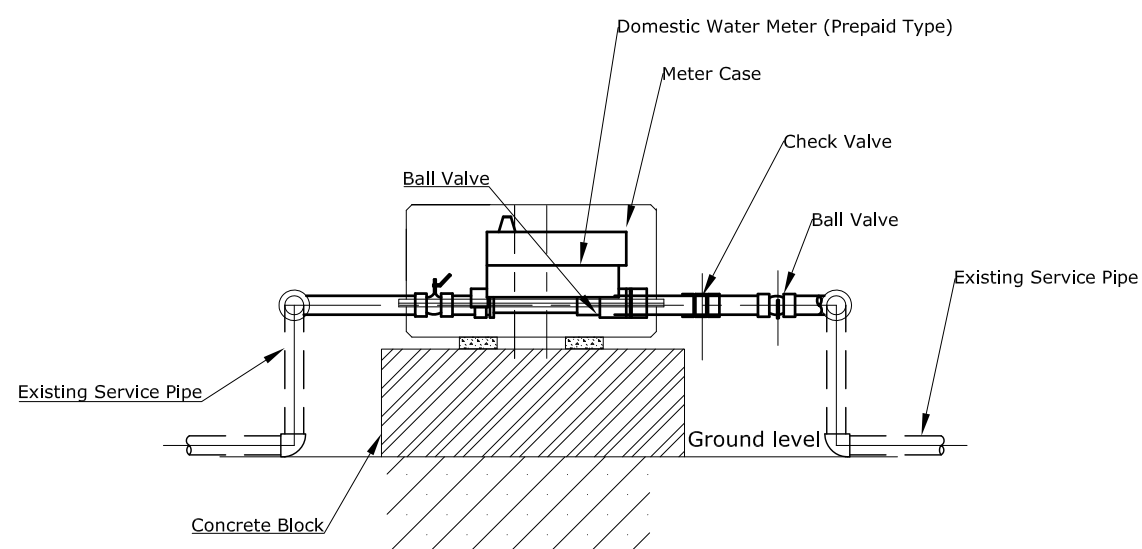
Trouble Type	Potential cause	Expected events or points to do
		this must be solved by the supplier's responsibility within warranty. Thus, staff in charge of meter management shall negotiate with the supplier to replace with a new one if troubled meter is not repairable at the supplier's maintenance center.

Table 10.4 Actions to be taken for troubleshooting

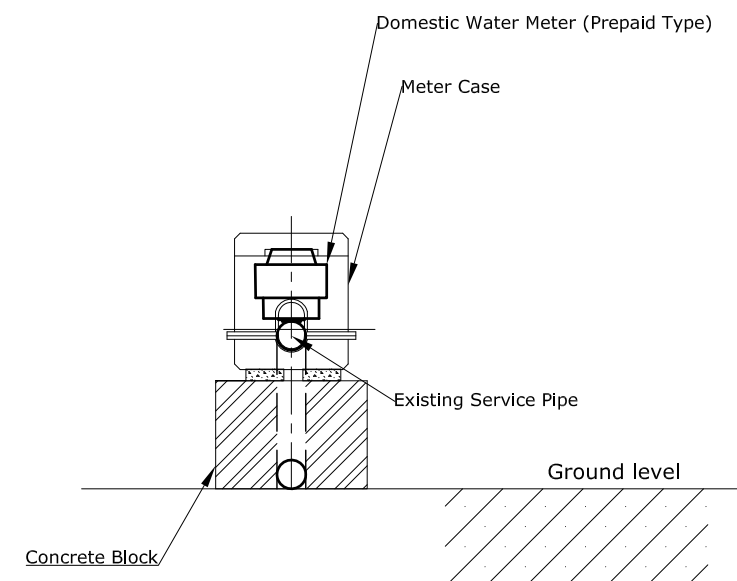
Trouble type in PPWM	Actions to be taken	
Valve closed (Failure)	Critical credit level	<ol style="list-style-type: none"> 1) The technician shall tell the reason to the customer and request to charge the credit. 2) Then, the technician shall open the valve by using the Master Card.
	Removed cover or removed battery cover	<ol style="list-style-type: none"> 1) The technician shall check the sensors and confirm that they are fixed properly. 2) Then, he/she can open the valve by using the Master Card.
	Malfunction in sensor	<ol style="list-style-type: none"> 1) In case valve is still closed when he/she opens the valve, it indicates malfunction in the sensors. 2) The technician shall replace the PPWM with a new one. 3) Staff in charge of meter management shall request the maintenance center to check it.
Valve closed due low battery charge	Defect in PPWM	<ol style="list-style-type: none"> 1) The technician shall replace existing PPWM with a new PPWM. 2) The staff in charge of meter management shall request the maintenance center for replacement of battery.
Leakage (Water inside the meter)	Defect in PPWM	<ol style="list-style-type: none"> 1) the technician shall replace existing PPWM with a new PPWM. 2) The staff in charge of meter management shall request the maintenance center to check it. 3) If PPWM is not repairable, the staff in charge of meter management shall request the warehouse to record property status as "Finished" and it should be discarded.
	High water pressure	<ol style="list-style-type: none"> 1) The technician shall replace existing PPWM with a new one. 2) If leakage is due to high water pressure, staff in charge of meter management shall request the maintenance center to check whether it is repairable or not. 3) If the meter is repaired and brought back, the staff in charge of meter management requests the warehouse to

Trouble type in PPWM	Actions to be taken	
		<p>stock it at the warehouse.</p> <p>4) If it is not reparable, staff in charge of meter management shall request the warehouse record property status as "Finished" and it should be discarded.</p>
Fire mode	Customers' misunderstanding	<p>1) The technician shall request the customer to charge credit when he/she finds customer's disoperation.</p> <p>2) The technician shall make valve open with master card, after the customer charges credit.</p>
	Defect in PPWM (Valve failure)	<p>1) The technician shall replace it with a new PPWM.</p> <p>2) The staff in charge of meter management shall request the maintenance center to check mechanical problem.</p> <p>3) If it is not repairable, staff in charge of meter management shall request the warehouse to record property status as "Finished" and it should be discarded.</p>
Valve failure	Defect in PPWM or obstacles in water	<p>1) The technician shall replace existing PPWM with a new PPWM.</p> <p>2) The staff in charge of meter management shall request the maintenance center to check mechanical problem.</p> <p>3) If it is not repairable, staff in charge of meter management shall request the warehouse to record property status as "Finished" and it should be discarded.</p>
Battery (Not working)	Defect in PPWM	<p>1) The technician shall replace existing PPWM with a new PPWM.</p> <p>2) The staff in charge of meter management shall request the maintenance center for replacement of battery.</p>
Problem in tariff	Defect in PPWM	<p>1) The technician shall replace existing PPWM with a new PPWM.</p> <p>2) The staff in charge of meter management shall request the supplier to replace it with a new one at his own cost.</p> <p>3) If not, staff in charge of meter management shall request the warehouse to record property status as "Finished" and it should be discarded.</p>
Problem in serial number	Setting up	<p>1) In case the technician finds this case after installation of PPWM, he/she shall write correct No. on PPWM with a permanent marker or stick the tape that is printed with correct No.</p> <p>2) The staff in charge of meter management shall re-enter correct customer data in software.</p>
Reverse flow (Error in connection)	Wrong setting of PPWM set	The technician shall correct the wrong connection position of the meter.
	Check valve	The technician shall replace check valve.

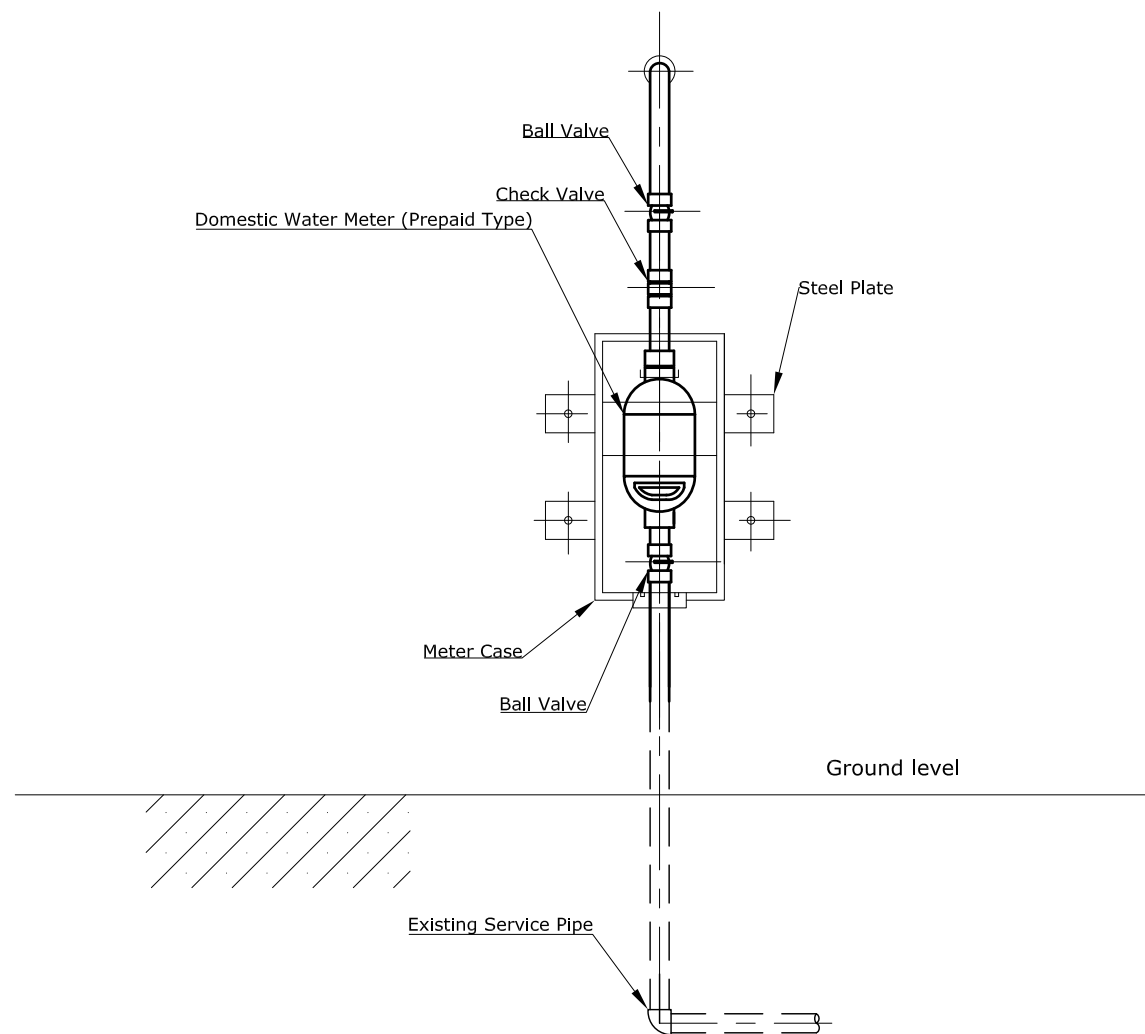
Trouble type in PPWM	Actions to be taken	
	<p>failure</p> <p>Wrong connection of internal sensors' wire</p>	<ol style="list-style-type: none"> 1) The technician shall replace the meter with a new PPWM. 2) The staff in charge of meter management shall request the maintenance center for checking. 3) If it is not repairable, staff in charge shall request the supplier to replace it with a new one.
Meter doesn't work	Defect in PPWM	<ol style="list-style-type: none"> 1) The technician shall replace the meter with a new PPWM when he/she finds this case. 2) The staff in charge of meter management shall send it to the maintenance center. If it is not repairable, he/she shall request the supplier to replace it with a new one.



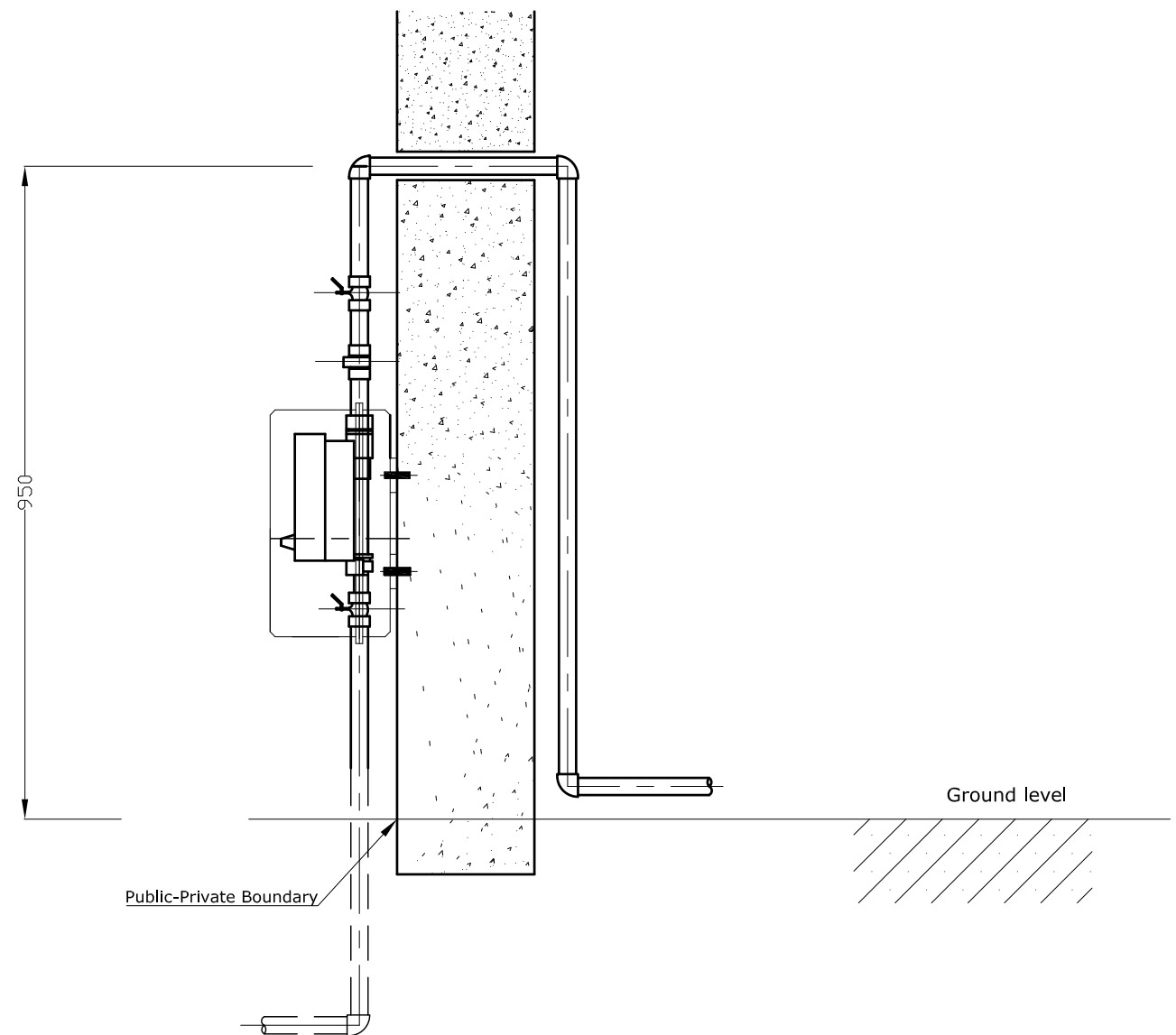
Front View



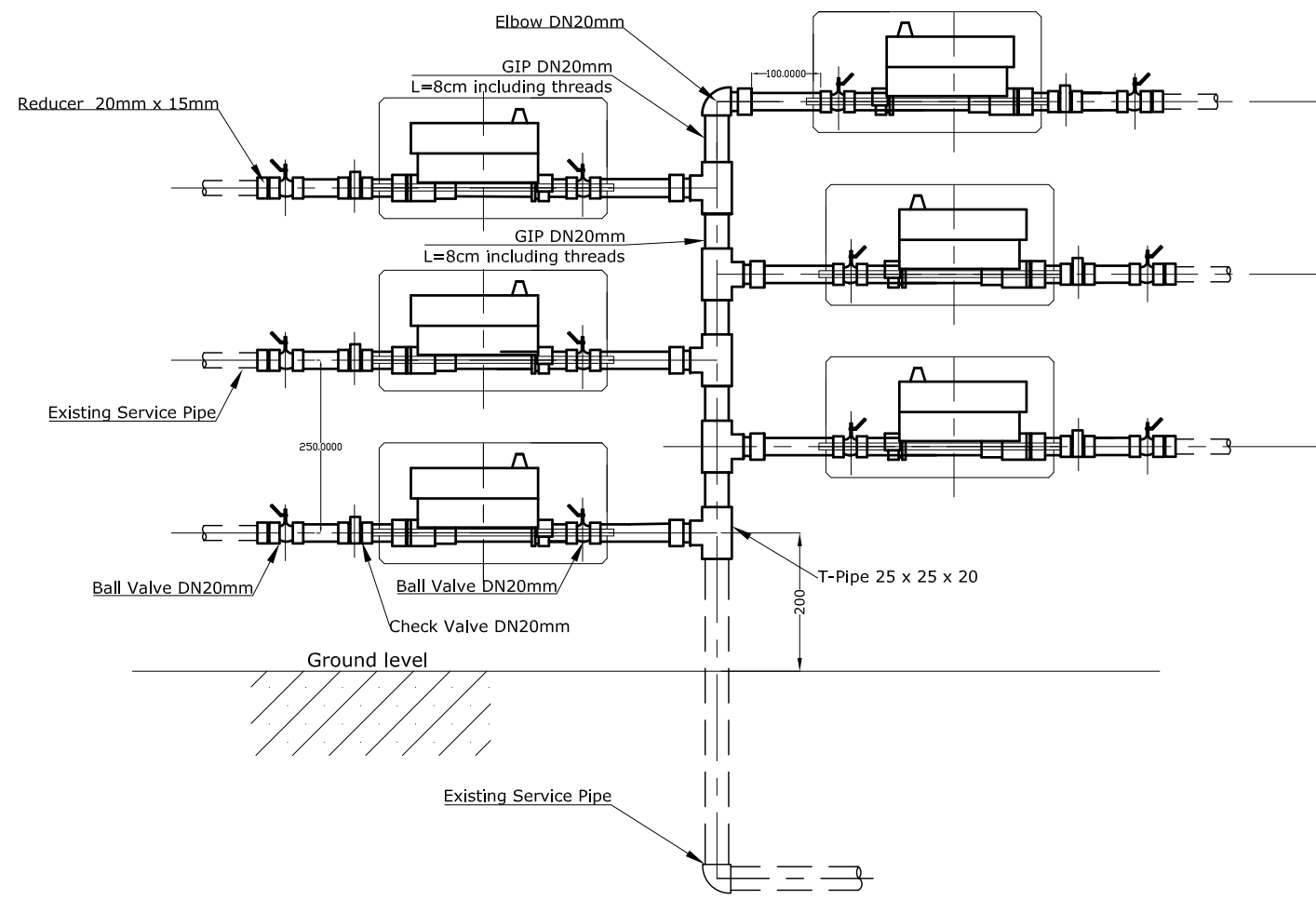
Side View



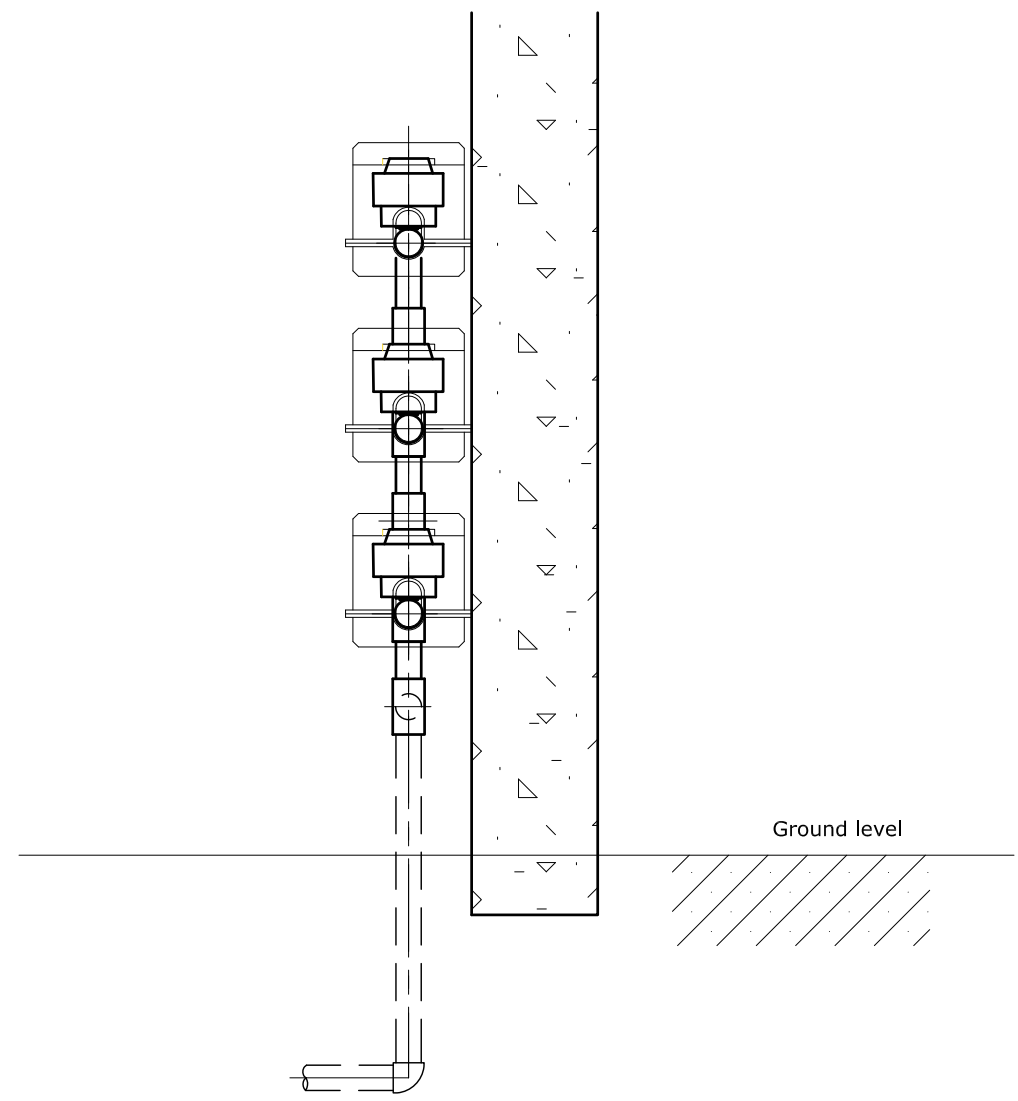
Front View



Side View



Front View



Side View



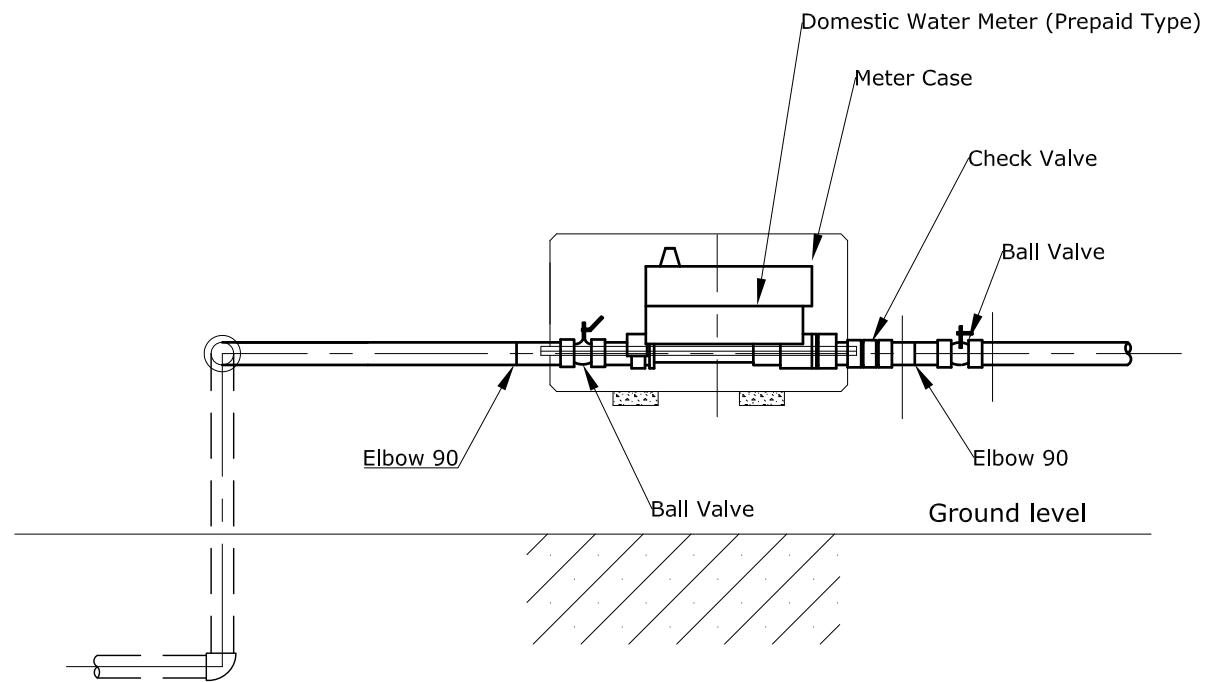
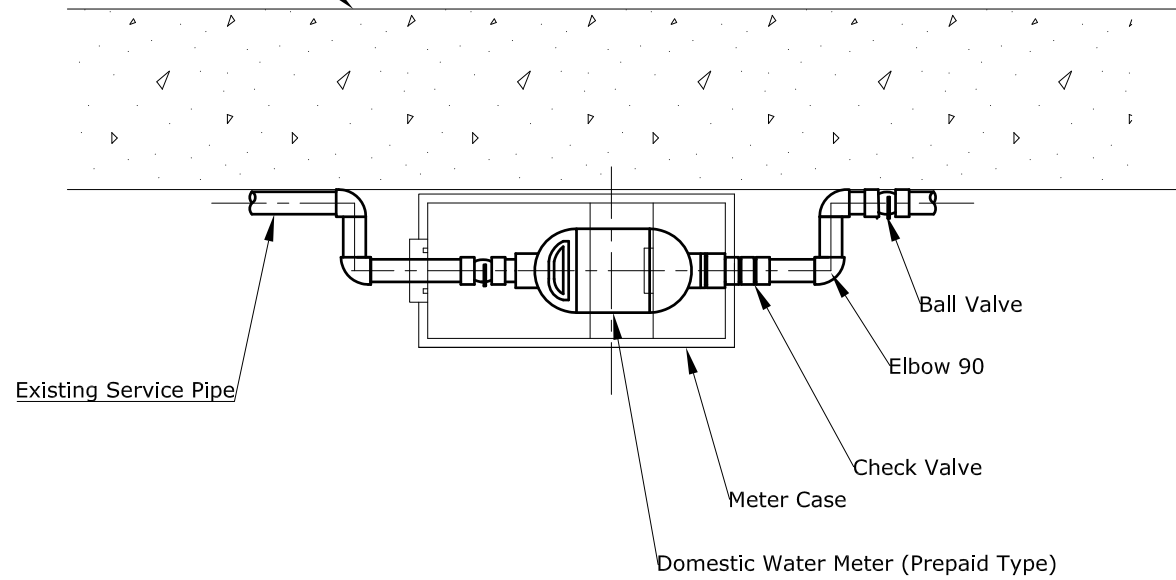
The Project for Strengthening the Capacity of Water Service Management in Jenin Municipality

The Joint Venture of TEC International Co., Ltd. and PADECO Co., Ltd.

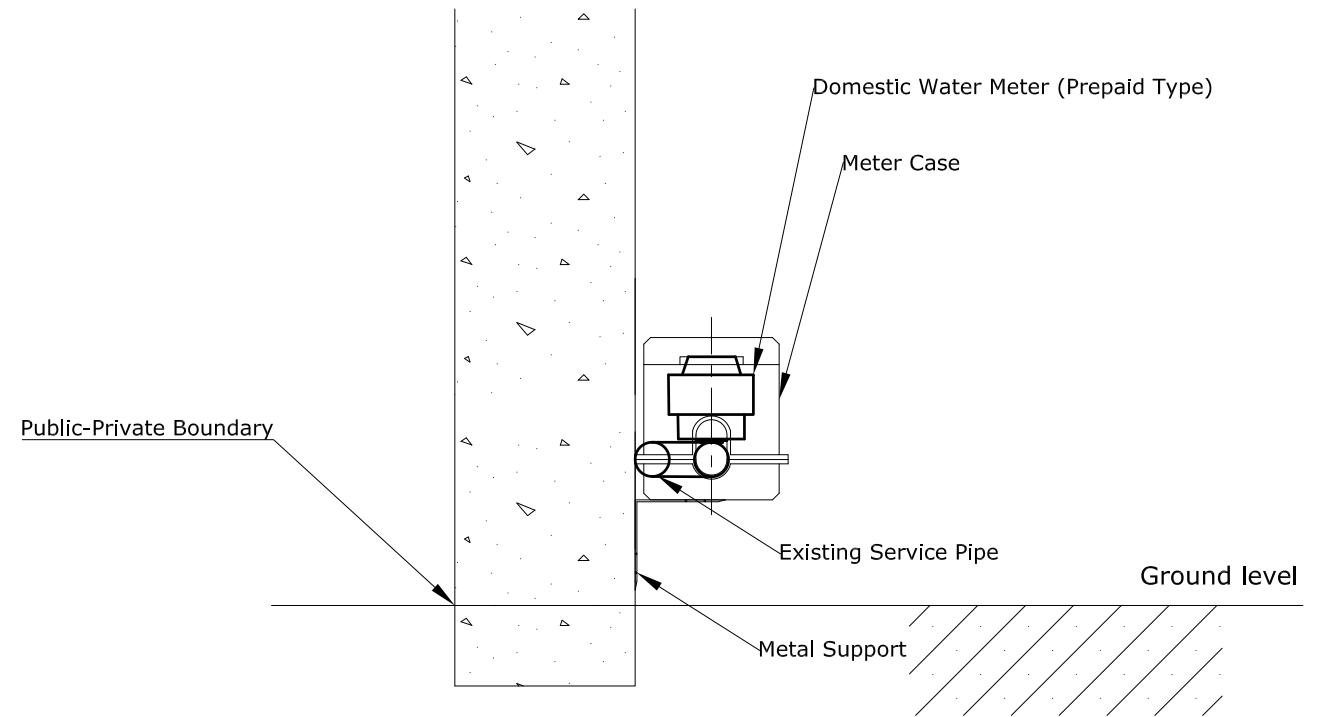
TITLE: Standard Lay-out of Prepaid Water Meter 4th Case		
SCALE:	DATE: Jan. 2019	DRAWING No.: 004

Public-Private Boundary

Top View



Front View



Side View



The Project for Strengthening the Capacity of Water Service Management in Jenin Municipality

The Joint Venture of TEC International Co., Ltd. and PADECO Co., Ltd.

TITLE: Standard Setting of Prepaid Water Meter 1st Case

SCALE:

DATE: Jan. 2019

DRAWING No.: 001

別冊資料 CD 1.15

**Manual for Management of Prepaid Water Meter
System in Jenin Municipality**

別冊資料 CD 1.15.2 Arabic Version



تسلاK - تحسين إدارة خدمات المياه في بلدية جنين

دليل إدارة نظام علاادات الدفع المسبق (PPWMs) في بلدية جنين

كانون الاول 2021

بلدية جنين
وكالة اليابان للتعاون الدولي (JICA)

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شعبة إدارة قاعدة بيانات المشترك (CDMD)

استيلاء مسح بيانات المشتركين (CDS)

قسم خدمات المشتركين (CSS)

اللاقط الهوائي (GW)

قسم إدارة العدادات (MMD)

عداد المياه مسبق الدفع (PPWM)

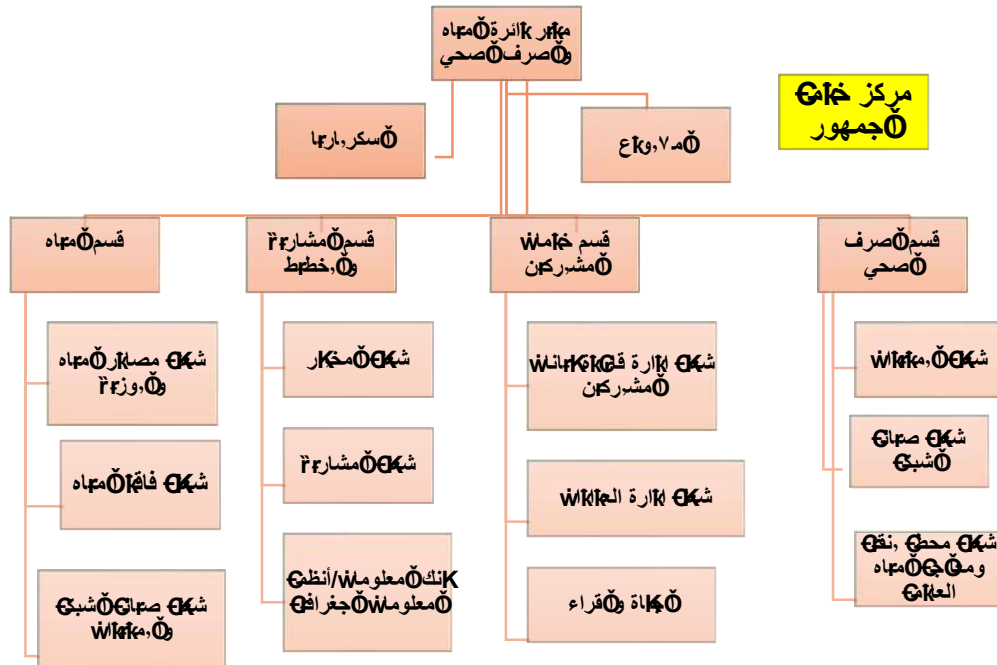
قسم المشاريع والتخطيط (PPS)

حط الشحن (VS)

دائرة المياه والصرف الصحي (WWD)

قسم المياه (WS)

كلية المياه والصرف الصحي



الفصل الأول: المقدمة

يتناول الوعد الدليل في كة^١ جميع الأنشطة المتعلقة بإدارة نظام عتد دفع مسبق (PPWMs) بة^٢ و^٣ رجعي شامل (الطن اقم) شابة أو متد كة^٤ تة^٥ ستطابها^٦ دة^٧ لأقسام الأخرى العمل في قسا^٨ خدمة^٩ مشتر كة (CSS) في دائرة مياه و صرفة^{١٠} صحي في بلدية كة. و لا ه^{١١} سبب^{١٢} فهد^{١٣} ظفو^{١٤} قسم^{١٥} ات^{١٦} المشتر كة بشكل رئيسي في عتد محتويات^{١٧} الوعد دليل^{١٨} رشادي^{١٩} و لا تي^{٢٠} تستند بشكل كة^{٢١} و لا فح^{٢٢} جميع الأنشطة والمهام التي يتك على قسم خدمات^{٢٣} مشتر كة^{٢٤} بام بها^{٢٥} , من تسلسل نظام العمل المتبع في بلدية كة . ويت^{٢٦} و^{٢٧} 10 كة^{٢٨} ف^{٢٩} Öf^{٣٠} بال^{٣١} , اقف^{٣٢} و^{٣٣} مرفقات^{٣٤} : K «^{٣٥} و^{٣٦} ل^{٣٧} 2 يتناو^{٣٨} " ك^{٣٩} عمل نظام عتد دفع مسبق^{٤٠} " و^{٤١} يجاز^{٤٢} لسا^{٤٣} الأسا^{٤٤} كل نظام. بينما تتناول و^{٤٥} Öf^{٤٦} و^{٤٧} 8 و^{٤٨} وشك^{٤٩} ف^{٥٠} ل^{٥١} تسلسل خط^{٥٢} تركيب^{٥٣} وصلات^{٥٤} الملا^{٥٥} مشتر كة^{٥٦} وتسجيلها^{٥٧} على^{٥٨} لأنظمة^{٥٩} موجودة داخل^{٦٠} البلدي^{٦١} في كة^{٦٢} يطرح الفصل 9 و^{٦٣} K^{٦٤} التي ينفذها^{٦٥} طاقم قسم خدمات^{٦٦} مشتر كة^{٦٧} .

الفصل الأول: مقدمة

فصل ٢٧: أسي نظام الدفع مسبق.

فصل ٣٧: ا^{٣٨} راحل تركيب^{٣٩} و^{٤٠} و^{٤١} و^{٤٢} و^{٤٣} و^{٤٤} و^{٤٥} و^{٤٦} و^{٤٧} و^{٤٨} و^{٤٩} و^{٥٠} و^{٥١} و^{٥٢} و^{٥٣} و^{٥٤} و^{٥٥} و^{٥٦} و^{٥٧} و^{٥٨} و^{٥٩} و^{٦٠} و^{٦١} و^{٦٢} و^{٦٣} و^{٦٤} و^{٦٥} و^{٦٦} و^{٦٧} و^{٦٨} و^{٦٩} و^{٧٠} و^{٧١} و^{٧٢} و^{٧٣} و^{٧٤} و^{٧٥} و^{٧٦} و^{٧٧} و^{٧٨} و^{٧٩} و^{٨٠} و^{٨١} و^{٨٢} و^{٨٣} و^{٨٤} و^{٨٥} و^{٨٦} و^{٨٧} و^{٨٨} و^{٨٩} و^{٩٠} و^{٩١} و^{٩٢} و^{٩٣} و^{٩٤} و^{٩٥} و^{٩٦} و^{٩٧} و^{٩٨} و^{٩٩} و^{١٠٠} و^{١٠١} و^{١٠٢} و^{١٠٣} و^{١٠٤} و^{١٠٥} و^{١٠٦} و^{١٠٧} و^{١٠٨} و^{١٠٩} و^{١١٠} و^{١١١} و^{١١٢} و^{١١٣} و^{١١٤} و^{١١٥} و^{١١٦} و^{١١٧} و^{١١٨} و^{١١٩} و^{١٢٠} و^{١٢١} و^{١٢٢} و^{١٢٣} و^{١٢٤} و^{١٢٥} و^{١٢٦} و^{١٢٧} و^{١٢٨} و^{١٢٩} و^{١٣٠} و^{١٣١} و^{١٣٢} و^{١٣٣} و^{١٣٤} و^{١٣٥} و^{١٣٦} و^{١٣٧} و^{١٣٨} و^{١٣٩} و^{١٤٠} و^{١٤١} و^{١٤٢} و^{١٤٣} و^{١٤٤} و^{١٤٥} و^{١٤٦} و^{١٤٧} و^{١٤٨} و^{١٤٩} و^{١٥٠} و^{١٥١} و^{١٥٢} و^{١٥٣} و^{١٥٤} و^{١٥٥} و^{١٥٦} و^{١٥٧} و^{١٥٨} و^{١٥٩} و^{١٦٠} و^{١٦١} و^{١٦٢} و^{١٦٣} و^{١٦٤} و^{١٦٥} و^{١٦٦} و^{١٦٧} 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- يمكن للمستهلكين مراقبة والتحكم بإغلاق وفتح صمام العداد عن بُعد خلال نظام الاتصال الآلي.
- تغطي الواقيات الميكانيكية دائرة ذات قطر 4 سم بشرط عدم وجود حاجز أو معيق للعداد عند دفع المسبق للواقي الهوائي يحول دون التمكن للعداد من التقاط إشارة المرسل للعداد عند دفع المسبق.
- تستطيع الواقيات الميكانيكية استقبال بيانات 400-500 عداد في نفس المرة.
- إذا كان العداد يدفع المسبق، من منطقة الخط قبل القطبين للعداد، في السيرفر الخاص بالعداد سيستقبل نصف البيانات المرسل للعداد اللاقي (يرجى مشاهدة الشكل 2.4).

1.1.2 اتجاه سعة بيانات شحنات عدادات الدفع المسبق.

يظهر الشكل 2.2 شحن مشتركين بطاقة عداد الدفع المسبق (PPWM Card)، وفيما يلي معلومات الأساس لعملية شحن بطاقة عداد الدفع المسبق:

- تتم عملية شحن رصيد المشترك للعداد خلال بطاقة الشحن (Smart Card).
- كل عداد كارت خاص به بحيث لا يمكن شحنه باستخدام كارت آخر مع ١٥-.
- عند تعريض كارت يتم إضافة بيانات معينة عن المشترك للعداد وتعرفه والرصيد الإضافي ورصيده احتيا - وما إلى ذلك.
- يمكن للمشترك شحن بطاقات عداد الدفع المسبق للعداد خلال محطة شحن (موزع) في حل أو سوبرماركت أو كاتب جباية بلدي وقد انتشر في مصر.
- ينخفض رصيد الشحن وفيه لاستهلاك المياه، ويتم إغلاق صمام العداد الدفع المسبق بمجرد الانتهاء الرصيد.
- لحالة انتهاء الرصيد في المنتهى للليل يمكن حفظ جزئ للعداد قيمته لشحنة على بطاقة شحن كرصيد لتبسط يتم استخدامه عند انتهاء الرصيد عادي.




(المصدر الرئيسي: الشركة المصنعة - بايلان)

الشكل 2.2 آلية شحن المشتركين لكرت عداد الدفع المسبق

2.2 عداد الدفع المسبق (PPWM)

تم اختيار العداد الدفع المسبق AK-411 والتابع لـ بايلان تجاريًا وعُظم في دورة أدناه مميزات العداد كسعة التخزين للعداد $Y = 16$ ولقد تم اختياره الرئيسي كالتالي: $Q_3 = 2500 \text{ L/h}$ $DN 20$ $R = 200$ $Q_1 = 12.5$ لتر / ساعة) $Q_2 = 3$ لتر / ساعة $Q_3 = 16$


بار C50° وعمر البطارية 10 سنوات وفترة الضمان هي ثلاث (3) سنوات كما (©) في صورة أدناه.




AK-411 LoRa

Remote Reading and Prepaid

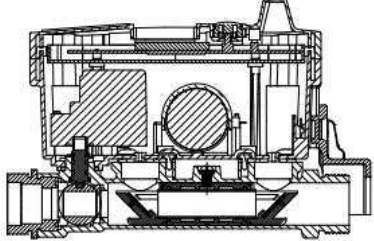
Ultrasonic Water Meters





GENERAL

- MID Certified • Supports Wireless MBUS Protocol • RF Readings
- Integrated Lora module-chipset allows both LORA and FSK modulation
- Supports LoRaWAN™ and Wireless MBUS Protocols simultaneously (Optional)
- Supports LoRaWAN™ - Class A Protocol • Built-in buzzer
- Selectable Frequency Band EU 863-870 Mhz
- Ultrasonic principle assures very high sensitivity even at low flow
- Contactless card usage ensures isolation against external affects
- 3.6V Lithium battery replaced by local administration
- LCD display with back light (128x64px) • Advanced service network
- Suitable for cold water up to 50°C • Suitable for potable water
- No measurement of air • Reverse flow detection
- Wide dynamic measuring range and low pressure loss
- Solid stainless steel reflector • IP 68 protection class
- Can be mounted all positions desired
- Leakage control system, • 3 years of warranty
- Service and spare parts available for 10 years



الشكل 2.3 صور من كتيب الشركة المصنعة للعداد .

2.3.2 ت الشحن (VS) وسيرفر عدادات دفع المسبق K السيرفر الرئيسي.

فيما يلي معلن ما Y الأساسية عن محطات الشحن وسيرفر عدادات دفع مسبق Y السيرفر الرئيسي :

- توزيع محطات الشحن على محلات Y سوبرمارك المتعاقد معها (©) كاتب جباية Y بلدية و قسم خدمة Y مشتركين .
- توفير محطة شحن Y لطواقم Y مسؤول عن الشحن في قسم خدمات المشترك K بجو « تتك» محطة الشحن (©) كمبيوتر شخصي شاشة عر D طابع (©) زهد - اق Y K - ي (UPS) وقارئ البطاقات .
- ي (©) ظرف) قس | (©) مشترك K بتدريسي Y ط Y مختلف Y مسؤول عن تشغيل محطات Y شحن في (©) حلا Y سوبل (©) اکت أو مراكز الجباية.
- يتم إعطاء عمال او نسب محددة على عمليات الشحن Y محلات السوبرمارك Y متعاقد معها.
- تم تك E سيرفر عدادات Y دفع مسبق في قس | تكنوجيا المعلومات في البلدية^a وربطه مع يد (©) Y لشمالي Y متواجد على Y سيرفر الرئيسي.
- يت ك (©) كرفر عدادات Y دفع مسبق Y كرفر Y الرئيسي و عدادات Y كراه بشك (©) . فعندما ي (©) مشترك بشحن رصيدة Y (©) خلال محطة الشحن يتم فقط ذن Y لانا (©) قبل حط Y شحن وإرساله Y Y لسيرفر Y الرئيسي عبر سيرفر عدادات الدفع Y المسبق.

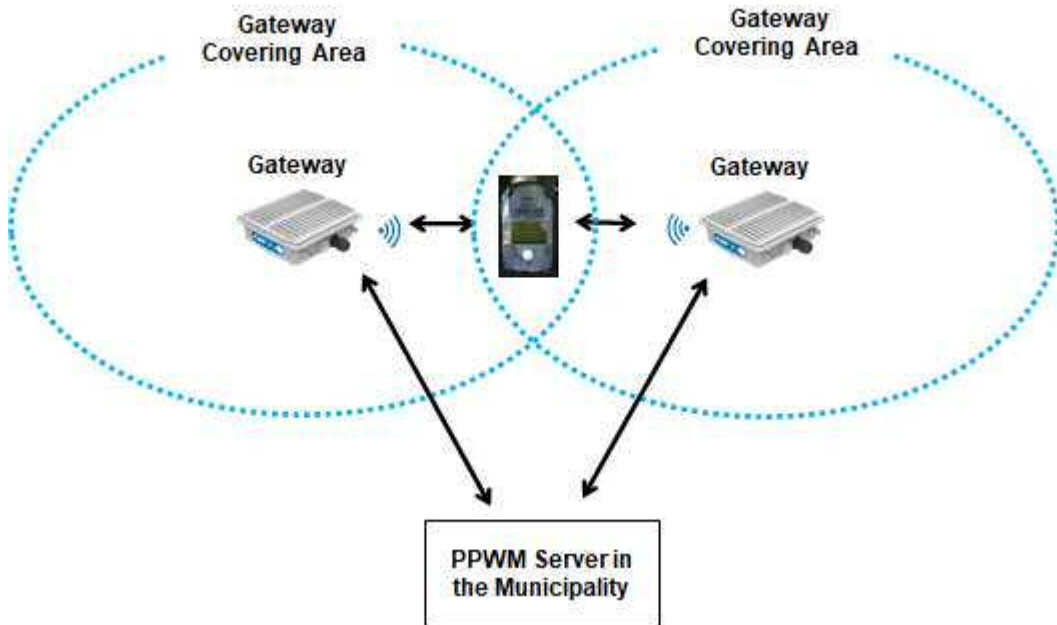
2.4 الكرت الرئيسي (Master Card)

بطاق رئيسي يمكن استخدامها فقط إعادة تعبئة خصائص عدادات المياه عند E لاق Y تمام Y تقطاع دورة مياه نظريه لظرو Y لتزوي Y متقطع في Y مدينة . Y ه Y سبب يجب أن يكون Y كرت Y رئيسي تحت ادارة رئيس قس | خدمات Y مشتركين CSS أو مدير دائرة المياه وال ترف الصحي .WWD

2.5 اللاقط الهوائي (LORA)

يستخدم اللاقط الهوائي (GW) جهاز يستخدم لنقل البيانات المشتركة بين عدة أجهزة الدفع المسبق إلى الكارفر الرئيسي (سيرفر عدة الدفع المسبق). وقد تم اختيار منتج العلامة التجارية MultiTech في النظام الحالي. وفيما يلي مميزات اللاقط الهوائي المستند:

- اللاقط الهوائي GW قادر على تغطية منطقة يظل نصف قطر محيطها 4 كم وذلك في حال عدم وجود عائق مثل المباني عدة الدفع المسبق واللاقط الهوائي.
- اللاقط الهوائي GW قادر على استقبال بياناتنا من 400 جهاز دفع مسبق في نفس الوقت (بما في ذلك أجهزة الدفع المسبق القديمة).
عدة الدفع المسبق من الجيل القديم لا يمكن استخدامها ويتطلب وقت إعداد قبل استخدامها (تعد).
- لا يمكن هنا تقسيم منطقة تغطية للاقتطاع لعدة مناطق مختلفة في الكارفر الخاص بالأعدادات سيستقبل نفس البيانات من عدة اللاقطات.



الشكل 2.4 يوضح عدة دفع مسبق في منطقة شركة للإثنين هوائيين مختلفين.

الفصل 3.1 لث 70 حل 70 كتاب 70 شت 70 اكات المياه للمشتركين الجدد.

3.1 تسلسل الخطوات الرئيسية الملائمة لتركيبة اشتراك جديد.

شكل 3.1 تسلسل الخطى 70 لث 70 كتاب 70 شت 70 اكات المياه للمشتركين الجدد.

يتم تقديم طلب تركيب 6 ايام قبل مشترك في مركز اتنا لجمهور لبلدية جنين وبعد ذلك دفع مشترك كافة الرسوم 70 اكات المياه للمشتركين الجدد. يتم تحويل الطلب 70 اكات المياه للمشتركين الجدد. يتم تحويل الطلب 70 اكات المياه للمشتركين الجدد. يتم تحويل الطلب 70 اكات المياه للمشتركين الجدد.



3.2 يتم تقديم طلب تركيب 6 ايام قبل مشترك في مركز اتنا لجمهور لبلدية جنين وبعد ذلك دفع مشترك كافة الرسوم 70 اكات المياه للمشتركين الجدد. يتم تحويل الطلب 70 اكات المياه للمشتركين الجدد. يتم تحويل الطلب 70 اكات المياه للمشتركين الجدد.

بعد انتهاء مسح الأولي يتم تركيب عداد الدفع المسبق 70 اكات المياه للمشتركين الجدد. يتم تحويل الطلب 70 اكات المياه للمشتركين الجدد. يتم تحويل الطلب 70 اكات المياه للمشتركين الجدد.

وبعد الانتهاء عمل التركيب تبدأ حلة 70 اكات المياه للمشتركين الجدد. يتم تحويل الطلب 70 اكات المياه للمشتركين الجدد. يتم تحويل الطلب 70 اكات المياه للمشتركين الجدد.

3.1, 70 اكات المياه للمشتركين الجدد الخطوات الرئيسية اللازمة لتركيب اشتراك مياه جديد



اشعارك مياه جديد

بيانات الطلب الرئيسية:

تاريخ الطلب: 16/11/2021 10:29:29 صي رقم الطلب: 352 - 2021 - 11 - 11 - تاريخ: 11/11/2021

أرخصت تاريخي

بيانات المكاتب:

رقم المكاتب: 964122873 رقم البطاقة الشخصية: 964122873

اسم المكاتب: محمد هويدا توفيق عمارة

الجنس: جنين

بيانات مقدم الطلب:

اسم مقدم الطلب: محمد هويدا توفيق عمارة

جنس: جنين

رقم البطاقة الشخصية: 964122873 رقم الهاتف: *****

رقم الحوالة: 0094541882 رقم الماكس: *****

البريد الإلكتروني: *****

بيانات العقار:

رقم الخوصية: 964122873 أصغر الخوصية:

رقم الموقوف / الحد: 0 اسم الموقوف / الحد:

رقم المنطقة: المزارع

رقم الوحدة: المارية

حالة استعمالات العقار: سكني

ملاحظات: جنين / المزارع حيفا / المزارع البرازيل قرب تالون حلا

بيانات رسوم الطلب:

المعبر	العملة	الكمية	النسبة	رقم الوصل	تاريخ الوصل
0	شكك	1	0	06/11/2021	

بيانات رسوم الخدمة:

العملة	النسبة	الوحدة	الكمية	النسبة	هل الرسوم تأسس
شكك	1	شكك	1	1	<input type="checkbox"/>

القائمة رسوم خدمة حيا:

العملة	النسبة	الوحدة	الكمية	النسبة	هل الرسوم تأسس
شكك	1	شكك	1	1	<input type="checkbox"/>

التعليمات المختلفة:

- صورة قهوة
- تعويض مؤسسة حكومية (كتاب رسمي لرئيس البلدية من مدير المؤسسة بالتعويض وكتاب التعويض بالتوفيق
- مائة ذمة سارية المعول. بأسم المشترك من المولج وأداء المطلوب لعدم العمدة حيا
- خارج حدود البلدية [صدر معاهة من المكبر المعطل = صورة قهوة فقط]



المنافع والردود

شكل 3.2 كلب تركيب (@) جديد.



صورة 3.1 تركيب وصلة تنزلية لمشترك جديد.

3.2 تفصيل المهام للمؤقنين المسالكين وكذا الموردين والواجب فحصهم.

يخصص جدول 3.1 تفاصيل المهام وطواقم العمل ومسؤولياتهم والأموال واجباتهم واجتماعهم.

جدول 3.1 خطوات تركيب عدادات المياه للمشتركين الجدد.

رقم التسلسل (المهمة الرئيسية)	تفصيل المهام	القسم المسؤول	الموردين والواجب فحصهم
1. طلب تركيب عداد مياه جديد	1.1 اعداد طلب تركيب اشتراك مياه جديد وإرساله إلى إدارة قاعدة بيانات المشتركين (CDMD)	مركز خدمات الجمهور CSC	• إكمال اشتراك (الاسم رقم هوية رقم هاتفي رقم الخ. الخ. يرجى الرجوع إلى شكل 3.2)
	1.2 دفع الرسوم اللازمة	مركز خدمات الجمهور CSC	• رقم اشتراك المياه .
	1.3 إرسال طلب إقرار قسم المياه لتنفيذ مسح وفحص الفني الموقع.	شعبة المراجعة قاعدة بيانات المشتركين (CDMD)	
2. الخطوات التحضيرية لتنفيذ مسح الفني لموقع تركيب عداد المياه الجديد	2.1 اتخاذ اجراءات اللازمة لتنفيذ مسح الفحص الفني الموقع.	قسم المياه WS	<ul style="list-style-type: none"> • إكمال اشتراك المشترك . • دفع العمل. • وقت الزيارة . • معلومات خط توزيع (نوع الخط موقع خط قطر الخط). • الأذونات والقطع اللازم خلال العمل في الموقع.
	2.2 تنفيذ مسح وفحص الفني الموقع.	قسم المياه WS	<ul style="list-style-type: none"> • موقع محتمل لتركيب عداد الدفع والمسبق. • دفع خط توزيع المياه الرئيسي المزود للمياه. • دفع وصلات المنزل. • توفر مادة الزقفة لارجاع مكان التركيب كما كان في السابق. • وجود أي عائق أو مانع يحول دون القدرة على تمديد وصلة المنزل. • تاريخ تمديد وصلات المنزل.

<ul style="list-style-type: none"> • شبكة الوصلية الدولية مع خط التوزيع . 	قسم المياه WS	2.3 كمل تلي ك-الوصلة لمنية في حالة تم وجودها.	
<ul style="list-style-type: none"> • قسم المشترك ، رقم المشترك ، رقم اشتراك المياه .. الخ. (يرجى الإشارة إلى شكل (3.3) 	شعبة إدارة إدارة المشترك MMS	2.4 إدخال بيانات مشترك على برنامج إدارة عدادات المسبوق .	
<ul style="list-style-type: none"> • دفع الدفع مسبق . • الفتح اللازمة . • نوع مادة خط . • الأدوات اللازمة للتركيب . • اناق مشترك . 	شعبة إدارة دفع مسبق MMS	3.1 اتخاذ الاجراءات اللازمة لتركيب دفع مسبق.	3. أوركا عداد الدفع المسبق
<ul style="list-style-type: none"> • سهولة وصول إلى مكان تركيب سهولة فتح عداد • لتقاط وأورموك • 	شعبة إدارة دفع مسبق MMS	3.2 تركيب دفع مسبق	
<ul style="list-style-type: none"> • صورة موقع • عدادات مسبق (MMS) . • اعداد التقرير الخاص بتركيب • دفع مسبق (يرجى الإشارة إلى صورة (3.3) . • أرشفة لتقرير . 	شعبة مشاريع - قسم لتخطيط وإدارة مشاريع PPS	4.1 اعداد ورشفة تقرير الخاص بتركيب عداد مسبق.	4. إدخال بيانات الاشتراك
<ul style="list-style-type: none"> • اعداد الكرت الذي تم تعريده بيانات مشترك K- (يرجى مشاهدة R) من 3.5 • كرت مسبق للمشارك بلا كتيبات تو - أماكن شدة وتوزيع نقا الشحن . • تزويد مشترك بالتهات اللازمة حول كيفية استخدام الكرت لذلك . 	شعبة اداة عدادات دفع مسبق MMS	4.3 تعريده كرت مسبق مشترك.	
<ul style="list-style-type: none"> • متابعة اليومية لاستهلاك مشتركين من • ملاحظة قيم الاستهلاك طبيعية . • ابلأ موم إدارة عدادات عن قيم الاستهلاك وجدت . • اعداد تقرير سنوي لاستهلاك لمشاركين من المياه . • اعداد التقرير إلى مركز قسم خدمات المشاركين . 	شعبة إدارة دفع مسبق (MMD)	5.1 من قبلة استهلاك لمشاركين	5. كمال الرقابة ومتابعة حل مشاكل العتاد .
<ul style="list-style-type: none"> • اتخاذ الاجراءات مناسبة مبلا - منها وفقاً لمخذة £ . • إيجاد سبب المشكلة وفه صفرية . • اطلب لمساعدة من مركز الشركة موردة لزم . 	شعبة إدارة دفع مسبق (MMD)	5.2 كمل تلي حل بعاد المياه .	

<ul style="list-style-type: none"> • كمل تلى ايجاد حل شركة د بالتعاون مع مركز انة الشركة الاموردة . • اتخاذ الاجراءات المناسبة لتل شكوا , المشركين . 			
--	--	--	--

Create New Consumer

Meter Information

Meter Type Meter No

Diameter 20 mm

Consumer Type RF Module No

Old Meter Number :

Consumer Information | Address Information | Communication Info

Consumer No Registration Number

Social Security Numbr Additional Information

Name Enter first name Tariff

Last Name Enter last name Registration Date

Fathers name

Mothers name Contract activation Da

Grand fathers name Contract expiration D:

Tax Number Description

Tax Office Name

Is Credit load allowed: Active Consumer Status Active

Save Cancel

شكل 3.3 يورة لنموذج ادخال اانات مشترك K w (بيانات لمشارك)

Create New Consumer

Meter Information

Meter Type Meter No

Diameter 20 mm

Consumer Type RF Module No

Old Meter Number :

Consumer Information Address Information Communication Info

Building Address Text

Door Number

Flat Number

Floor Number

+

+

+

+

+

+

+

Latitude

Longitude

Zone

شكل 3.4. صورة لنموذج اخال بيانات مشترك جديد (ل عنوان مشترك)

Create New Consumer

Meter Information

Meter Type Meter No

Diameter 20 mm

Consumer Type RF Module No

Old Meter Number :

Consumer Information Address Information Communication Info

Home Phone

Mobile Phone

Work Phone

Fax

E-mail

شكل 3.5. صورة لنموذج اخال بيانات مشترك (معلومات لتصل)



دولة فلسطين
State of Palestine
وزارة الحكم المحلي
Ministry of Local Government
بلدية جنين
Jenin Municipality



محمد زكريا الشاذلي

PPWM Installation Report

Location Information: Date: 17/12/2024
 Name / الاسم: مديرية قطارات البعثة
 Pilot Area 1 / Sub Area: / Block #: شارع الناصرة
 House Connection ID / رقم الاثراك: W 5745
 New Customer / ملحق بـ Replacement / استبدال Existing / غير حرجي DC. No. / رقم العداد

Fittings & Resources / القطر والتوصيلات المستخدمة:
 محمد زكريا الشاذلي / محمد زكريا الشاذلي

JM Technicians / الفنيون: علاء JM Supervisors / المشرفون:

Meters Information: meter status
 Old Meter Readings / قراءة العداد القديم: 884.1 Photo / صورة
 SN: 549764

PPWM Readings / قراءة العداد بين الحاج: 0.560980 Photo / صورة
 SN: 1404004



Water Section Comments: Signature:
 Customer Service Section Comments: Signature:
 JET Observer: Signature:

3.2. صور تقرير العمل الخاص بتركيب عداد الدفع المسبق

الفصل الرابع . مراحل استبدال العددين الميكانيكية بعد الدفع المسبق .

4.1 تكر الخطو التحضيرية لاستبدال العددين الميكانيكية بعدادات الدفع المسبق .

يتم استبدال العددين المشتركين المنزلية بعد الدفع المسبق بالجملة كما هو موضح في هذه الخطوات تقع من منطقة جغرافية معينة لا يمكن مثل هذا الأمر لا أكثر من 1/4 في عدة حالات مثل طلبات تركيب الدفع المسبق لمشارك جديد .

وفي حال استبدال العددين المنزلية بعد الدفع المسبق بالجملة، فإن ذلك لا يتم إلا في حالة استواجه صعوبة آتية في الأثر 1/2 وعليه لا بد من تنفيذ العملية استبدال العددين المشتركين الحالية بعد الدفع المسبق من خلال استئانة بمقاول خارجي مع قيام مهندس كهربائي به وفنيي قسم خدمات المشتركين بالإشراف على أداء العمل .

وخطوة استبدال العددين، جزء من أنشطة العلاقات العامة قبل بدء العمل، حيث يتم تركيب العددين في المسبق وتتمتع أنشطة العلاقات العامة بتنفيذ كافة مساهمات الشركة وتكون مساهمة الشركة في هذه الأنشطة من 4.1 و 4.2 في العلاقات العامة تقديم شرح مبسط حول أهمية العمل في الدفع المسبق وتسليم المشتركين كتيب إرشاد خاص بالعددين في الدفع المسبق، اجتماعات خاصة مع أهالي المنطقة في استبدال العددين بها وذلك لسهولة توفير نبذة عامة عن العددين في المسبق وكسب رضا العملاء حول العمل التركيبي التي سيتم تنفيذها .

وهناك حاجة ملحة لتنفيذ مسح لتحديث بيانات المشتركين (CDS) كما هو مبين في الشكل 4.1، حيث يتم تحديث بيانات المشتركين في حالات نقل المشترك مكان إقامته أو قد يتوفى صاحب الاشتراك، كما هو هناك حاجة إلى تحديث حالته وغيرها من الأمور . ومن هنا لمنطلق لا بد من العمل على مسح تحديث بيانات المشتركين قبل بدء العمل، كما هو موضح في الشكل 4.1 .

وحتى هذه اللحظة، تولى قسم العلاقات العامة في شركة الشركة مهمة مسح بيانات المشتركين التي كانت بيانات المشتركين . ويتم ذلك في بيانات المشتركين كما هو موضح في صورة 4.2 ، ومن المقترع متابعة العمل مسح بيانات المشتركين خلال الـ 10 سنوات القادمة مع إمكانية استئانة بجهة خارجية في مسح .



الشكل 4.1 سير العمل التحضيرية لاستبدال العددين الميكانيكية بالدفع المسبق .

Customer Database Survey - Surveyor Name: أحمد

Date: 10/12/2021

Pilot Area 2	Locality Name: <u>أ.ق</u>	House NO: <u>89/2</u>	Owner's Name: <u>محمد كمال محمد</u>
House Status: <input checked="" type="checkbox"/> Registered	1. Registered <input checked="" type="checkbox"/> 2. Not Registered <input type="checkbox"/>		
Family size: <u>3</u>	Storage tank number & total capacity: <u>1</u>		
If the house owner answers "YES or Registered", please fill up below.			
HC ID: <u>4778</u>	Water Meter NO:		
Reg. Category: <input checked="" type="checkbox"/> Domestic <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Agriculture			
<input checked="" type="checkbox"/> Visible problem in water meter مشكلة ظاهرة في المقاسم	<input type="checkbox"/> Legal connection وصلة غير قانونية	<input type="checkbox"/> Not horizontal غير أفقية	<input type="checkbox"/> Not accessible غير متاحة
<input type="checkbox"/> Own private resource مياه خاصة	<input type="checkbox"/> Own private resource مياه خاصة	<input type="checkbox"/> Own private resource مياه خاصة	<input type="checkbox"/> Own private resource مياه خاصة
Comments: If you discover anything, please write down below.			

صورة 4.2 نموذج تقرير مسح بيانات المشتركين

تحضير وثائق العطاء الخاصة بقطع المواد اللازمة، إكمال تركيبها لانتهاء من تنفيذ مسح المناطق المستهدفة وسيتم ادائها وثائق العطاء بالتعاون ما بين قسم المياه وقسم خدمات المشتركين على إعداد جدول الكميات للمواد المطلوبة و إعداد برنامج استيعابها بناءً على نتائج المسح. إن شاء الله تعالى. إن شاء الله تعالى. إن شاء الله تعالى. إن شاء الله تعالى.

كما فيما يتعلق بأعمال استبدال العدادات / اف يتم تنفيذها من قبل مفاول خارجي وأشكال من شباية فترة الفتح السابق ويتأهل دوقا قول الخارجي باستبدال اادات المشتركة للحالية اادات لدفع مسبق وتسليم لمشتركة كرقم ادا ؛ بلا افقة تسليم نموذج تقرير تدبير اادات الفتح المسبق الى الوهة - شراية التي دورها تقوم بتقييم اداء مفاول وتقوم بتوجيهات والاراء التامة الى المله ؛ وجدت .

وبعد الانتهاء من استبدال اادات ؛ تبدأ مرحلة ادخال بيانات المشتركين التي تتم من خلال موظف اشعبة ادارة بيانات مشتركة في قسم خدمات المشتركة ؛ بلا افقة تصدق بيانات مشتركة الى قاعدة اادات الشامل .

هم المرحلة الأخيرة من الفتح من اكمال متابعة ومرحلة الاعداد و ايجاد الحلول المناسبة للمشاكل التي تواجه مشتركين / وتبلغ هه المرحلة مباشرة بعد الانتهاء من مرحلة ادخال بيانات مشتركة ؛ يتم موظف اشعبة ادارة بيانات مشتركة مسؤولية متابعة ومراقبة اادات الفتح اادات والتعامل مع اعطابها المحتالة / في حين يتولى موظف شباية فترة اادات لدفع مسبق اتخاذ الاجراءات المناسبة للتعامل مع مشاكل الفتح .

4.2.2 تفصيل الفهم والموظفين المسؤولين عن الفهم والأمر الوالي - فحصول

يلد « الجدول 4.1 تفصيل الفهم والموظفين المسؤولين عن الفهم والأمر الوالي - فحصول . مع مكانية تخطي بد الفتح والانتقال الى المرحلة بناء على مرور اادات ب .

إدول 4.1 تفصيل المهام والقسم المسؤول عن المهام والأمر الواجب فحصولها .

تسليم المهام اسمية	الاهداف	القسم المسؤول	أمر واجب مراجعتها لتأكد منها
1. خطة اكمال	1.1 اعداد اادات اللازمة (الهدف) لادخال بيانات مشتركة مستهدفة وعدد من اادات الفتح في المنطقة مشتركة في المنطقة مستهدفة وأولية (تركيب... الخ)	قسم تخطيط و اارة مشاريع وقسم اادات ومشتركة .	<ul style="list-style-type: none"> عداد من اادات المستهدفة مراد تبدي اعدادات فيها . عداد مشتركين في منطقة الفتح . اختيار المنطقة ذات الأولوية والأخذ بعين الاعتبار ظروف اادات لتزود في اادات للمنطقة اختيار .
1.2 وضع جدول زمني لتنفيذ خطة اكمال .		قسم تخطيط و اارة مشاريع وقسم اادات ومشتركة .	<ul style="list-style-type: none"> اعداد اادات المتوفرة لتنفيذ كل مهلة . تأكد الأعداد لازم لاتمام كل مهم . ترابط اادات مهام . الفترة الزمنية لكل اادات مهلة .
2. أنشطة اادات لعامة .	2.1 اعداد اادات لادخال بيانات مشتركة لترويجية .	قسم اادات لعامة	<ul style="list-style-type: none"> وضع خطط تنفيذ أنشطة اادات لعامة (أنشطة اادات لعامة من خلال وسائل الاعلام المتاحة و توفير الاجتهادات العامة مع الفهم .. الخ) .
2.3 اعداد وتنفيذ أنشطة اادات لترويجية .		قسم اادات لعامة	
3. مسح بيانات المشتركين (CDS) .	3.1 اعداد بيانات مشتركة (الهدف) .	قسم اادات لعامة	<ul style="list-style-type: none"> اعداد بيانات مشتركة (اسم مشترك ، رقم هوية ، رقم شباية اادات ، رقم هاتف الفتح .. الخ) .

<ul style="list-style-type: none"> اسم مشترك . رقم هو مشترك. رقم اشتراك (D). رقم هاتفي. موقع أعداد الحبال . موقع الخط الالوي للخدمة . وجود أمان عائق وموانع يحول دون نشاطه . تدريب أولي على كيفية استخدامه . تسليم الكتيبات الإرشادية الخاصة بإدارة الأعمال السابقة مسبقاً . وتقديم تقرير عن الأعمال السابقة اللازمة للمشتريين . إعداد تقرير مسح بيانات للمشتريين . 	<p>قسم العلاقات العامة</p>	<p>3.2 « مسح بيانات لمشتريين بالإضافة إلى مسح الزيارات مسبقاً .»</p>	
<ul style="list-style-type: none"> تسليم قسم العلاقات العامة تقرير مسح بيانات لمشتريين إلى قسم التخطيط وإدارة المشاريع . أرشفة تقرير مسح بيانات للمشتريين من قبل قسم التخطيط وإدارة المشاريع . قيام قسم التخطيط وإدارة المشاريع بالطلب من قسم تكنولوجيا المعلومات (IT) لتوفير الأمان للمشتريين إن لزم . 	<p>قسم التخطيط وإدارة المشاريع .</p>	<p>3.3 تحديد اناءات للمشتريين على برنامج شامل .</p>	
<ul style="list-style-type: none"> جدول كميات الخاص بعدات وتسليم قسم العلاقات العامة تقرير مسح بيانات لمشتريين إلى قسم التخطيط وإدارة المشاريع . أرشفة تقرير مسح بيانات للمشتريين من قبل قسم التخطيط وإدارة المشاريع . قيام قسم التخطيط وإدارة المشاريع بالطلب من قسم تكنولوجيا المعلومات (IT) لتوفير الأمان للمشتريين إن لزم . 	<p>قسم التخطيط وإدارة المشاريع</p> <p>قسم المشتريات</p>	<p>4.1 تقدير تكلفة أنشطة مشروع.</p>	<p>4. اعداد وثائق العطاء</p>
	<p>فترة المشتريات</p>	<p>4.2 وصول على موقع 1.7 أ</p>	
<ul style="list-style-type: none"> موافقة على اقتناء نماذج عطاء معتادة . 	<p>قسم التخطيط وإدارة المشاريع</p> <p>قسم المشتريات</p>	<p>4.3 إتمام وأداء العطاء اللازمة لشراء عدادات الدفع لمسبق (يشمل القطع ، نوع ٧٦ و ٧٧) (مستهلكات) الأخرى).</p>	
<ul style="list-style-type: none"> إتمام إخراج عطاء شراء إتمام ادوات مسبق وعطاء وسائل الإعلام المختلفة . 	<p>قسم العلاقات العامة</p>	<p>4.4 إتمام إخراج عن طرح عطاء شراء</p>	
<ul style="list-style-type: none"> تقييم وثائق عطاء . التفاوض مع موردين مترشحين . ترسيخ عطاء . 	<p>دائرة المشتريات وقسم التخطيط وإدارة المشاريع .</p>	<p>4.5 تنفيذ عطاء شراء إتمام ادوات مسبق</p>	
<ul style="list-style-type: none"> تقييم وثائق عطاء . التفاوض مع موردين مترشحين . ترسيخ عطاء . تعديل خطة تنفيذ تركيب إتمام ادوات مسبق (إن لزم) . 	<p>دائرة المشتريات وقسم التخطيط وإدارة المشاريع .</p>	<p>4.6 تنفيذ عطاء تركيب عدادات مسبقاً .</p>	

<ul style="list-style-type: none"> • معاينة عدادات الدفع المسبق للمستأمنين من حيث توافقها مع مواصفات الفتح المطلوبة والكمية المتأق عليها . • ادخال بيانات المواد التي تم شحها إلى قائمة جرد المستودع. 	<ul style="list-style-type: none"> • دائرة المشتريات وقسم التخطيط وإدارة المشاريع ومستودع نرة مياه لصرأ . 	<p>4.7 معاينة كابية وجود عدادات دفع مسبق موردة.</p>	
<ul style="list-style-type: none"> • ادخال بيانات المشتركين برنامج الدفع السابق. 	<ul style="list-style-type: none"> • شعبة ادارة عدادات دفع مسبق 	<p>5.1 ادخال بيانات المشتركين برنامج الدفع السابق.</p>	<p>5. ادخال البيانات</p>
<ul style="list-style-type: none"> • اعداد بطاقات عدادات دفع مسبق من خلال تعريفها ببيانات مشتركة. 	<ul style="list-style-type: none"> • شعبة ادارة عدادات دفع مسبق. 	<p>5.2 تعريف بطاقات عدادات دفع مسبق وتسليهاها في قاول يقوم بتوزيعها إلى المشتركين.</p>	
<ul style="list-style-type: none"> • اغلاق محب آ البوابة Gate valve مركب على شبكة توزيع مياه . • استقبال عدادات مياه الحماية في عدادات دفع مسبق. • شحها على ادعاء قاول الخارجي . • تقييم أداء مقاول خارجي. 	<ul style="list-style-type: none"> • مقاول وقسم خدمات مشتركين وقسم مياه . 	<p>6.1 استبدال اعدادات مياه في عدادات دفع مسبق.</p>	<p>6. استبدال عدادات المشتركين الحالية بعدادات الدفع السابقة.</p>
<ul style="list-style-type: none"> • توزيع بطاقات عدادات دفع مسبق للمشاركين. 	<ul style="list-style-type: none"> • مقاول وقسم خدمات مشتركين وقسم مياه . 	<p>6.2 توزيع بطاقات عدادات دفع مسبق.</p>	
<ul style="list-style-type: none"> • تقني توجيهات للمشاركين حول كيفية تعامل مع عدادات دفع مسبق. 	<ul style="list-style-type: none"> • قسم علاقات العامة. 	<p>6.3 مرحلة لثانية من مسح لزيارات انزلية (DTD).</p>	
<ul style="list-style-type: none"> • فتح محب مياه بوابه (gate valves) 	<ul style="list-style-type: none"> • قسم مياه وقسم خدمات المشتركين. 	<p>6.4 لبدء بتزويها مياه.</p>	
<ul style="list-style-type: none"> • إعداد نموذج تقرير تركيب عدادات دفع مسبق من قبل مقاول. • تسليم قاول من قبل جهة المشرفة . • تلخيد بيانات مشتركة على برنامج لاكل من قبل قسم التخطيط ومشاريع. • أرشفة تقارير تركيب عدادات دفع مسبق من قبل قسم التخطيط وإدارة مشاريع (K) الرجوع إلى ورقة (3.2) . 	<ul style="list-style-type: none"> • قسم خدمات المشتركين وقسم التخطيط وإدارة مشاريع. • قسم مياه وقسم خدمات المشتركين. 	<p>6.5 تقديم نموذج تقرير تركيب عدادات دفع مسبق إلى قسم التخطيط ومشاريع.</p>	
<ul style="list-style-type: none"> • لمتابعة اليومية لاستهلاك مشتركين من المياه وملاحظة عدم الاستهلاك الطيبية . • إبلا موظف مختل بمتابعة فدء عدادات دفع مسبق لاستهلاك الطيبية وجدنت . • إعد تقرير سنوي باستهلاك مشتركين من مياه . • تدقم التقرير إلى مكار قسم خدمات مشتركين . 	<ul style="list-style-type: none"> • شعبة ادارة عدادات دفع مسبق. 	<p>7.1 مراقبة استهلاك مشتركين .</p>	<p>7. مراقبة الرقابة ومتابعة حل مشاكل العداد.</p>
<ul style="list-style-type: none"> • إتخاذ الاجراءات المناسبة لحل مشاكل المياه وفقا لتعليمات لشخص مختل . 	<ul style="list-style-type: none"> • شعبة ادارة عدادات دفع مسبق. 	<p>7.2 كمل على حل مشاكل عدادات مياه.</p>	

<ul style="list-style-type: none"> • إيجاد سبب المشكلة وفد £ • لقرءاءة w@ فريية . • يلب w@ ساءة م م مركز • w@ يانة w@ تابع للشركة w@ موردة • z لم . • w@ kml على إيجاد حل w@ مشكلة • w@ w@ د بالتعاون مع مركز • صيانة الشركة w@ موردة . • إتخاذ الاجراءات w@ مناسبة لحل • شكاو , لمشتركين . 			
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الفصل الثاني - فصل 5.1 اد مشترك الدفع المسبف و اجراءات نقل مكان عداد w@ مع w@ مسبف .

5.1 فصل اشتراك الدفع مسبف و نقاء كان w@ داد w@ فع المسبف .

كتم ف w@ ل w@ اد مشترك لدفع w@ مسبق w@ موافقة على طلب فصل الاشتراك w@ م w@ مركز خدمات w@ - w@ هور ، w@ كتين w@ طلب ل w@ ف w@ حال w@ م w@ w@ ففة w@ - w@ w@ ك w@ الق بنقل مكان w@ w@ ف w@ سبب w@ بشكل w@ ساسد w@ مكا w@ قام w@ مشترك w@ و w@ ك تم نقاء م يلب نقل w@ د عند انتقال w@ مشترك إلى مكان آخر في w@ w@ كة نفسها .

5.2 تفصيل الاجراءات w@ نيسية لفصل اشتراك w@ فع المسبف .

يلخ w@ لجدول 5.1 تسلسل الاجراءات w@ رئيسية w@ ل اشتراك w@ فع لمسبق

جول 5.1 اجراءات فصل w@ اد اشتراك الدفع مسبف .

تسلسل الاجراءات الرئيسية	تفاصيل الاجراءات w@ نيسية	الاقسام w@ مسؤولة	الاور الواجب التحقق منها
1. طلب فصل الاشتراك .	1.1 تباينة نموذج 1 يلب فصل لاشترك وارمها إلى شعبة ادارة بيانات لمشتركين.	مركز خدمات w@ - w@ هور	• w@ w@ بيانات اللازمة مثل w@ سم • لمشترك و رقم الهوية و رقم لهاتف والعنوان .. الخ .
	1.2 w@ لتحقق من بياناته لطلب ومعلومات المشتركين.	شعبة إدارة بيانات w@ مشترك w@	• w@ لتأكد من رقم اشتراكه w@ ياه ورقم هوية w@ مشترك وتاريخ يلب فصل لاشترك .
	1.3 w@ بدء بتنفيذ w@ مال فصل لاشترك .	شعبة إدارة w@ انات لمشترك w@	
2. أعمال w@ الاشتراك	2.1 إحصاء w@ انات w@ مشتركين من برنامج الدفع w@ سبق وال GIS.	شعبة إدارة بيانات w@ مشترك w@ و قسم التخطيط و w@ و w@ مشاريع .	• معلومات المشترك . • مكان اقامة w@ مشترك . • وقت w@ م . • رقم w@ اد .
	2.2 إزالة عداد w@ لمسبق و و ع سدة على نهاية الخط.	شعبة إدارة w@ دات لدفع w@ مسبق .	• فد £ رقم w@ د . • فحص كفاءة w@ اد . • و ع سدة على نهاية الخط • w@ رود للخدمة . • لتقاضي صورة لمكان w@ م .

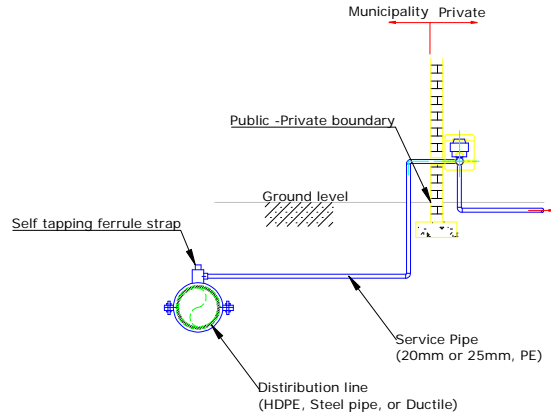
3. مال مكتبية.	3.1 إعداد تقرير فصل عداد لدفع مسبق.	قسج لتد ط وإرة شاريع .	• إعداد تقرير فصل عداد لدفع مسبق. • أرفاف لتقرير.
3.2 لتجهيد فحو § د w ك تم تنفيذها م قبل وورد.	شعبة إدارة ت دات لدفع مسبق.	• تنفيذ فحص دق فاد باستخدام ماكنة فحص عداد w و v . • يلب « ت مال الصيانة و ك زم الأمر.	
3.3 ت ك انات لمشتر « على برنامج الدفع w مسبق.	شعبة إدارة ت دات لدفع مسبق وشعبة إرة	• ت ك انات لمشتر « على برنامج الدفع لمسبق وفت ت ت ك ر فصل ت اد الدفع لمسبق.	
3.4 ستلام عداد w فح w مسبق لتي تم فد ها من قبل w مورد.	شعبة إرة ت دات لدفع المسبق و مكار مستودع أ ر w مياه و w ر w ر w ر w ر .	• توجيه مكار المستودع و ت تخزين عداد w ك تي تم صيانتها. • توجيه مدي w مستودع إلى حذ أ أرقام عداد w تي لم يتم صيانتها من قائمة جرد w موجودات .	

5.3 تفصيل الإجراءات الرئيسية لنقل عدادات الدفع مسبق.

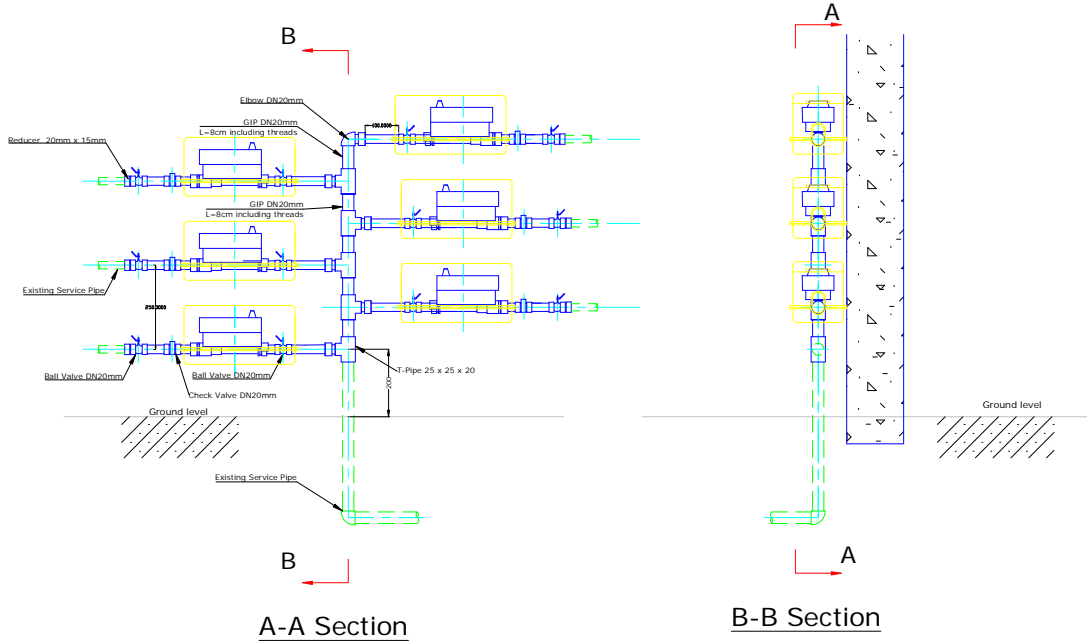
K لخص w- ول 5.2 تسلسل الإجراءات الرئيسية لنقل عداد w فح لمسبق .

5.2 تسلسل الإجراءات الرئيسية لنقل عدادات الدفع المسبق .

تسلسل الإجراءات الرئيسية	تفاصيل الإجراءات الرئيسية	قسام مسؤولة	الأمر الواجب التحقق منها
1. طلب نقد الواد .	1.1 تهيئة نموذج 1 يلب نقل w ك وإرفاف إلى شعبة إدارة بيانات w لمشترين.	مركز خدمات w- v هور	• ذ أ إجراءات ف ر ل الاشتراك .
1.2 تلتحق من بيانات لطلب ومعلومات المشركين.	1.2 شعبة إدارة بيانات w مشتر « .	• رقم الهوية . • رقم اشتراك w ياه . • و ف و ك w تركيب ت ك د الدفع w مسبق.	
1.3 بدء « ت مال نقل w ك اد.	1.3 شعبة إدارة بيانات w مشتر « .		
2. مسح المحصن كاني موقع تركيب العداد.	• تنفيذ مسح w ك هدف إلى فحص w موقع w ك لتركيب w عداد والتأكد من ملائمة فنيا للتركيب. • فد ك بقاء تمل ت ك الدفع w مسبق. • يلب استئجار عادم w مسبق لحالي بعداد جديد إن و ك زم م ر .		
3. أعمال نقل الاشتراك .	• ك تم « نقل لاشترتك و ففت و ج ت ك ت w كورة سابقا.		
4. أعمال التركيب.	• تنفيذ مسح w ك ل فني w كان تركيب w عداد.		
5. الأعمال مكتبية .	• إتباع نفس آ ج ر ات المتبعة عد ر ل الاشتراك.		



6.1 كسفت جانبي لخط توزيع المياه وصول الماء المنزلي.



6.2 تركيب العدادات المسبوق للشقق السكنية.

ومع ذلك ، وفي كثير من الأحيان سيواجه طاقم الفني الكثير من الحالات الصعبة التي تتطلب بل كان التركيب وسهولة الوصول إلى العداد وخاصة عند تركيب الشقق السكنية. وفي صور 6.4 و 6.5 مثالاً ؛ على هذا في حالات الصعبة التي واجهها طاقم إني في موقع .

فتسلياً رورة 6.4 وضوء على حالة عدم توفر مساحة مناسبة لتركيب الكو ، إلا فيلارغم من ذلك تم تركيب الكو اد بناءً على ما (طاقم إني) مناسباً.

ومما يميز ، في رورة 6.5 ، طريقة تثبيت الكو اد تحده مستوى سطح الأرض / الجدران ؛ التي ريانة تتطلب (طاقم إني) د فوق مستوى سطح لأر D .



صورة 6.2 طريقة التركيب العمود .



صورة 6.3 طريقة التركيب الأفقي.



صورة 6.4 تركيب عدادات دفع مسبق الدفع السكنية .



صورة 6.5 تركيب عداد دفع مسبق الدفع تحت مستوى الأرض .



صورة 6.6 وجود مكان لتركيب عدادات دفع المسبق .



صورة 6.7 تركيب عدادات الدفع المسبق في مساحة «يقة» .

وتمثل الصورة 6.6 و الصورة 6.7، أسوأ حالات تركيب عدادات الدفع المسبق التي واجهها لطاقم إني في موقع . فالصورة 6.6 كان مكان تركيب عبارة «فتحة مجوفة في الـ» ولم يكن هنالك مساحة كافية لتركيب عدادات الدفع المسبق لمطلوبة؛ لذلك كان هناك حاجة إلى نقل وصلات البلاستيكية بها إلى مكانها في الصورة 6.7، تم تركيب عدادات الدفع المسبق بصعوبة كبيرة تم ثني وصلات وصلات وأسلاك الخارجة إلى خارج المشترك بالإضافة إلى نقل الوصل إلى مكان مناسب من تركيب عداد بالشكل .

الفصل السابع. استحداث محطات الشحن .

7.1 مراحل استحداث محطات الشحن (Vending Stations) في مدينة جنين.



الشكل 7.1 تسلسل مراحل استحداث محطات الشحن

تتمثل عملية استحداث محطات الشحن (VS) في توفير الظروف المناسبة لتمكين المشتركين من شحن سياراتهم ؛ ولتحقيق هذا الهدف تم الإتفاق على استحداث محطات الشحن في الأماكن التي يسهل على المشتركين الوصول إليها وعليه تم اختيار (محلات السوبرماركت ب) (SY) كبديل الجاهزة للبلدية ؛ فتعتمد عملية شحن بطاقة عدداً (6) دفع المسبق في محلات السوبرماركت على (PALPAY) في (SY) يتم شحنها في (SY) ببلدية خلال الدفع.

وصولاً إلى تشرين الثاني 2021م تم فتح 10 محلات سوبرماركت لتقديم خدمة شحن بطاقات مشتركي عدادات الدفع المسبق (6) لخدمة (6) وقربها للمستهلكين. بالإضافة لمحطتي شحن (6) للبلدية ويتم توفير (6) قبل (6) بلديتها وقربها كالتالي 1 في مكتب جباية البلدية في وسط المدينة والثاني في دائرة المياه والصرف الصحي.

شرح الشكل 7.1 تسلسل الإجراءات الرئيسية لاستحداث محطات الشحن.

وتتمثل الإجراءات الرئيسية لاستحداث محطات الشحن (VS) في البحث عن المحلات المناسبة وإعدادها ؛ على سبيل المثال : في حال إيجاد محلات السوبرماركت المناسبة (6) لها لتقديم خدمة شحن بطاقات مشتركي عدادات الدفع المسبق ؛ يتولى طاقم شعبة إدارة عدادات الدفع المسبق في قسم خدمة المشتركين مهمة تزويد محلات السوبرماركت بالمختار بقارئ بطاقات عدادات الدفع المسبق وتثبيت برنالي الشحن وتقييم التدرجات اللازمة لتشغيل البرنالي. ..ألا 1 أما بالنسبة لاستحداث محطات الشحن في مكاتب البلدية فلا يتم توفير البرنالي التالية :

(1) توفير وحدات محطة الشحن (كمبيوتر وطابعة ووحدة قراءة البطاقة) وتثبيت برنالي الشحن .

(2) تركيب اقم البلدية على كيفية توفير محطة الشحن .

تبدأ أعمال متابعة عملية شحن ولاقمة مكالمة كتنها 2 من تركيب محطات الشحن (VS) في الأماكن المختارة .

7.2 تفصيل الإجراءات والطواقم المسؤولة والأمور التي يجب التأكد منها.

يشرح الجدول 7.1 تفاصيل الإجراءات الرئيسية لاستحداث محطات الشحن .

جول 7.1 تفصيل الإجراءات الرئيسية والطواقم المسؤولة والأمور الواجب التحقق منها .

تسلسل الأعمال الرئيسية	تفاصيل الإجراءات الرئيسية	الأقسام المسؤولة	الأمور الواجب التحقق منها
1. إيجاد محلات سوبرماركت مناسبة.	1.1 إيجاد محلات السوبرماركت المناسبة.	شعبة إدارة wkwk الدفع المسبق في قسم wkwk المشتركون .	• إمكانية الوصول . • تقديم توصية بأفضل محلات السوبرماركت لتقديم خدمة الشحن .
	1.2 القران wkwk الخاصة للتوصية.	Pal Pay	
2. استحداث محطات الشحن.	2.1 فحص المواصفات الفنية لجها- الكمبيوتر في محل السوبرماركت وإمكانية توظيفه على استحداث محطة الشحن.	شعبة إدارة wkwk الدفع المسبق	• فحص ½ الموصف wkwk الفاية لجهاز الكمبيوتر في محل السوبرماركت wkwk وظيفته عند استحداث محطة الشحن
	2.2 تثبيت wkwk; الرفع المسبق.	شعبة إدارة wkwk الدفع المسبق	• تزويد محل السوبرماركت بوحدة قارئ الكرت... الخ. • تثبيت برنامج wkwk; الدفع المسبق.
	2.3 إعداد برنامج الرفع المسبق.	wkwk الدفع المسبق.	• التأكيد على عمل wkwk; الدفع المسبق.
	2.4 تدريب الموظفين.	wkwk الدفع المسبق و/او شعبة إدارة wkwk; الدفع المسبق.	
3. المتابعة ومعالجة المواقف.	3.1 متابعة استهلاك wkwk; المشتركون المياه.	شعبة إدارة wkwk; الدفع المسبق.	• المتابعة اليومية لمبالغ الشحن وملازمة wkwk; الشحن غير الطبيعية . • الإبلاغ عن الحاس wkwk; المشكوك فيها لل wkwk; اقم المسؤولة.
	3.2 لجنة المشاكل المتعلقة بأم ² محطة الشحن.	شعبة إدارة wkwk; الدفع المسبق.	• قيام الطواقم المختصة wkwk; wkwk; wkwk; wkwk; لجنة المشاكل wkwk; قبل الطواقم المختصة .



صورة 1-5 تثبيت محطة الشحن .



صورة 2-5 التدريب على استخدام محطة الشحن.

الفصل الثامن. تركيب اللواقط الهوائية (Gateways).

8.1 تركيب اللواقط الهوائية (Gateways).

وضح الشكل 8.1 تسلسل خطوات تركيب اللواقط الهوائية.



وكخطوة أولية؛ لا بد من إيجاد الأماكن المناسبة لتركيب اللواقط الهوائية والتي يجب أن تمتاز بعلو وكثافة وخلو المنطقة من العقبات والموقع التي تمنع إمكانية عملها المشترك وعلوه عليه تم اقتراح تركيب اللواقط الهوائية على الأماكن المسطحة وأسطح المباني السكنية.

و يجب اختيار الموقع المناسبة يتم تنفيذ مسح الأرض المحيطة بالموقع والتفاوض مع المالك للمكان للحد من على ارتفاعه لاستخدام المكان؛ ولا بد أن تتوفر الشروط التالية في الموقع المختار (1) ارتفاع مناسب و (2) المنطقة الحرة من العقبات و (3) توفر الطاقة الكهربائية.

وبمجرد الموافقة مالك المكان على تركيب اللواقط الهوائية تتوجه الشركة الفنية

المختصة للمكان؛ لتركيب اللواقط الهوائية وفرد 1/2 بوصة للإشارة المرسله

شكل 8.1 تسلسل خطوات تركيب اللواقط الهوائية

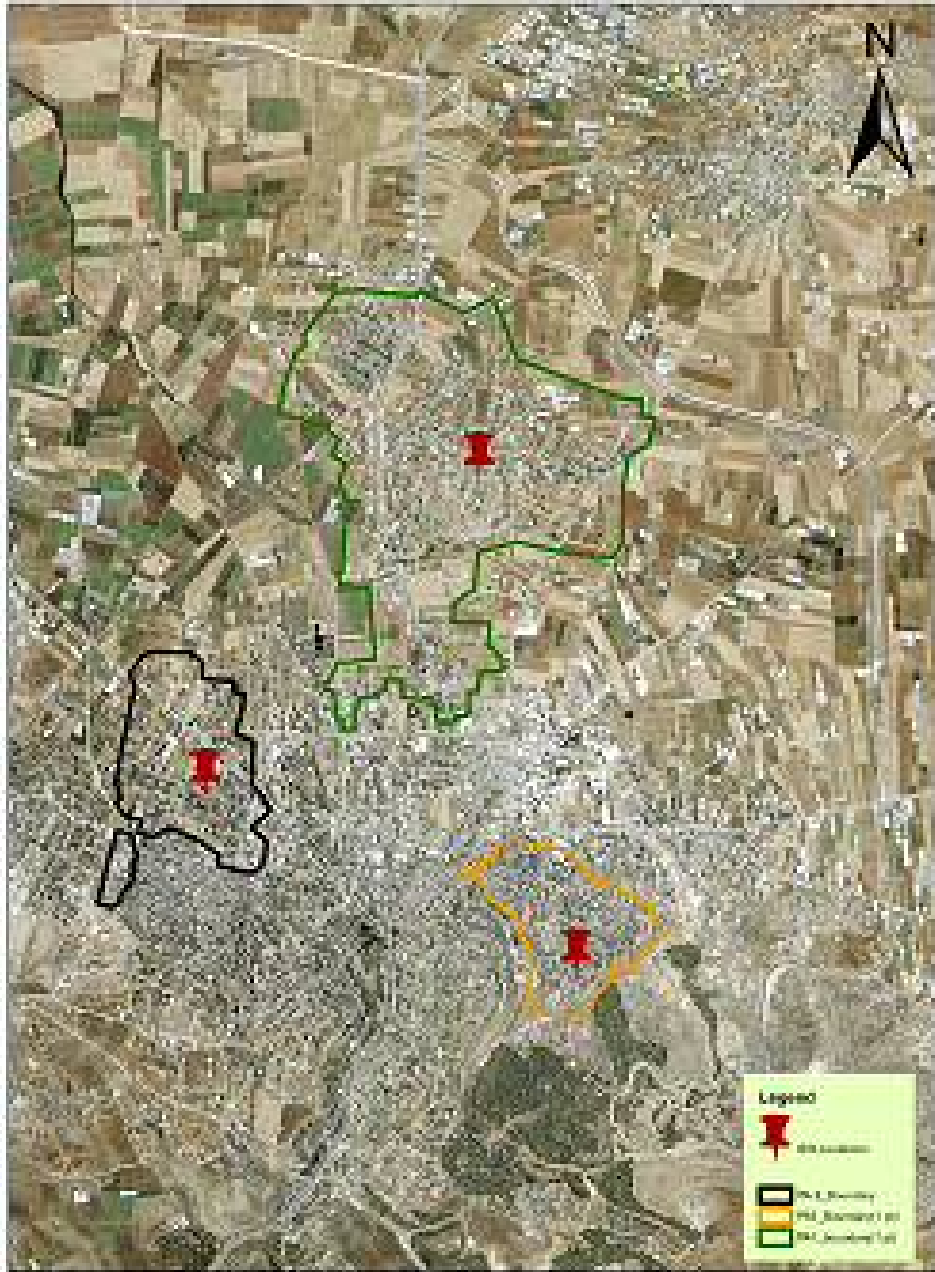
عندما يتم التعرف على جميع عناصر الدفع المسبق المركبة في المنطقة وظهورها على جهاز الكمبيوتر في مكتب الشركة المشترك واستقبالها فهذا يدل على كفاءة عمل اللواقط الهوائية والعكس فلا بد من وجود عقبات دون تمكن اللواقط الهوائية من الالتقاط جميع الإشارات المرسله

وحتى هذه اللحظة تم تركيب اللواقط الهوائية على المباني المسطحة وأسطح المباني السكنية كما هو موضح في الفقرة 8.1 و 8.2. وبدء كل أساسي يجب تركيب اللواقط الهوائية في الأماكن ذات ارتفاع مناسب.

يلخص الجدول 8.1 مراحل تركيب اللواقط الهوائية (Gateways).

جدول 8.1 تفصيلة الإجراءات والأقسام المسؤولة والأورث واجباتها

تسلسل الإجراءات الرئيسية	تفاصيل الإجراءات الرئيسية	الأقسام المسؤولة	الأمر الواجب التحقق منها
1. تيار موقع التركيب.	1.1 البحث عن الأماكن المناسبة لتركيب اللواقط الهوائية.	شعبة إدارة الدفع المسبق.	• المباني أو البنايات المرتفعة. • المساحات.
2. الفحص الحثي لموقع التركيب والتفاوض مع المالك للحصول على موافقته.	2.1 التفاوض مع المالك للمكان لتركيب اللواقط الهوائية على أسطح البنايات والمساحات. 2.2 التأكد من وجود مصدر للطاقة الكهربائية.	شعبة إدارة الدفع المسبق.	• التأكد من وجود مصدر للطاقة لشحن اللواقط الهوائية.
3. تركيب اللواقط الهوائية وفحص قوة الإشارة.	2.1 استلام أجهزة اللواقط الهوائية والصيانة والصرف الصحي.	شعبة إدارة الدفع المسبق والإدارة والمياه والرفاهية.	• استلام أجهزة اللواقط الهوائية والصيانة والصرف الصحي. • تحديث قائمة موجودات الدفع المسبق قبل تركيبها.
	2.2 تركيب اللواقط الهوائية في الأماكن المختارة.	شعبة إدارة الدفع المسبق.	• فحص الإشارة المرسله على جهاز الكمبيوتر المستخدم في مكتب قسم المشتركين. • نقل اللواقط الهوائية وتركيبها في أماكن أخرى في حال كانت الإشارة ضعيفة.



صورة 8.1 خار 8.1: أقع تركيب اللواقط العلية.



6.1 تركيب لاقط هوائي على K6 ائنة مسة .G.



صورة 6.2 تركيب لاقط هوائي على سطح @مارة .



صورة 6.3 أجهزة اللواقط الهوائية.



صورة 6.4 صدر طاقة ل@ح- اللواقط الهوائية .

فصل ٩.١ . تصنيف مشكلات النظام

وبمجرد تشغيل نظام الدفع المسبق (عروض الدفع) المسبق وكلمات الشحن والواقف الهوائية تبدأ رحلة متابعة وإقابة سير عمل النظام، والتي تهدف بشكل رئيسي إلى متابعة عمل نظم الدفع المسبق بكل سلسل لإيجاد الفجوات أو الأخطاء التي قد تقع في النظام نفسه (عدادات الدفع المسبق ومحطات الـ KVA واللقط الهوائية) أو أثناء عملية تشغيله، بالإضافة إلى تقليص وقت بيوت العمل في نظم الدفع المسبق (أسبسي سيظهر اشعار تنبيهي على شاشة الكمبيوتر بمعدل مرتين في اليوم KVA و KVA وجود كل أو أخطاء في النظام وذلك وفقاً لظروف التنزيل بين عدادات الدفع المسبق واللقط الهوائية .

وفي حالة ايجاد المشكلة يقوم الطاقم لمسؤول عن متابعة عمل نظام الدفع المسبق بإرسال فني إلى الموقع لحل المشاكل لطائرة متابعة المشاكل الأخرى التي تصنف غير طارئة في أقرب وقت ممكن وإرسال فني إلى الموقع إذا لزم الأمر. ويوضح الجدول 9.1 تصنيف اشعارات المشاكل حسب جدتها .

الجدول 9.1 تصنيف اشعارات المشاكل حسب جدتها .

نوع الاضرار (اسم المشكلة)	التصنيف
1. فتح غطاء العزل.	عزل
2. إزالة غطاء البطارية .	عزل
3. انخفاض مستوى شحن بطارية العدا.	عزل
4. وضع إطفاء الحريق.	منخفض
5. إزالة قطع العزل.	عزل
6. عطل في الصمام.	عزل
7. عدم تغير قيمة الاستهلاك ¹ .	منخفض
8. انخفاض قيمة الرصيد المشحون.	منخفض

¹ تتضمن النقطة 7 حالات لقراءات الصفرية.

جدول 9.2 يوضح تفاصيل أعمال متابعة مشاكل نظام الدفع المسبق .

المهام الرئيسية	طواقم العمل المسؤولة	تفاصيل الاجراءات
1. أعمال المتابعة اليومية .	موظف متابعة ومراقبة عمل نظام الدفع المسبق في شعبة العروض عدالت الدفع المسبق.	(1) يقوم موظف متابعة ومراقبة عمل نظام عدادات الدفع المسبق بـ (شعارات لشاشة التي تفيد بـ كVA في كل ساعة على النظام (يرجى الإشارة إلى شكل 9.1). (2) في حال وجود إشعار يبرر إلى KVA في نظم الدفع المسبق، يتم إبلاغ المشرفة على عدادات الدفع المسبق فوراً، وفي حال استمرار المشكلة يقوم موظف متابعة بإرسال فني إلى موقع العدا الذي يعاني من المشكلة. (3) يتم التفتيش على كVA فني الموقع، يقوم موظف متابعة بتوجيه الفني لاتخاذ الإجراءات المناسبة (استبدال العداد أو إصلاحه أو إعادة الدفق المنزلية .. الخ) كالمسؤول في وحدة إدارة عدالت الدفع المسبق .
2. أعمال المتابعة الأسبوعية.	موظف متابعة ومراقبة عمل نظام الدفع المسبق في شعبة العروض عدالت دفع المسبق.	(1) يترتب على موظف متابعة عمل نظام عدادات الدفع المسبق العمل على تنظير فحص عدادات الدفع المسبق في كل أسبوعين لإزالة المشاكل المرصودة اليومية لأشعارات المشاكل. (2) ينبغي على موظف متابعة عمل نظام الدفع المسبق تقديم تقرير أسبوعي حول كيفية التعامل مع إشعارات المشاكل وتسليمه لرئيس قسم الخدمات المشتركين.
3. أعمال المتابعة الشهرية	موظف متابعة ومراقبة عمل نظام الدفع المسبق في شعبة العروض عدالت دفع المسبق.	(1) يجب على موظف متابعة عمل نظام عدالت الدفع المسبق إعداد تقرير شهري حول لوضع العام لعدادات الدفع المسبق وتقديمه إلى رئيس قسم الخدمات المشتركين.

Consumer Management Software

SYSTEM CONSULT OPERATIONS PREPARE CREDIT SALE OPERATIONS DEBIT OPERATIONS A/R OPERATIONS CONSUMER OPERATIONS

Create New Consumer - Edit Consumer - Consumer Contact - Debit Card - Card Payments Detail - Refund Card - Update Card Contents - Debit Operations - Debit Payment Operations - Archive Consumer - Deactivate Consumer - Scan consumer contract file

Consumer No. Mobile No. Name Last Name Status Zone Consumer Type

Enter 5th number Enter Action Consumers All Search Search By Card Number Quick Search

Drag column header and use it here to group by that column

رقم العميل	رقم الهاتف	الاسم الأخير	الاسم الأول	رقم الهاتف	نوع العميل	التاريخ التسجيل	اسم العميل	الرقم الوطني	الهاتف المحمول	رقم هاتف المنزل	مدين العميل	اسم المنطقة	نوع المنطقة	العنوان
W172	1402692	عزير	عبد الكريم	86-413	عميل	25/01/2020 11:29	عبد الكريم	98797111		818681281	2098840	مناطق	MarRegion	عزير - وادي حوران
W1728	1402695	عزير	عبد الكريم	86-413	عميل	25/01/2020 2:12	عبد الكريم	91273032		819018617	3131708	مناطق	MarRegion	الزهره - منبج - حوران
W1727	1402685	عزير	عبد الكريم	86-413	عميل	15/01/2021 8:32	عبد الكريم	91273032		819018617	3131708	مناطق	MarRegion	عزير - وادي حوران - حوران
W1720	1402674	عزير	عبد الكريم	86-413	عميل	20/02/2020 9:43	عبد الكريم			818732149	7117850	مناطق	MarRegion	عزير - حوران - حوران
W1717	1402332	عزير	عبد الكريم	86-413	عميل	22/02/2020 9:21	عبد الكريم	901750709		818681281	81541208	مناطق	MarRegion	عزير - حوران - حوران
W1722	1402681	عزير	عبد الكريم	86-413	عميل	22/09/2020 11:34	عبد الكريم					مناطق	MarRegion	عزير - حوران - حوران
W1705	1402642	عزير	عبد الكريم	86-413	عميل	23/01/2021 10:24	عبد الكريم		838477090		90882709	مناطق	MarRegion	عزير - حوران - حوران
W1714	1402695	عزير	عبد الكريم	86-413	عميل	24/09/2014 2:30	عبد الكريم	10026250			40027261	مناطق	DefaultType	حوران - حوران - حوران
W1709	1402689	عزير	عبد الكريم	86-413	عميل	25/12/2019 11:48	عبد الكريم	87480118		818681284	21377480	مناطق	MarRegion	عزير - حوران - حوران
W1752	1504	عزير	عبد الكريم	86-413	عميل	28/01/2019 22:28	عبد الكريم	1202120				مناطق	DefaultType	عزير - حوران - حوران
W1744	1402679	عزير	عبد الكريم	86-413	عميل	11/06/2020 4:35	عبد الكريم	7011202			2170418	مناطق	MarRegion	الزهره - منبج - حوران
W1729	1402684	عزير	عبد الكريم	86-413	عميل	15/08/2020 18:29	عبد الكريم	992791911		818231264	5033740	مناطق	MarRegion	عزير - حوران - حوران
W1743	1402697	عزير	عبد الكريم	86-413	عميل	25/01/2021 3:27	عبد الكريم	91489483		818271225	81541208	مناطق	MarRegion	الزهره - منبج - حوران
W1720	1402679	عزير	عبد الكريم	86-413	عميل	24/09/2020 15:22	عبد الكريم				20404340	مناطق	MarRegion	عزير - حوران - حوران
W1749	1414073	عزير	عبد الكريم	86-413	عميل	22/04/2020 19:02	عبد الكريم	941587790		818681281	71180140	مناطق	MarRegion	عزير - حوران - حوران
W1709	1402684	عزير	عبد الكريم	86-413	عميل	14/11/2020 10:35	عبد الكريم				82588340	مناطق	MarRegion	عزير - حوران - حوران
W1718	1402692	عزير	عبد الكريم	86-413	عميل	28/01/2021 4:29	عبد الكريم	47143342		818231264	21481340	مناطق	MarRegion	الزهره - منبج - حوران
W1704	1402678	عزير	عبد الكريم	86-413	عميل	28/08/2021 9:46	عبد الكريم	97488342	834727489		4713883	مناطق	MarRegion	عزير - حوران - حوران
W1748	1402643	عزير	عبد الكريم	86-413	عميل	24/07/2024 13:07	عبد الكريم	96446171	836616538		21872030	مناطق	MarRegion	عزير - حوران - حوران
W1708	1402690	عزير	عبد الكريم	86-413	عميل	19/01/2020 8:09	عبد الكريم	7038230			41481352	مناطق	DefaultType	الزهره - منبج - حوران
W1716	896	عزير	عبد الكريم	86-413	عميل	23/05/2019 22:31	عبد الكريم	93488323				مناطق	DefaultType	الزهره - منبج - حوران
W1710	1402683	عزير	عبد الكريم	86-413	عميل	21/08/2020 12:36	عبد الكريم	921700394			82134040	مناطق	MarRegion	عزير - حوران - حوران
W1729	1402689	عزير	عبد الكريم	86-413	عميل	24/09/2020 12:02	عبد الكريم	91273032		818681284	40284294	مناطق	MarRegion	عزير - حوران - حوران
W1709	1402684	عزير	عبد الكريم	86-413	عميل	20/06/2019 16:53	عبد الكريم	94235027				مناطق	MarRegion	عزير - حوران - حوران
W1765	1402700	عزير	عبد الكريم	86-413	عميل	21/08/2019 2:14	عبد الكريم	15461248			20884029	مناطق	DefaultType	عزير - حوران - حوران

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Consumer Operations Consumer Operations Consumer Operations

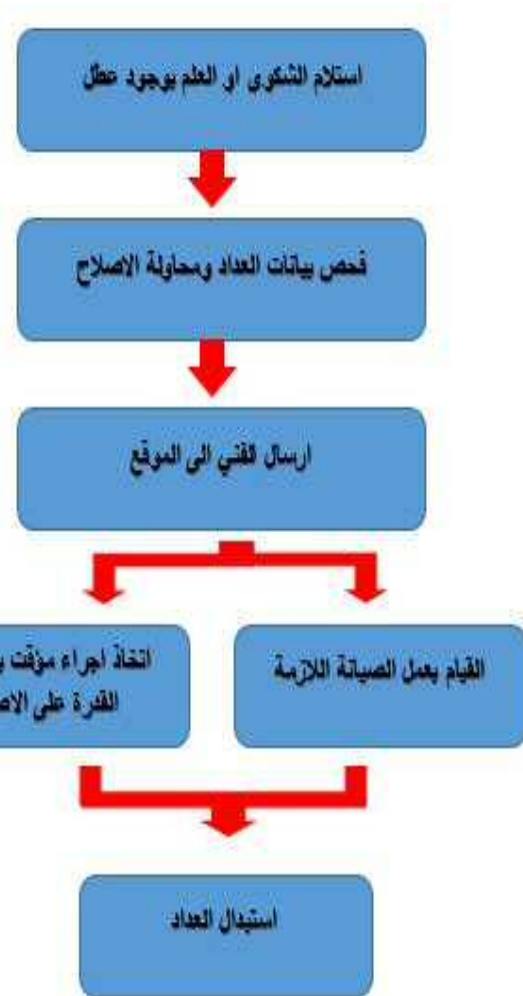
Fig.9.1 الصفحة الرئيسية لبيانات المشتركين على برنامج الؤة لمسبتي

الفصل 10. أعمال وصيانة مشكل نظام العدادات الذكية

10.1 مشكل وصيانة العدادات الذكية

يقتصر المشكل فقط على بيعة نظام التزويد بالغاز؛ لكنها قد تشمل النظام برمجي المتبني من قبل الشركة (أو من نظام الشركة) كنظام دفع المسبق الذي يتلف عن النظام لسبب. ويتم إبلاغ شعبة إدارة العدادات بالمشاكل التي يواجهها مشترك الدفع المسبق خلال الطريقة التالية:

- (1) وقوع شكوى - بلدية (يرجى الإشارة إلى شكل 10.2 و 10.3).
- (2) أعمال المتابعة اليومية .
- (3) المشاكل الواسعة - المرسل عبر تطبيق الهاتف أو لمكالمات الهاتفية .
- (4) الإبلاغ المباشر عن المشكلة من قبل الحضور لشخصي إلى قسم خدمات التركيب.



يوضح الشكل 10.1 تسلسل الإجراءات المتبعة لمعالجة مشكل نظام الدفع المسبق. يجب أن يكون المشكل في النظام؛ يقوم موظف شعبة التزويد بالغاز بالتحقق من وصول العداد على تفاصيل لمشكلة التي يواجهها العداد أو من خلال استفسار المباشر عند فريق التزويد بالغاز. يتم إرسال الفني إلى الموقع لإجراء الصيانة اللازمة عن المشكلة التي تواجهه.

ثم يقوم موظف شعبة إدارة عدقات الدفع المسبق بسد البيانات العطل أو الذي يعاني من مشكلة من بيانات نظام الدفع المسبق لتشخيص المشكلة بشكل أدق. وفي حال عدم قدرة موظفي التزويد بالغاز على حل المشكلة خلال إعادة إدخال بيانات العداد؛ يقوم موظف شعبة إدارة عدقات الدفع المسبق بإرسال الفني إلى الموقع للعداد.

وعليه سيحصل الفني قسم خدمات المشتركين لعمل على حل مشكل العداد في الموقع وسيتم إبلاغ شعبة إدارة عدقات الدفع المسبق بحال كانت المشكلة خارجة عن سيطرته .

في حال كانت المشكلة بعنصر الدفع المسبق سيقيم الفني باستبدال عداد الوكيل المناسب لحالي بعداد ميكانيكي بشكل مؤقت؛ لإرسال عداد الدفع المسبق المعطل إلى مركز الصيانة التابع للمورد (شركة فيوري) في حالة بلدية جنين؛ وبعدها انتهاء فترة صيانة عداد الوكيل المسبق يتم تركيبه مرة أخرى للمستهلك. في حال عدم نجاح عملية صيانة عداد الدفع المسبق المعطل يتم استبدال عداد المشترك بميكانيكي بعداد دفع مسبق.

10.1، سلسلة إجراءات المتبعة لمعالجة مشاكل نظام الدفع المسبق .



#	التاريخ	الوقت	الاسم	العنوان	الرقم
15043	09-36 21/11/2021	11:10	عبد الرحمن محمد مسطفي	دارة المياه والصرف الصحي	099745966
15012	11-22 18/11/2021	11:22	محمد علي حبيب	دارة المياه والصرف الصحي	099793887
14910	09-46 14/11/2021	09:46	عبد الحامد محمد جوي	دارة المياه والصرف الصحي	099789784
14710	12-44 01/11/2021	12:44	خالد محمد شوقي	دارة المياه والصرف الصحي	099987377
14707	11-43 01/11/2021	11:43	محمد جوي	دارة المياه والصرف الصحي	099902488
14611	10-38 21/10/2021	10:38	عبد الحامد محمد جوي	دارة المياه والصرف الصحي	099705536
14489	10-52 20/10/2021	10:52	أحمد محمد	دارة المياه والصرف الصحي	099841234
14300	08-28 11/10/2021	08:28	عبد الحامد محمد جوي	دارة المياه والصرف الصحي	099741411
14194	09-45 02/10/2021	09:45	عبد الحامد محمد جوي	دارة المياه والصرف الصحي	099952137

الاورز 10.3 قائمة لشكاوى - على موقع بلدية جنين .

10.2 أنق لشكاوى - التي يقدمها مشتركو خدمة المياه في بلدية جنين.

يوضح الجدول 10.1 تصنيف الشكاوى التي تقدمها مشتركو خدمة المياه في بلدية جنين. فمنذ تشرين الأول 2021 تعامل قسم المياه مع 700 شكوى تتعلق بـ 10.2 أنق لشكاوى - التي تقدمها مشتركو خدمة المياه في بلدية جنين. يوضح الجدول 10.1 تصنيف الشكاوى التي تقدمها مشتركو خدمة المياه في بلدية جنين. فمنذ تشرين الأول 2021 تعامل قسم المياه مع 700 شكوى تتعلق بـ 10.2 أنق لشكاوى - التي تقدمها مشتركو خدمة المياه في بلدية جنين. يوضح الجدول 10.1 تصنيف الشكاوى التي تقدمها مشتركو خدمة المياه في بلدية جنين. فمنذ تشرين الأول 2021 تعامل قسم المياه مع 700 شكوى تتعلق بـ 10.2 أنق لشكاوى - التي تقدمها مشتركو خدمة المياه في بلدية جنين.

جاول 10.1 أنواع الشكاوي التي يقدمها مشتركين خدمة المياه في بلدية جنين.

الملاحظات	عدد الشكاوي الإجمالي (تشرين الأول 2019 - تشرين الأول 2021)	نوع الشكاوى
يقسم النوع 1 (شكاوي إلى 1) تسريب في خط لتوزيع الرئيسي. 2) تسريب في 4/4 مياحة لمستخدمي أو 4/4 المندولية. يتم اتخاذ إجراء لمستخدمي قبل 15 دقيقة من تسريب المياه. يتم تنفيذ الفحص الفني (زيارة الموقع).	78	تسريب مياه
1) عطل فني في عداد (لدفن المسبق). 2) خطأ في استخدام العداد. 3) ترويق العداد. 4) تسريب في عداد العداد. 5) عطل فني في عداد العداد. 6) تسريب في عداد العداد. 7) عطل فني في عداد العداد. 8) تسريب في عداد العداد. 9) عطل فني في عداد العداد. 10) تسريب في عداد العداد. 11) عطل فني في عداد العداد. 12) تسريب في عداد العداد. 13) عطل فني في عداد العداد. 14) تسريب في عداد العداد. 15) عطل فني في عداد العداد. 16) تسريب في عداد العداد. 17) عطل فني في عداد العداد. 18) تسريب في عداد العداد. 19) عطل فني في عداد العداد. 20) تسريب في عداد العداد. 21) عطل فني في عداد العداد. 22) تسريب في عداد العداد. 23) عطل فني في عداد العداد. 24) تسريب في عداد العداد. 25) عطل فني في عداد العداد. 26) تسريب في عداد العداد. 27) عطل فني في عداد العداد. 28) تسريب في عداد العداد. 29) عطل فني في عداد العداد. 30) تسريب في عداد العداد. 31) عطل فني في عداد العداد. 32) تسريب في عداد العداد. 33) عطل فني في عداد العداد. 34) تسريب في عداد العداد. 35) عطل فني في عداد العداد. 36) تسريب في عداد العداد. 37) عطل فني في عداد العداد. 38) تسريب في عداد العداد. 39) عطل فني في عداد العداد. 40) تسريب في عداد العداد. 41) عطل فني في عداد العداد. 42) تسريب في عداد العداد. 43) عطل فني في عداد العداد. 44) تسريب في عداد العداد. 45) عطل فني في عداد العداد. 46) تسريب في عداد العداد. 47) عطل فني في عداد العداد. 48) تسريب في عداد العداد. 49) عطل فني في عداد العداد. 50) تسريب في عداد العداد. 51) عطل فني في عداد العداد. 52) تسريب في عداد العداد. 53) عطل فني في عداد العداد. 54) تسريب في عداد العداد. 55) عطل فني في عداد العداد. 56) تسريب في عداد العداد. 57) عطل فني في عداد العداد. 58) تسريب في عداد العداد. 59) عطل فني في عداد العداد. 60) تسريب في عداد العداد. 61) عطل فني في عداد العداد. 62) تسريب في عداد العداد. 63) عطل فني في عداد العداد. 64) تسريب في عداد العداد. 65) عطل فني في عداد العداد. 66) تسريب في عداد العداد. 67) عطل فني في عداد العداد. 68) تسريب في عداد العداد. 69) عطل فني في عداد العداد. 70) تسريب في عداد العداد. 71) عطل فني في عداد العداد. 72) تسريب في عداد العداد. 73) عطل فني في عداد العداد. 74) تسريب في عداد العداد. 75) عطل فني في عداد العداد. 76) تسريب في عداد العداد. 77) عطل فني في عداد العداد. 78) تسريب في عداد العداد. 79) عطل فني في عداد العداد. 80) تسريب في عداد العداد. 81) عطل فني في عداد العداد. 82) تسريب في عداد العداد. 83) عطل فني في عداد العداد. 84) تسريب في عداد العداد. 85) عطل فني في عداد العداد. 86) تسريب في عداد العداد. 87) عطل فني في عداد العداد. 88) تسريب في عداد العداد. 89) عطل فني في عداد العداد. 90) تسريب في عداد العداد. 91) عطل فني في عداد العداد. 92) تسريب في عداد العداد. 93) عطل فني في عداد العداد. 94) تسريب في عداد العداد. 95) عطل فني في عداد العداد. 96) تسريب في عداد العداد. 97) عطل فني في عداد العداد. 98) تسريب في عداد العداد. 99) عطل فني في عداد العداد. 100) تسريب في عداد العداد.	108	عداد مياه معطل
يتم نقل العداد المشترك على طلب المشترك.	17	نقل العداد
1) عطل إلكتروني أو فني في عداد الدفع المسبق. 2) سوء فهم في طرفي المشتركين في حقل العداد. 3) تسريب في عداد العداد. 4) عطل فني في عداد العداد. 5) تسريب في عداد العداد. 6) عطل فني في عداد العداد. 7) تسريب في عداد العداد. 8) عطل فني في عداد العداد. 9) تسريب في عداد العداد. 10) عطل فني في عداد العداد. 11) تسريب في عداد العداد. 12) عطل فني في عداد العداد. 13) تسريب في عداد العداد. 14) عطل فني في عداد العداد. 15) تسريب في عداد العداد. 16) عطل فني في عداد العداد. 17) تسريب في عداد العداد. 18) عطل فني في عداد العداد. 19) تسريب في عداد العداد. 20) عطل فني في عداد العداد. 21) تسريب في عداد العداد. 22) عطل فني في عداد العداد. 23) تسريب في عداد العداد. 24) عطل فني في عداد العداد. 25) تسريب في عداد العداد. 26) عطل فني في عداد العداد. 27) تسريب في عداد العداد. 28) عطل فني في عداد العداد. 29) تسريب في عداد العداد. 30) عطل فني في عداد العداد. 31) تسريب في عداد العداد. 32) عطل فني في عداد العداد. 33) تسريب في عداد العداد. 34) عطل فني في عداد العداد. 35) تسريب في عداد العداد. 36) عطل فني في عداد العداد. 37) تسريب في عداد العداد. 38) عطل فني في عداد العداد. 39) تسريب في عداد العداد. 40) عطل فني في عداد العداد. 41) تسريب في عداد العداد. 42) عطل فني في عداد العداد. 43) تسريب في عداد العداد. 44) عطل فني في عداد العداد. 45) تسريب في عداد العداد. 46) عطل فني في عداد العداد. 47) تسريب في عداد العداد. 48) عطل فني في عداد العداد. 49) تسريب في عداد العداد. 50) عطل فني في عداد العداد. 51) تسريب في عداد العداد. 52) عطل فني في عداد العداد. 53) تسريب في عداد العداد. 54) عطل فني في عداد العداد. 55) تسريب في عداد العداد. 56) عطل فني في عداد العداد. 57) تسريب في عداد العداد. 58) عطل فني في عداد العداد. 59) تسريب في عداد العداد. 60) عطل فني في عداد العداد. 61) تسريب في عداد العداد. 62) عطل فني في عداد العداد. 63) تسريب في عداد العداد. 64) عطل فني في عداد العداد. 65) تسريب في عداد العداد. 66) عطل فني في عداد العداد. 67) تسريب في عداد العداد. 68) عطل فني في عداد العداد. 69) تسريب في عداد العداد. 70) عطل فني في عداد العداد. 71) تسريب في عداد العداد. 72) عطل فني في عداد العداد. 73) تسريب في عداد العداد. 74) عطل فني في عداد العداد. 75) تسريب في عداد العداد. 76) عطل فني في عداد العداد. 77) تسريب في عداد العداد. 78) عطل فني في عداد العداد. 79) تسريب في عداد العداد. 80) عطل فني في عداد العداد. 81) تسريب في عداد العداد. 82) عطل فني في عداد العداد. 83) تسريب في عداد العداد. 84) عطل فني في عداد العداد. 85) تسريب في عداد العداد. 86) عطل فني في عداد العداد. 87) تسريب في عداد العداد. 88) عطل فني في عداد العداد. 89) تسريب في عداد العداد. 90) عطل فني في عداد العداد. 91) تسريب في عداد العداد. 92) عطل فني في عداد العداد. 93) تسريب في عداد العداد. 94) عطل فني في عداد العداد. 95) تسريب في عداد العداد. 96) عطل فني في عداد العداد. 97) تسريب في عداد العداد. 98) عطل فني في عداد العداد. 99) تسريب في عداد العداد. 100) عطل فني في عداد العداد.	75	إفقا عداد المياه
يتم نقل العداد المشترك على طلب المشترك.	49	تعريب - كرت شحن عداد لدفن المسبق/ عدم التوافق بين كرت الشك و عداد الدفن المسبق.
تدارك مشكلة ك خلال أنشطة حملات التوعية لزيارات منزلية لبيانات مشتركين. الخ. في مكان قسم خدمات المشتركين. تم حل المشكلة في 100% من الحالات الأولية التي تسبق تركيب عداد الدفع المسبق.	28	ك ك لندري: عدم معرفة المشترك بكيفية شحن كرت عداد مياه الدفن المسبق.
تحدثت المشكلة في 100% من الحالات الأولية التي تسبق تركيب عداد الدفع المسبق.	233	عدم وجود مياه (1/4 امام العداد كخلق).
تحدثت المشكلة في 100% من الحالات الأولية التي تسبق تركيب عداد الدفع المسبق.	80	انقطاع المياه
تحدثت المشكلة في 100% من الحالات الأولية التي تسبق تركيب عداد الدفع المسبق.	45	للب تفعيل وضع إ-فاه الحريغ.
المجموع	713	

يتناول الجدول 11.1 الشكاوى المتعلقة بعدادات الدفع لمسيبيغ التي تم تسجيلها خلال العام 2021. مع توضيح وتقييم المشكلة ؛ بحيث يشير إلى ¼ " مرتفعة " إلى ¼ "متوسطة" إلى حدٍ المشكلة في بعض الأحيان ،في حين تم استخدام ¼ " منخفضة" للمشكل النادر حدوثها.

جاءل 10.2 المشكل المتعلقه بعدادات الدفع المرمـ والتي تم تسجيلها 2021.

وتيرة حدوث المشكلة	سبب المشكلة	العدد	نوع مشكلة عداد الدفع المرمـ.
مرتفعة	رصيد الشحن، إبرة طاء العف، خلل في عمل الحسة wms (العدال)	39	¼ مام كغلق (فشل في إلام)
منخفضة	عطل فني في عداد الدفع لمسيبيغ.	2	إلام نتيجة انخفاض كستوى شكا بطاريات.
مرتفعة	عطل فني في عداد الدفع لمسيبيغ أو الضغط العالي في شبكة المياه .	39	تسريب مياه إلى خل العف.
منخفضة	عطل فني في عداد الدفع لمسيبيغ أو الضغط العالي في شبكة المياه .	3	تسريب مياه (إلى داخل عداد الدفع لمسيبيغ) و اغلاق ال مام 1*
منخفضة	خطأ تشغيلي من قبل المشتري wms عطل فني في عداد الدفع لمسيبيغ.	3	وضوء الحريق (مفعل دائما).
منخفضة	عطل فني في عداد الدفع لمسيبيغ	3	(لبطارية (معطلة).
منخفضة	عطل فني في عداد الدفع لمسيبيغ	1	تعرفه المياه خائنة.
منخفضة	عطل فني في عداد الدفع لمسيبيغ	1	خطأ في رقم العف لمتسلسل.
متوسطة	خطأ في عداد الدفع أو عطل في العف أو خلل في عمل العف الداخلي للعدال.	13	رجوع المياه بشكل عكسي (خلل ال ¼ الممس الداخلي للعف).
منخفضة	سوء استخدام المشتري أو عطل فني في عداد الدفع لمسيبيغ.	3	استه 10 مرتفع او عدم وجود استهلاك.
منخفضة	عطل فني في عداد الدفع لمسيبيغ	4	عداد لا يعمل.
81	مرتفعة	111	المجموع
13	متوسطة		
17	منخفضة		

*1: تتشابه العف مع خئلة التسري و تم إدراجهم ضمن المشاكل التي تحدث بوتيرة مرتفعة .

تظهر الصور 10.1-10.4 أمثلة للموسم على كل عدادات الة لمسيبيغ. فنتناول الة 10.1 و 10.2 لمشاكل التي (ة) بوتيرين عالية ويكون سببها تسري (ة) لغطاء إلى داخل أء العف نتيجة ضغط المياه لمرتفع في لشبكة . (ة) تم التقا - الصورة 10.3 خلال فوريات لفحص التي ينفق (ة) قسم (ة) مات المشتركين وتعكس الة و (ة) ضا (ة) على الة ري (ة) (ة) (ة) هذا (ة) بتأكد على أهمية دور العلاقات العامة في زيادن وعي المشتركين لتجنب وقوع مثل (ة) الة . (ة) صورة 10.4 فتعرض أحد المثل التي يهها المشترك نتيجة خطأ في تعري كرت العداد والتي (ة) تصنيفها تحـ المشاكل التي تحدث بوتيرة منخفضة في (ة) الحالة يطلب المشترك (ة) قسم (ة) مات (ة) مشتركين اعادة تعريف كرت العداد وهو أمر مهم يصب في ¼ 3 'رضا المشتركين حول عداد الدفع لمسيبيغ وال (ة) مات التي (ة) قتها (ة) خدمت المشتركين.



الصورة 10.1: تشكل "GK" لشاشة العداد دفع الماء نتيجة تآكل مياه.



الصورة 10.2: الجزء الذي يسمح بتسريب المياه إلى داخل عداد الدفع الماء.



صورة 10.3: حرق صندوق العداد دفع الماء.



صورة 10.4: خطأ في تعريف كرت عداد دفع الماء.

10.3 الميزة والوجهة للمشاكل.

تم تلخيص الأسباب المحتملة للمشكلة المتوقعة لمشكلة العداد المسبق في الجدول 10.3 ، وتم تلخيص إجراءات التي يجب اتخاذها لاستكشاف المشكلات المذكورة وإصلاحها في الجدول 10.4. بالإضافة إلى ذلك، عند مواجهة مشاكل المشتركين، يجب على الفنيين تأجيل إصلاح العداد المسبق، ويجب على الفنيين تأجيل إصلاح العداد المسبق من هذا التخريف.

الجدول 10.3 "مشاكل عدادات دفع الماء" وإجراءات التعامل معها

نوع المشكلة	الأسباب المحتملة	إجراءات المتعاملين للمشاكل
1/4 مام كغلق (فشل في الإغلاق)	(1) رصيد الشك.	يمكن لموظف قسم خدمات المشتركين التحكم به غلق وفتح الإمام عن بعد وذلك فقط لمتر بر في تقرير فني قسم خدمات المشتركين الذي يعمل على تأكيد لوضع الفني لعدده دفع المسبق في الموقع؛ وعليه يتخذ إجراء المناسب حيال عداد لعد المسبق للمشتري فقط (يرجى الإشارة إلى جدول 10.4).
(2) مائلة غطاء العداد أو غطاء البطارية.	(2) خلل في عمل الحساسة (مجس) العداد.	
(3) خلل في عمل الحساسة (مجس) العداد.		

<p>في الوضد الطبيعي يقوم عداد الدفق المسبب بإرسال اشعار تنبيهي إلى جهاز © عند تكتشف المشترك عبر اللواقط الهوائية بمعدل مرتين في اليوم. إنه وخلال فترة لمشروع قديم عدادات الدفق المسبب بإرسال بيانات لمشارك إلى جهاز كمبيوتر لرئيسي في قبة عند تكتشف لمشاركين ل 10 مرات على التوالي الأمر الذي يسبب إلى تقليل عمر البطارية فيصبح في الضرور للعداد المورد لمناقشة أو رضانها وصيانتها .</p> <p>في 3/4 شهر إشعار التحذير لأذ يفيد بانه فاض مستوى شحن البطارية سيغلي 1/4 من وقت التشغيل بشكل تلقائي؛ ذلك تجنباً لتعطيل الجزء الإلكتروني للعداد في الفترة التي يكون فيها في وضع الكفوت. سيتم إرسال رسالة «» احتسابها في حال انتهاء البطارية.</p>	<p>(1) أخطاء في برمجة العداد (عطل فني في عدال الدفع المسبب).</p>	<p>إغلاق الظام نتيجة انخفاض مستوى شحن بطارية العداد.</p>
<p>في يؤثر تسريء الماء إلى داخل عداد الدفق المسبق على ارتفاع ضغطات المياه في الشبكة التي تفوق مستوى الضغط المسموح به يتحملة عدال الدفع المسبب.</p>	<p>(1) عطل فني في عدال الماء المسبب. (2) ارتفاع ضغطات المياه في الشبكة التي تفوق مستوى الضغط المسموح به يتحملة عدال الدفع المسبب.</p>	<p>تسريب مياه إلى داخل العداد</p>
<p>هناك ثلاثة أسباب 2) محتملة لتفعل وضد إطفاء الحريق في عداد الدفع المسبب إما نتيجة سوء استلام المشترك في نا بة أو لتفعل الماء لمكلة في ٥ ساعة، نتيجة فشل عمل الظام و أكار خارجة عن سيطرة قسم خدمات المشتركين. في تفعيل وضد إطفاء الحريق عند قيام المشترك بالضغط على زر عداد الدفق المسبق بشكل متوالي 1/4 من طريء لخطأ وبعدها سيغلي الصمام بعد يوم واحد كحد أقصى.</p>	<p>(1) سوء فة المشتركين. (2) رصيد الشحن منخفض. (3) فشل في عمل الظام (عطل فني في عدال الدفع المسبب).</p>	<p>وضع إطفاء الحريق</p>
<p>في 3/4 شهر اشطر التحذير على شاشة العداد أو التقا - لإشارة من خلال اللواقط الهوائية في يعني أن الظام الداخلي في عدال الدفع المسبق يعمل بالشكل الملائم. قد أة المشكلة نتيجة عطل ميكانيكي في الظام يعود إلى خلل فني في عدال الدفع المسبق نفسه أو في حوائط شوائب في الماء.</p>	<p>(1) عطل فني في عدال الدفع المسبب (خلل ميكانيكي في الصمام الداخلية). (2) وجود شوائب في حوائط في الماء.</p>	<p>فشل في عمل الظام</p>
<p>يتم التحقق من المشكلة عند تركيب العداد في عدال الدفع المسبب.</p>	<p>(1) عطل فني في عدال الدفع المسبب.</p>	<p>البطارية (لا تعمل).</p>
<p>في حال اكتشاف المشتر أو موظف المتابعة عدم توافق المبلغ المدفوع ورم ك رصيد الشحن الكمية التي لمستهلكة فهذا مؤشر على وجود مشكلة في تعريف أو برمجة رسوم الماء.</p>	<p>(1) عطل فني في عدال الدفع المسبب.</p>	<p>تعريف الماء</p>

<p>(1) بشكل رئيسي يجب أن يتوقف الرقعة المتصلة على العداد الخارجي مع الرقعة لظاهر على شاشة الرقعة رقم العداد لمعرف على بطارية KVA 1/2 ؛ عدا عن ذلك لن يتعرف الكرت على العداد . (2) في حال عدم إدخال الرقعة المتصلة الصحيح للعداد «رقعة العداد لن يعمل . وعليه يترتب على موظفي قس خدمات المشتركين التأكد من توفر الرقعة الخارجي الداخلي للعداد قبل التركيب .</p>	<p>(1) عطل فني في عداد الدفع لمسيبي .</p>	<p>خطأ في رقم العداد المتسلسل .</p>
<p>وفي AE الحالة يظهر إشعار لتدوير على شاشة العداد كمؤشر على وجود خلل في إتجاه تدفق المياه أو وجود سبب آخر .</p>	<p>(1) خطأ في تجميع قطع عداد الدفع لمسيبي (تركيب عداد الدفع لمسيبي وتوابعه بـ 7 كل غير صحيح). (2) عطل في الرقعة (قطعة ميكانيكية تمنع رجوع المياه بشكل عكسي). (3) خطأ في توصيل أسلاك لمجسبات الخلية.</p>	<p>رجوع المياه (خلل 1/4 w لمجسبات الداخلي).</p>
<p>(1) وبشكل أساسي تشير الحالة إلى عدم وجود طاقة لتشغيل عداد المياه لمسيبي وعليه يجب على الفني للتحقق كإمكانية تفعيل العداد قبل تركيبه في الموقع. (2) الأمر يتعلق بـ العداد لمسيبي نفسه ويجب 1/4 يتم إصلاح العداد قبل الموردين عليه يقوم موظف قس خدمات المشتركين المسؤول بالتواصل مع المورد لتبديل العداد المعطل بعداد جديد في حال عدم على 1/4 حه.</p>	<p>(1) عطل فني في عداد الدفع لمسيبي .</p>	<p>العداد لا يعمل</p>

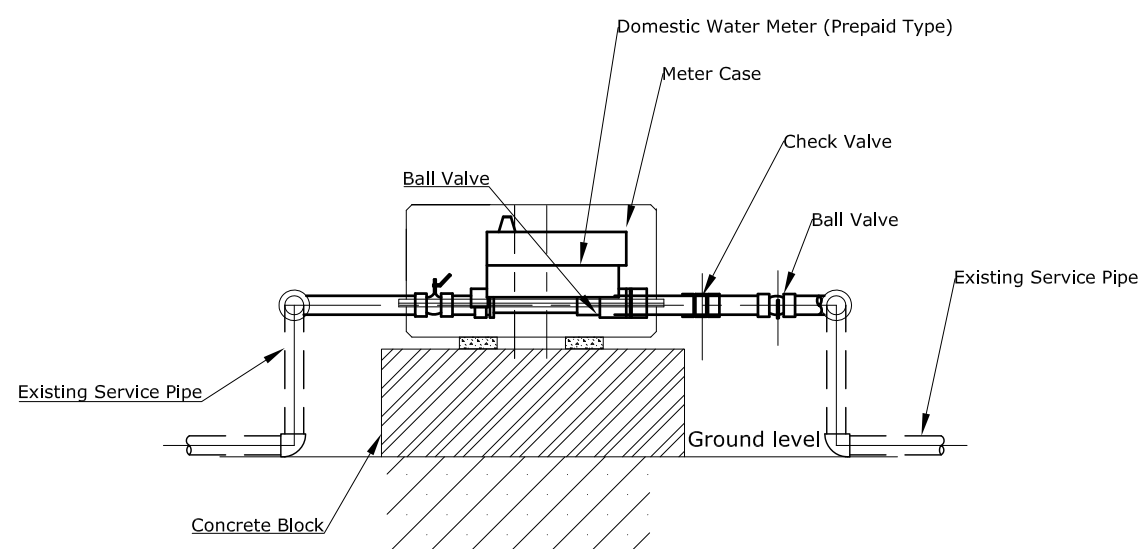
٤٠٠.4 أخطاء المتخذة في مواجهة مشاكل عدادات الدفع لمسيبي .

الاجراءات المتخذة في مواجهة مشكلة	الاجراءات المتخذة في مواجهة مشاكل عدادات الدفع لمسيبي	الاجراءات المتخذة في مواجهة مشاكل عدادات الدفع لمسيبي
<p>(1) يتوجب على قسم خدمات المشتركين الإبلاغ عن سبب الارتفاع وتوجيه المشترك إلى شك كرت العداد. (2) ثم يجب على فني قس خدمات المشتركين فتح الارتفاع عن طريق استخدام كرت التعريف الرئيسي (Master Card) .</p>	<p>انخفاض مستوى شك لارتفاع .</p>	<p>الارتفاع في عمل الارتفاع (الارتفاع في عمل الارتفاع)</p>
<p>(1) هنا يترتب على قسم خدمات المشتركين فحص حساسات / مجسات العداد لتأكد من 1/4 % بها بالكل الارتفاع . (2) وبعد ذلك يستطيع فني قس خدمات المشتركين فتح الارتفاع باستخدام بطارية التعريف الرئيسية (Master Card) .</p>	<p>بإزالة غطاء العداد لبطارية .</p>	<p>بإزالة غطاء العداد لبطارية .</p>
<p>(1) يشير بقا الارتفاع في قسم خدمات المشتركين فتحه إلى وجود عطل في مجسبات العداد . (2) وعليه يقوم فني قس خدمات المشتركين باستبدال العداد الحالي بعداد دفع مسيبي جديد . (3) من ناحية أخرى يقوم الموظف المسؤول عن إدارة عدادات الدفع لمسيبي بطلب تنفيذ كص فني لارتفاع قبل كرت الارتفاع .</p>	<p>عطل في حسبات عداد الدفع لمسيبي .</p>	<p>عطل في حسبات عداد الدفع لمسيبي .</p>
<p>(1) يقوم فني قس خدمات المشتركين باستبدال عداد الدفع لمسيبي الحالي بعداد دفع مسيبي جديد . (2) من ناحية أخرى يقوم الموظف المسؤول عن إدارة عدادات الدفع لمسيبي بطلب تنفيذ كص فني لارتفاع قبل كرت الارتفاع .</p>	<p>عطل فني في عداد الدفع لمسيبي .</p>	<p>إغلاق الارتفاع نتيجة انخفاض مستوى شحن البطارية .</p>

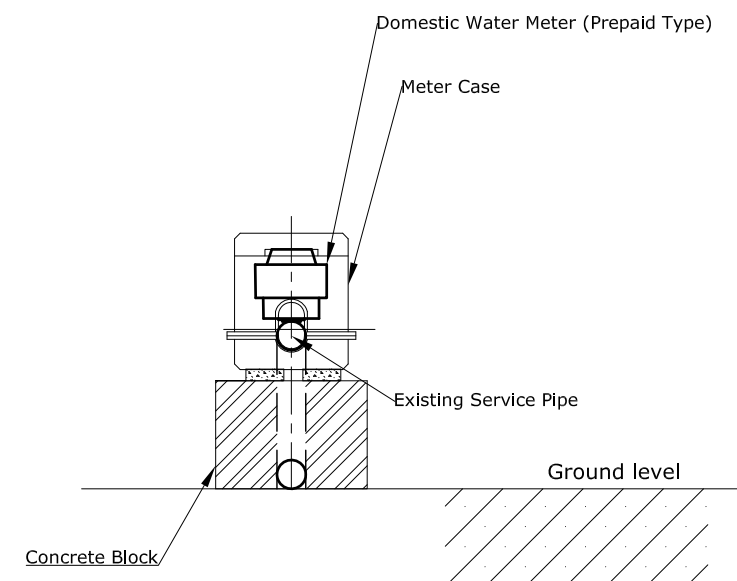
<p>(1) وبكل الأحوال يتوجب ' على فني في دفع خدمات المشتركين استبدال عداد الوجة الممنوع لحالي بعد دفع كسبي جديد .</p> <p>(2) من ناحية أخرى ؛ يقوم الموظف الممسوق عن إرفاعة عدادات (ك) للمسوق بطلب تنفيذ فحص فني (ك) قبل كارك كسبي .</p> <p>(3) وفي حال عدم $\frac{1}{4}$ عداد الدفع للمسوق ؛ يقوم الموظف الممسوق في شعبة إرفاعة عدادات الدفع للمسوق بتوجيه طلب ' إلى مدير مستودع دائر المبيعات للصرف الصحي لطلب العداد من قائمة موجودات المستودع .</p>	<p>عطل فني في عداد (دفع) للمسوق .</p>	<p>تسريب المياه إلى داخل عداد (دفع) للمسوق .</p>
<p>(1) يقوم فني قسم خدمات المشتركين باستبدال عداد الدفع للمسوق الحالي بعد دفع مسبق جديد .</p> <p>(2) كان تسريب المياه ناتج عن ارتفاع ضغط المياه ؛ يتم $\frac{1}{4}$ للموظف المسؤول في شعبة إدارن عدادات الوجة للمسوق مركز $\frac{1}{4}$ ؛ بانه للاستقرار عن وضو العداد فيمما اذا تم إصلاحه بنجاح أو ..</p> <p>(3) في حال $\frac{1}{4}$ عداد الوجة للمسوق ؛ إعادته إلى شعبة إرفاعة ؛ يقوم الموظف المسؤول في شعبة إدارن عدادات الدفع للمسوق بتوجيه طلب إلى مدير المستودع ' بطلب العداد في كسبي لطلب العداد للمياه .</p> <p>(4) وفي حال عدم $\frac{1}{4}$ عداد الوجة للمسوق ؛ يقوم الموظف الممسوق في شعبة إدارن عدادات الدفع للمسوق بتوجيه طلب ' إلى مدير كسبي لطلب العداد للصرف الصحي ' لطلب العداد من قائمة موجودات المستودع .</p>	<p>ارتفاع ضغطت المياه في الشبكة</p>	
<p>(1) قيام فني قسم خدمات المشتركين بتوجيه مشترك إلى شحن كرت عداد الدفع للمسوق في حقل سو (ك) قبل كسبي .</p> <p>(2) شحن كرت العداد ؛ يقوم فني قسم خدمات المشتركين بفتح $\frac{1}{4}$ من العداد باستخدام بطاقة التعريف الرئيسية .</p>	<p>سوء استخدام مشترك .</p>	<p>وضع اطفاء الحريق .</p>
<p>(1) يقوم فني قسم خدمات المشتركين باستبدال عداد الدفع للمسوق الحالي بعد دفع مسبق جديد .</p> <p>(2) من ناحية أخرى ؛ يقوم الموظف الممسوق عن إرفاعة عدادات الدفع للمسوق بطلب تنفيذ فحص فني للمشاكل الميكانيكية في أجزاء (ك) قبل كارك كسبي .</p> <p>(3) وفي حال عدم $\frac{1}{4}$ عداد الدفع للمسوق ؛ يقوم الموظف المسؤول في شعبة إرفاعة عدادات الدفع للمسوق بتوجيه طلب ' إلى مدير مستودع إرفاعة والصرف الصحي ' زال العدادات قائمة موجودات المستودع .</p>	<p>عطل فني في عداد (دفع) للمسوق (فال في عمل ل. مام) .</p>	
<p>(1) في كلا الحالتين يتوجب ' على فني قسم خدمات المشتركين استبدال عداد الوجة الممنوع لحالي بعد دفع كسبي جديد .</p> <p>(2) يقوم الموظف المسؤول عن إدارن عدادات الدفع للمسوق بطلب تنفيذ فحص فني للمشكل الميكانيكية في (ك) قبل كارك كسبي .</p> <p>(3) وفي حال عدم $\frac{1}{4}$ عداد الوجة للمسوق ؛ يقوم الموظف المسؤول في شعبة إدارن عدادات الدفع للمسوق بتوجيه طلب ' إلى مدير كسبي لطلب العداد للصرف الصحي ' لطلب العداد من قائمة موجودات المستودع .</p>	<p>عطل فني في عداد (دفع) المسوق أو (ك) رواس ' أو حجارن في المياه .</p>	<p>فشل عمل ال مام</p>
<p>(1) يتوجب على فني قسم خدمات المشتركين استبدال عداد الدفع للمسوق لحالي بعد دفع مسبق جديد .</p> <p>(2) يقوم الموظف المسؤول عن إدارن عدادات الدفع للمسوق بطلب (ك) بطلب دفع مسبق جديد .</p>	<p>عطل فني في عداد (دفع) للمسوق</p>	<p>البطارية لا تعمل</p>
<p>(1) يتوجب على فني قسم خدمات المشتركين استبدال عداد الدفع للمسوق لحالي بعد دفع مسبق جديد .</p> <p>(2) بطلب للموظف المسؤول عن إدارة عدادات الدفع للمسوق (ك) للمورد (ك) العداد بعدد جديد وعلى نفقته الخاصة .</p> <p>(3) وفي حال عدم استبدال عداد الوجة للمسوق ؛ يقوم الموظف المسؤول في شعبة إدارن عدادات الدفع للمسوق بتوجيه طلب ' إلى مدير كسبي لطلب العداد للصرف الصحي ' لطلب العداد من قائمة موجودات المستودع .</p>	<p>عطل فني في عداد (دفع) للمسوق</p>	<p>تعرفة المياه .</p>

<p>(1) في حال اكتشاف فني قسم خدمة المشتركين خطأ في الرقم المتسلسل بعد تركيب العداد؛ يتوجب عليه كتابة الرقم الصحيح على العداد أو إدخال شريط يحتوي على الرقم المتسلسل الصحيح للعداد.</p> <p>(2) يقوم الموظف الممثل في شعبية إدارة عدادات الدفع المسبق بإعادة إدخال بيانات المشترك لإدخال شريحة على بطاقة الدفع المسبق.</p>	<p>اعدادات عداد الدفع المسبق.</p>	<p>خطأ في رقم العنقا المتسلسل</p>
<p>يترتب على فني قسم خدمة المشتركين تجميع قطع العداد لدفع المسبق بالشكل الصحيح.</p> <p>يتوجب على فني قسم خدمة المشتركين تغيير:</p> <p>(1) المسبق الحالي (عداد دفع) مسبق يد.</p> <p>(2) يقوم الموظف المسؤول عن إدارة عدادات الدفع المسبق بطلب تنفيذ فحص فني للعداد قبل تركيبه في بيئة.</p> <p>(4) وفي حال عدم إمكانية العدال، يطل الموظف المسؤول عن إدارة عدادات الدفع المسبق المورد استبدال العداد بعدال يد وعلى نفقته.</p> <p>(3)</p>	<p>خطأ في تجميع قطع العداد.</p> <p>خلل في الرقم.</p> <p>خطأ في توصيل أسد</p> <p>لمجسات داخلية.</p>	<p>رجو إلمياه (خلل في الو ¼ المة).</p>
<p>(1) يتوجب على فني قسم خدمات المشتركين استبدال عداد دفع المسبق الحالي (عداد دفع) مسبق يد.</p> <p>(2) يقوم الموظف المسؤول عن إدارة عدادات الدفع المسبق بطلب تنفيذ فحص فني للميكانيكية في بيئة قبل تركيبه للصيانة في حال فشل عملية إصلاحه. يتوجب على المورد استبدال العداد الحالي بعدال.</p>	<p>عطل فني في عداد دفع المسبق</p>	<p>عداد معطل</p>

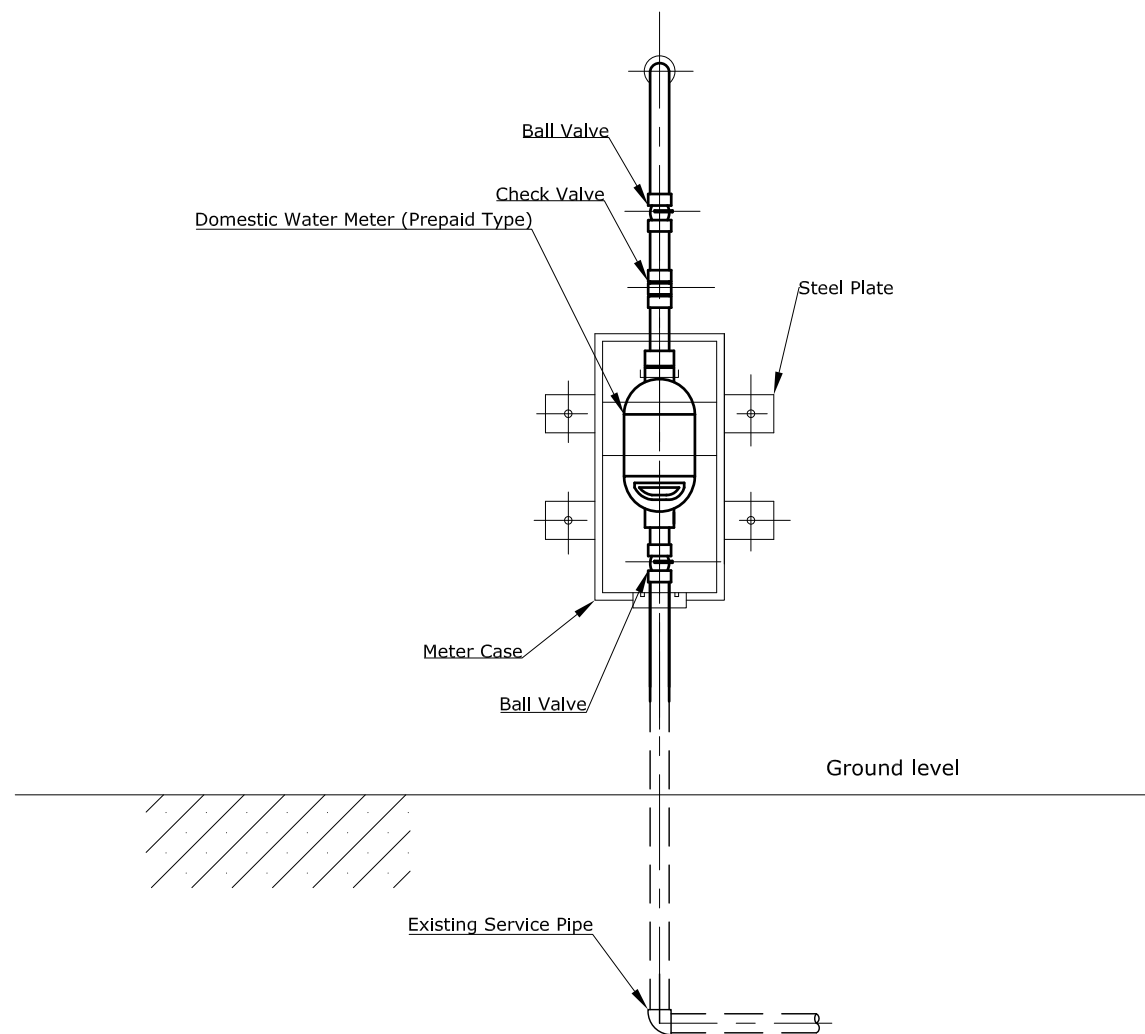
المرفقات .



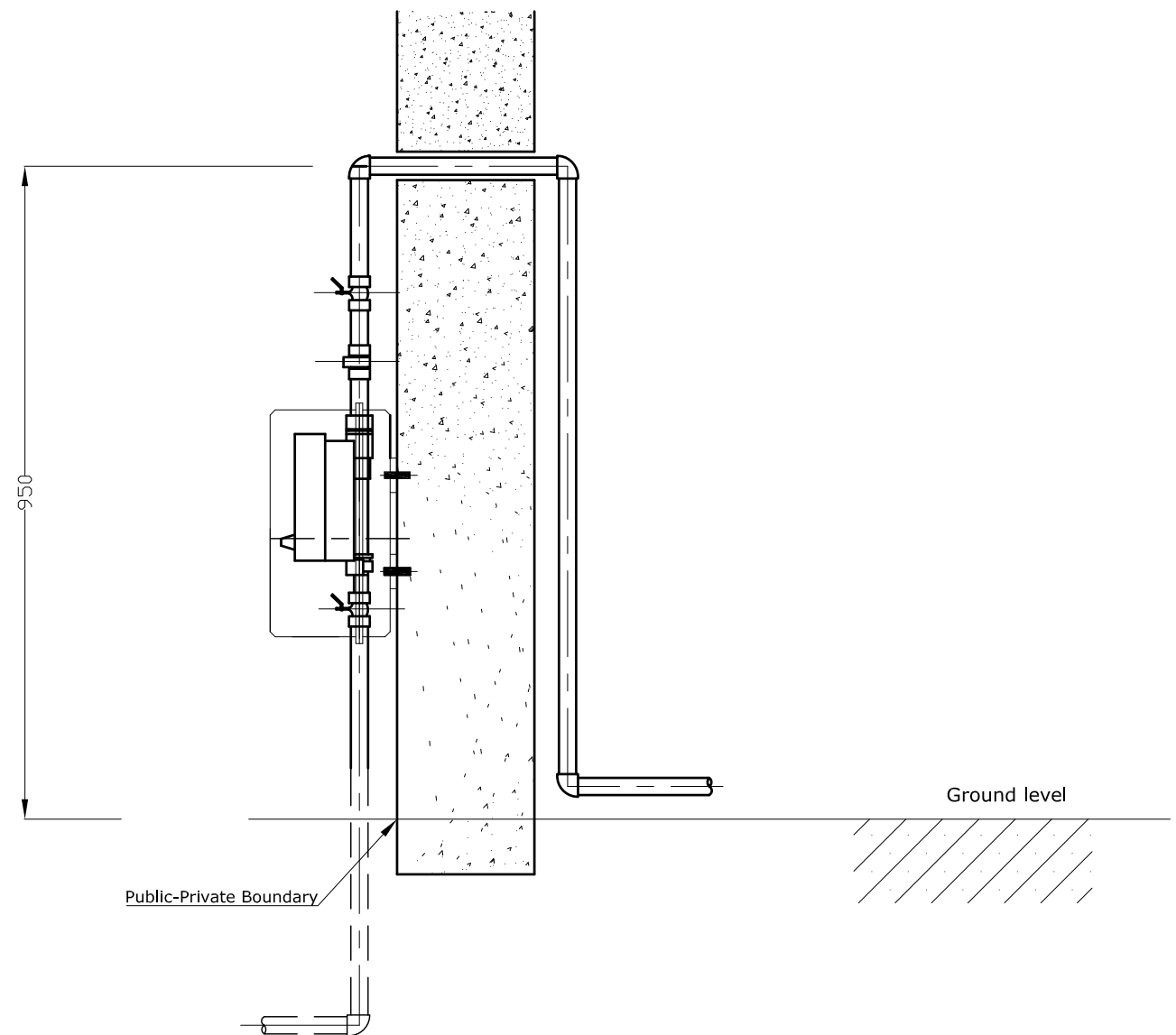
Front View



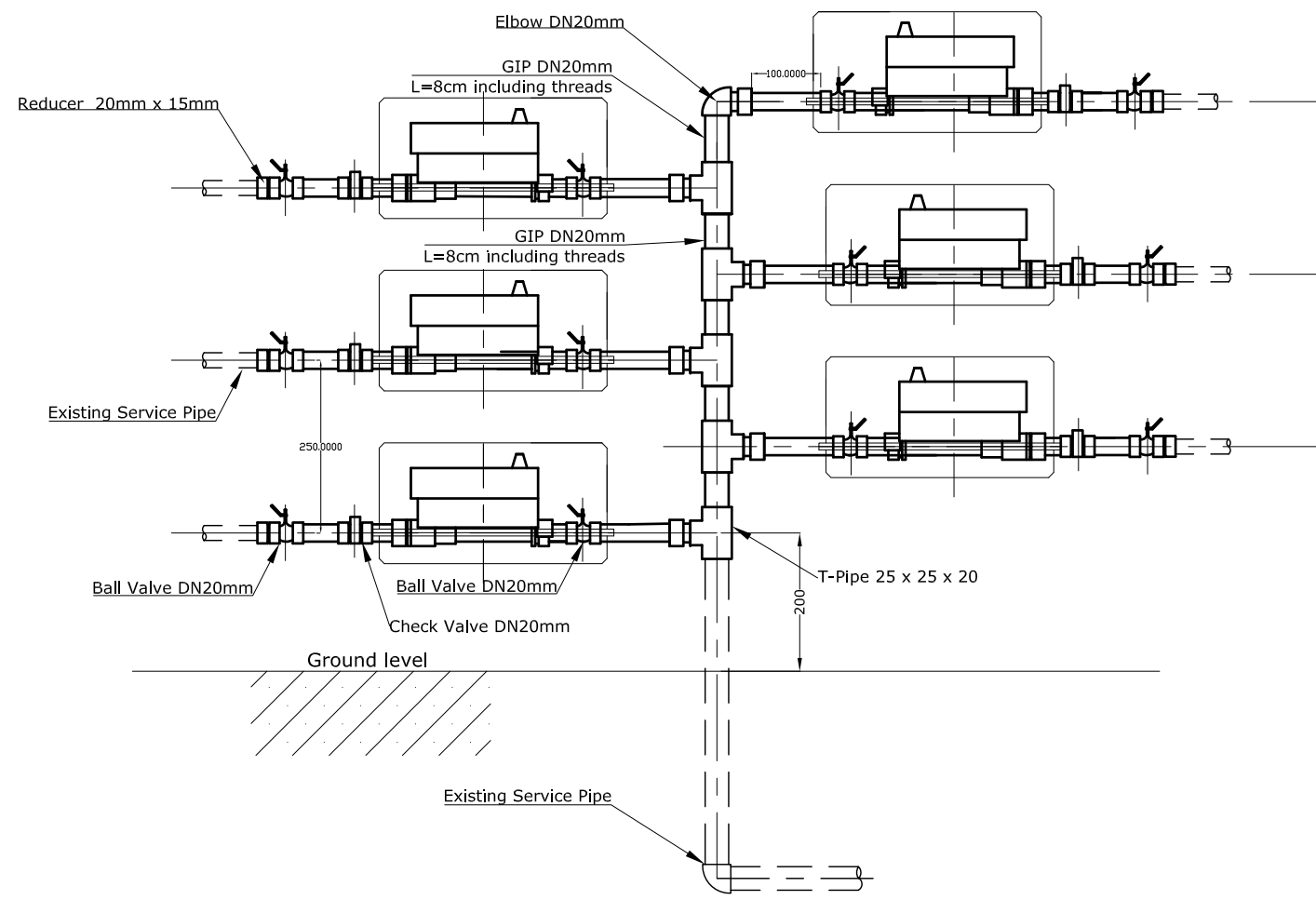
Side View



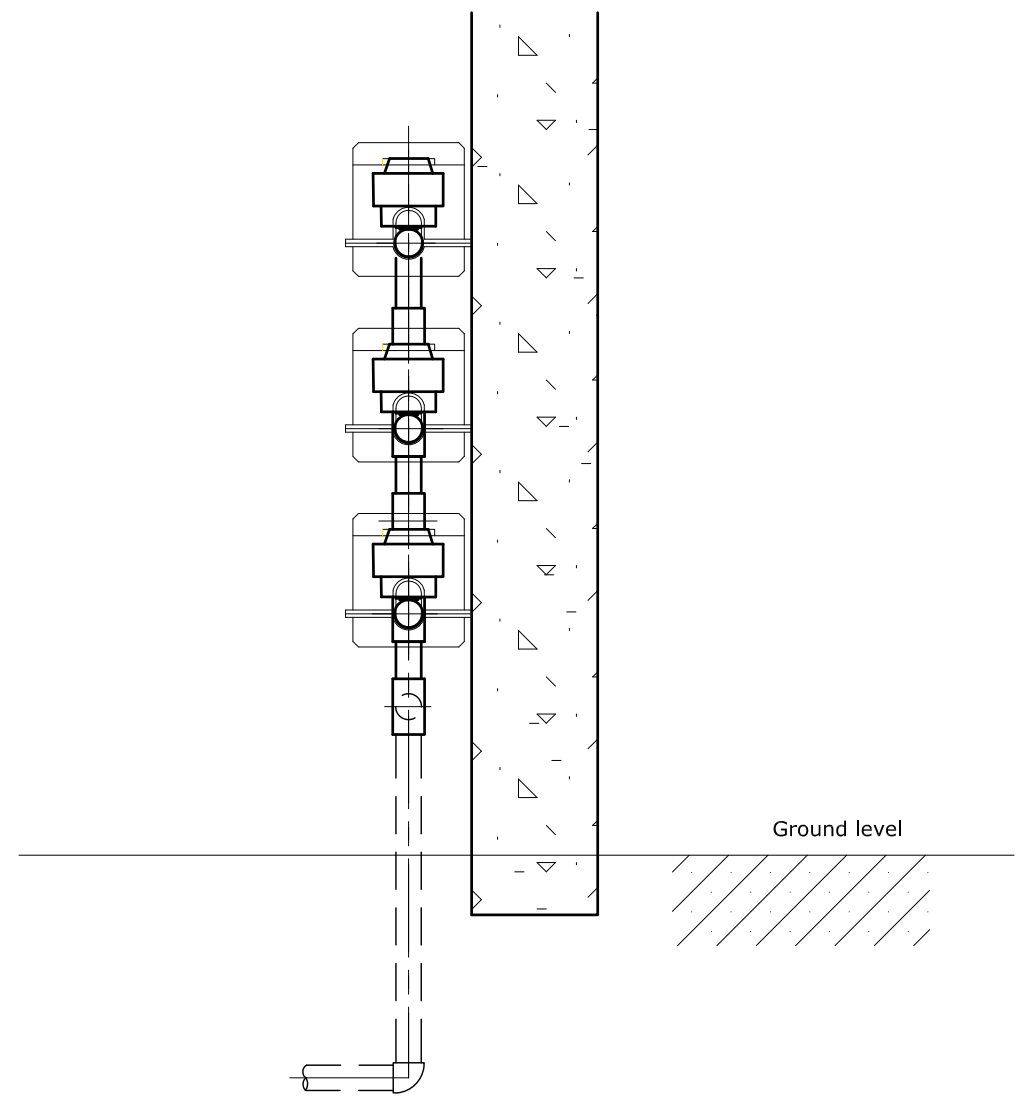
Front View



Side View



Front View



Side View



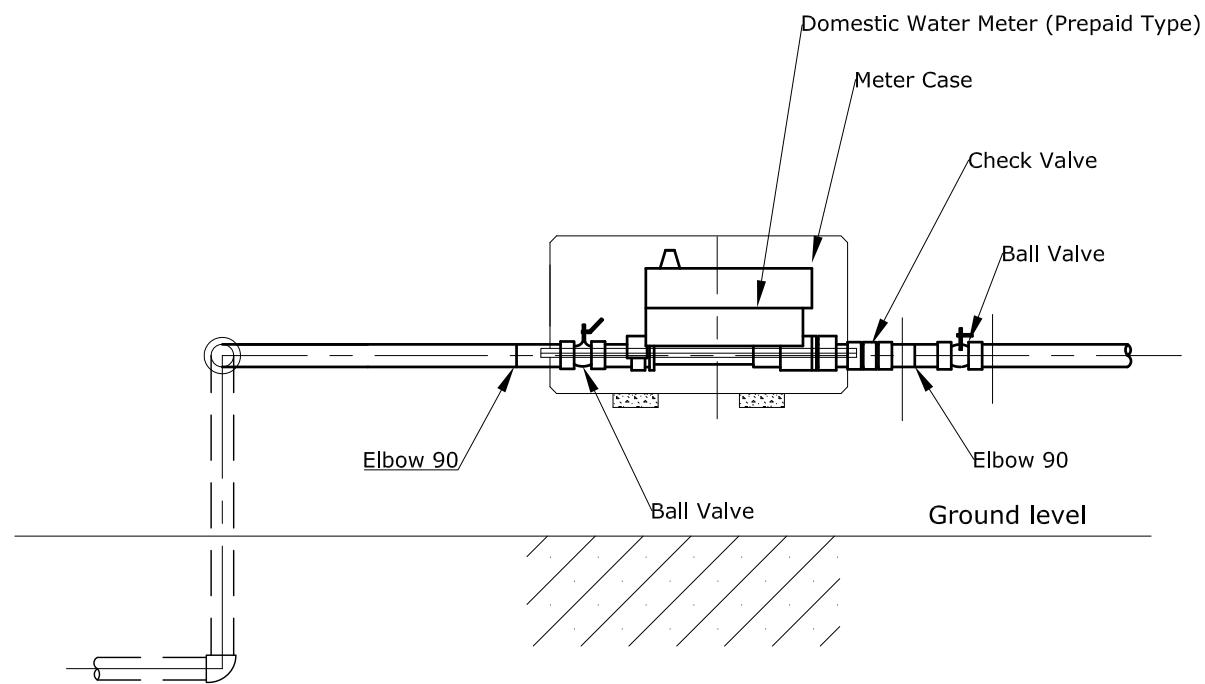
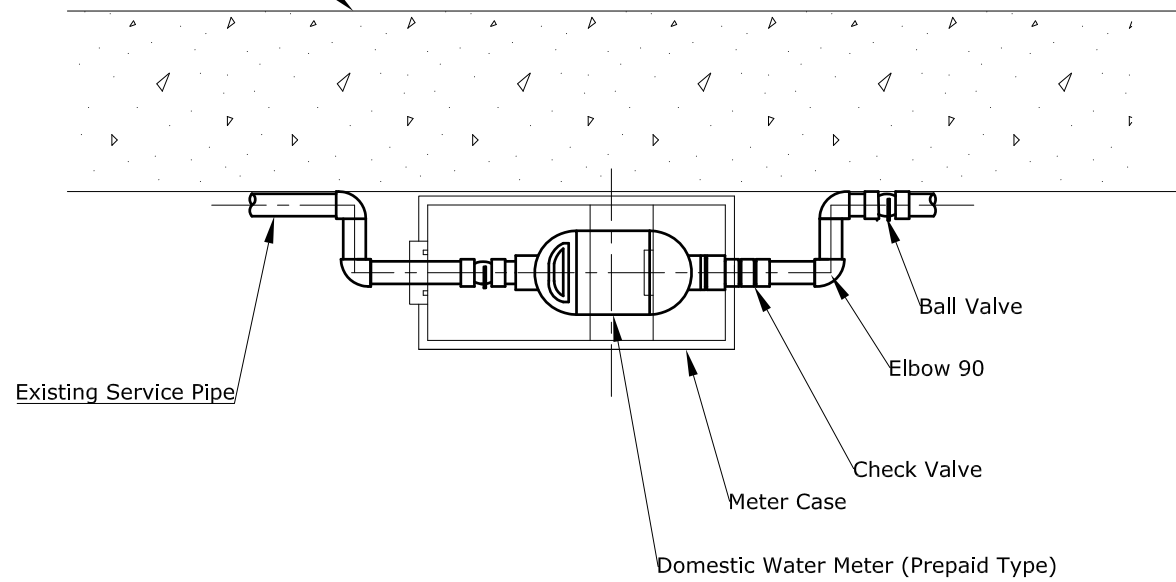
The Project for Strengthening the Capacity of Water Service Management in Jenin Municipality

The Joint Venture of TEC International Co., Ltd. and PADECO Co., Ltd.

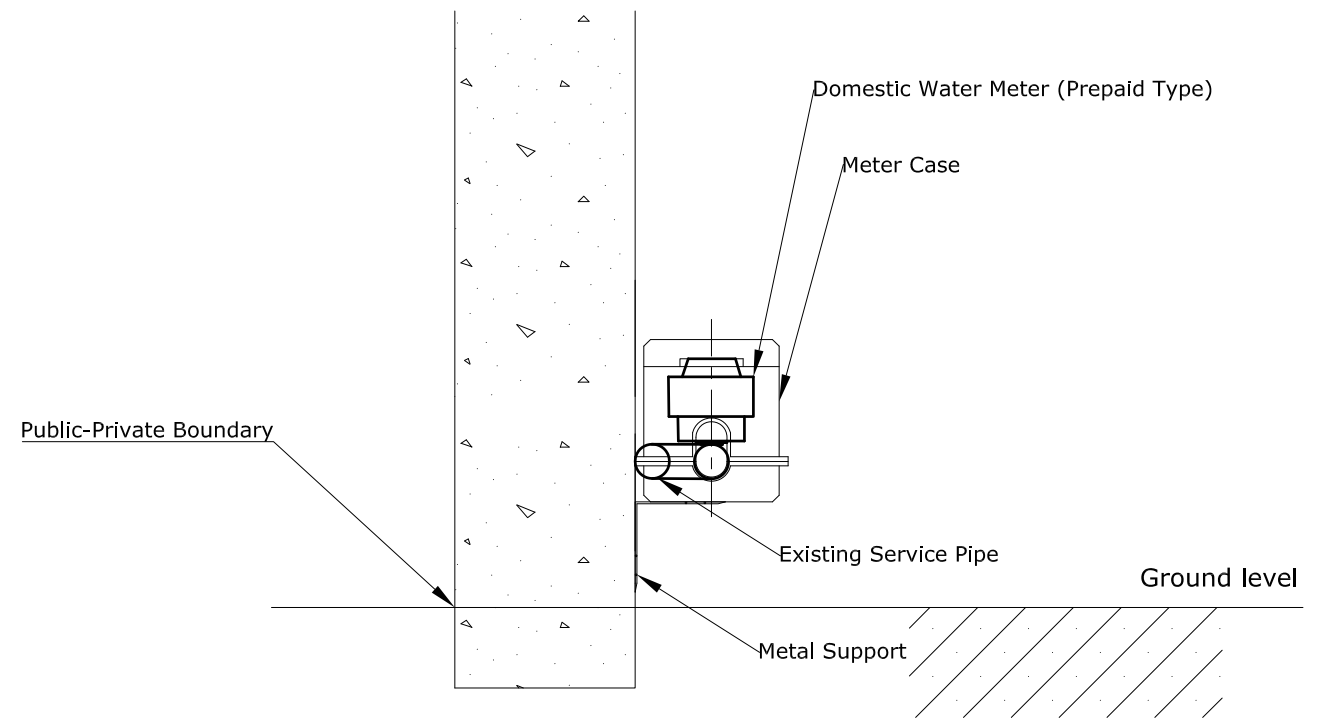
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Public-Private Boundary

Top View



Front View



Side View



The Project for Strengthening the Capacity of Water Service Management in Jenin Municipality

The Joint Venture of TEC International Co., Ltd. and PADECO Co., Ltd.

TITLE: Standard Setting of Prepaid Water Meter 1st Case

SCALE:

DATE: Jan. 2019

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別冊資料 CD 2

報告書

別冊資料 CD 2.1

Baseline Survey Report- 2018 – English Version

THE WEST BANK, PALESTINE
PALESTINIAN WATER AUTHORITY
JENIN MUNICIPALITY

**Project for Strengthening
the Capacity of Water Service Management
in
Jenin Municipality**

Baseline Survey Report

FEBRUARY 2018

JAPAN INTERNATIONAL COOPERATION AGENCY

**TEC INTERNATIONAL CO., LTD. TEC INTERNATIONAL CO., LTD. (TECI)
PADECO CO., LTD (PADECO)**

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8. Questions for Engineer's Level

ABBREVIATION

AC	Authorized Consumption
AL	Apparent Losses
BA	Bachelor
BAC	Billed Authorized Consumption
BMC	Billed Metered Consumption
BOQ	Bill of Quantity
BPS	Booster Pump Station
BUC	Billed Unmetered Consumption
C/P	Counterpart
CDS	Customer Database Survey
CS	Customer Service
DMA	District Metering Area
FY	Fiscal Year
GI	Galvanized Steel
GIS	Geographical Information System
HDPE	High Density Polyethylene Pipe
HRD	Human Resource Department
HSC	House Service Connection
ICT	Information and Communication Technology
JET	JICA Expert Team
JM	Jenin Municipality
JSC-JWV	Joint Service Council Jenin Western Villages
JWU	Jerusalem Water Utility
M/M	Minute of Meeting
MI	Metering Inaccuracies
MNF	Minimum Night Flow
MoLG	Ministry of Local Government
ND	Nominal Diameter
NEDCO	Electricity Distribution Company of the North
NIS	New Israeli Shekel
NRW	Non-Revenue Water
O&M	Operation & Maintenance
PA	Pilot Area
PDCA	Plan Do Check Act
PPWM	Prepaid Water Meter
PR	Public Relations
PVC	Polyvinyl Chloride
PWA	Palestinian Water Authority
RL	Real Losses
RW	Revenue Water
SIV	System Input Volume
UAC	Unbilled Authorized Consumption
UC	Unauthorized Consumption
UMC	Unbilled Metered Consumption
UUC	Unbilled Unmetered Consumption
WL	Water Losses
WSRC	Water Service Regulatory Council
WWD	Water and Wastewater Department

CHAPTER 1. WATER SUPPLY SYSTEM AND SERVICE IN JENIN

1.1 Water Supply System and Service Area

1.1.1 Overall Supply System

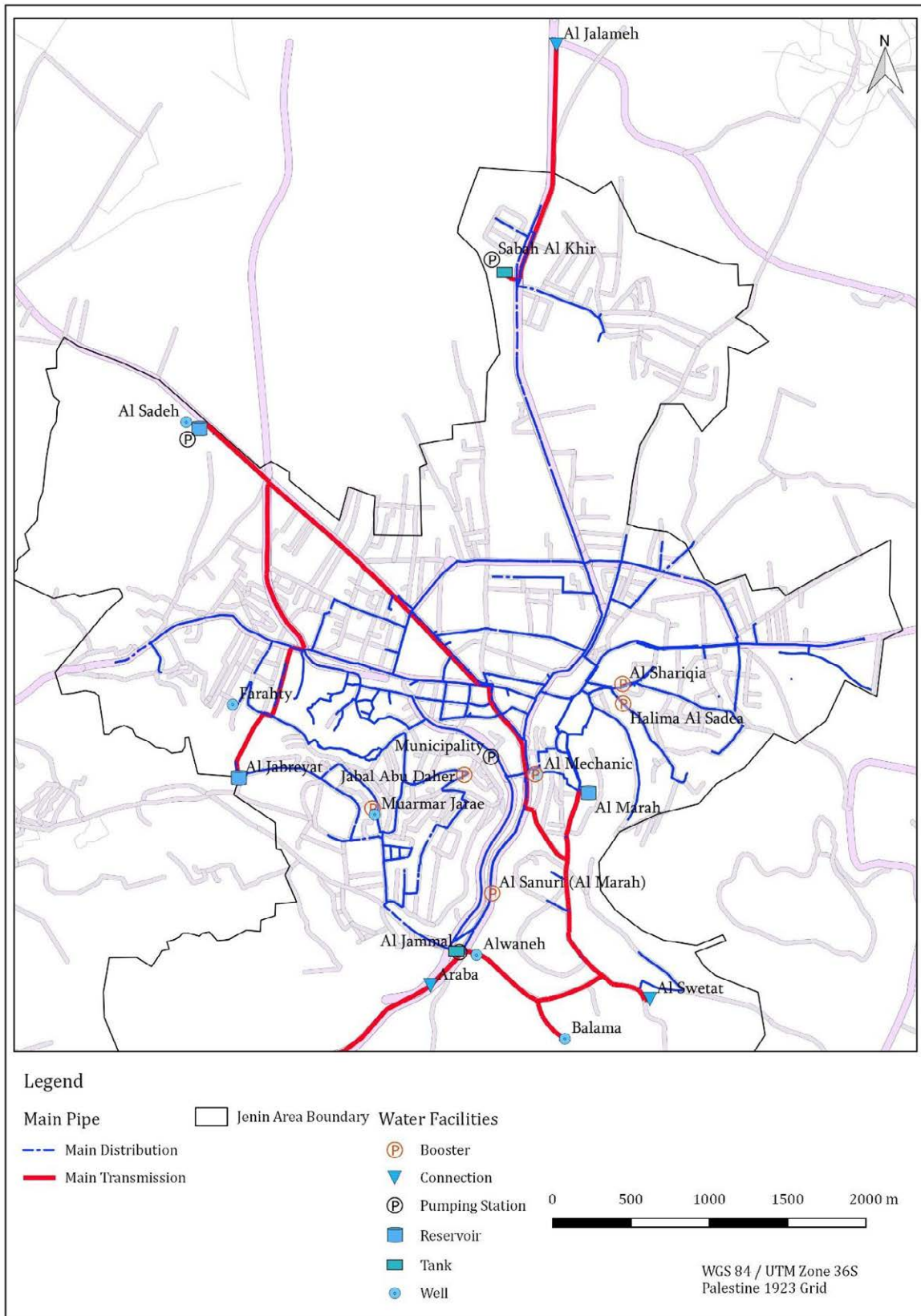
Jenin Municipality produces some water from its own wells (Al Saadeh, Al Mechanic, and Balama wells), some it buys from private wells within the Municipal boundary (Farathy, Alwaneh, and Muamar Jarrar wells), and some water it imports from outside (from Mekrot company via Al Jalameh connection and Al Swetat connection), and from West Bank Water Department via Abo Arraba connection. Main water supply facilities include wells, pumping stations, transmission mains, reservoirs, tanks, distribution mains, and booster pumping stations. These are shown in Figure 1.1.

The supply system is of mixed type; by gravity as well as by pumping. From some sources water is first transmitted to reservoirs and then distributed by gravity. For example, water from Al Saadeh well is first transmitted to Al Jabreyat and Al Marah reservoirs and then distributed by gravity. From some sources (such as Jalameh connection) water is fed into smaller (50 m³ FRP) tanks and boosted to the network. Some other sources (such as Farathy and Jarae wells) water is directly feed to the distribution network. In some locations online boosters are used to boost the water pressure.

The supply system is intermittent and cyclic. The cycle does not cover a whole week. So the supply days are not always the same day of the week but variable. The frequency of supply is thus different in different parts of the city based on the allocated source and areas covered by the source.

Based on the above system, most of the areas get water once or twice a week for durations varying from one day to two days in summer. In winter duration of supply becomes longer as water demand decreases and also some people use rain water for both drinking and non-drinking purposes. Supply to different parts of the city is maintained by manually opening and closing valves. Every day in the morning water directorate staffs are given tasks to open or close particular valves.

The supply schedule is shown in Table 1.1. This schedule is not always strictly enforced as it needs adjustment when water coming from outside is irregular.

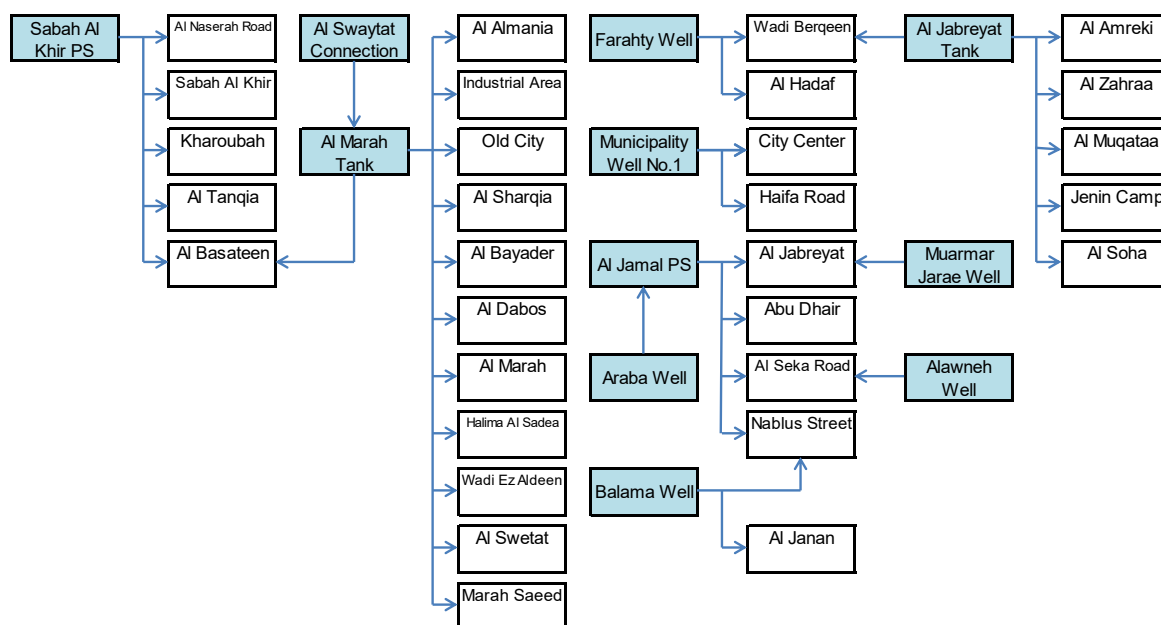


Source: JICA Expert Team

Figure 1.1 Main Water Supply Facilities in Jenin

Table 1.1 Supply Schedule

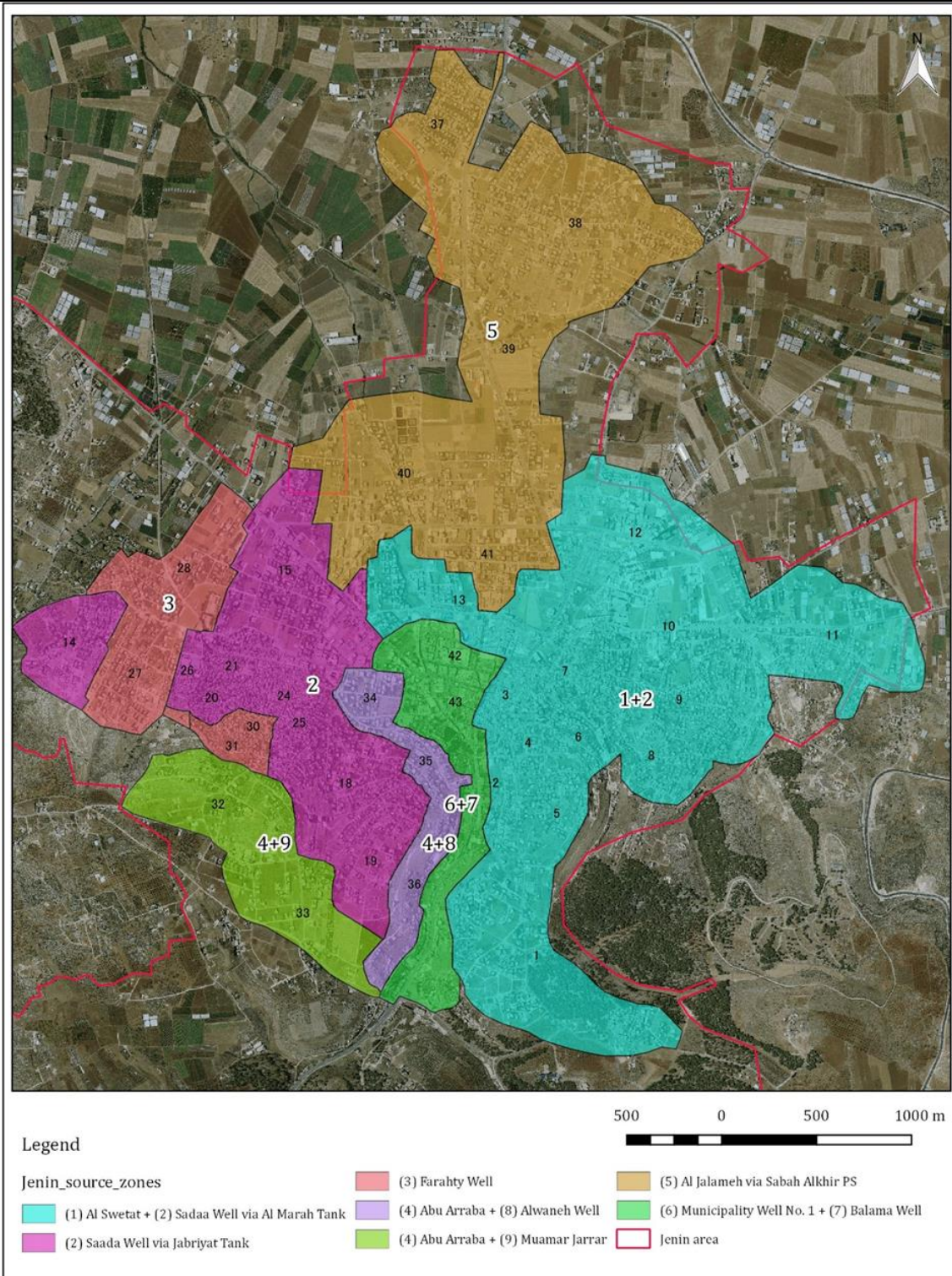
Source / Day	Morning	Evening	Remarks
1. Mekrot water from Al Swetat connection supplied directly plus from Al Marah reservoir			
Day 1	Al Marah	Swetat	
Day 2	Al Mania	Baghadad Street	
Day 3	Al Ibrahemen		
Day 4	Al Sharqia		
Day 5	Halima Al Sa'adia		
Day 6	Alorma + Industrial	Palestine housing	
Then the cycle repeats. So these areas get water once in 6 days for different durations.			
2. Sa'ada well (supplied from Jabreyat reservoir)			
Day 1	Jenin Refugee camp		
Day 2	Al Mania + Baghadad Street		Together with Source 1 via Al Marah reservoir
Day 3	Al Ibrahemen	Wadi Berqen	Al Ibrahemen area is supplied together with Source 1 via Al Marah reservoir
Day 4	Wadi Berqen	Al Zahara'a	
Day 5	Al Zahara'a		
Day 6	Al Ghobas + Al Damaj		
Day 7	Khalat Al Soha + Abu Dhair		
Then the cycle repeats. So these areas get water once in 7 days for different durations.			
3. Farathi well (private)			
Day 1 to 7	Al Hadaf		Intermittent only due to decreased yield
4. Abu Arab connection (West Bank Water Department) supplied directly and from Al Jamal tank			
Day 1	Abu Dhair		
Day 2	Al Jabriat		
Day 3	Nablus Street		
Day 4	Balama		Needs confirmation
Then the cycle repeats.			
5. Mekrot water from Al Jalameh connection supplied from Sabah Al Khir pumping station			
Day 1	Sabah Al Khir		
Day 2	Kharouba		
Day 3	Nasraa' Street		
Day 4	Palestine Street		
Then the cycle repeats.			
6. Al Mechanic well			
Day 1	Abu Bakra Street		
Day 2	Al Zam'a Street		
Day 3	Haifa Street		
Then the cycle repeats			
7. Balama well			
Day 1	Al Jinan		
Day 2	Al Jinan		
Day 3	Nablus Street		
Then the cycle repeats			
8. Alawneh well (private)			
Day 1	Al Mahata (b)		
Day 2	Al Sika		



Source: JICA Expert Team

Figure 1.3 Supply Areas and Their Sources

Supply areas covered by each distribution source (distribution reservoir or directly from the source) are shown graphically in Figure 1.4 and the names of the areas are listed in Table 1.2.



Source: JICA Expert Team

Figure 1.4 Areas Covered by Different Water Sources

Refer to Table 1.2 for names of each area marked with number in Figure 1.4.

1.1.3 Service Area

The areas supplied by different sources are shown in Figure 1.4 and listed in Table 1.2.

Table 1.2 Supply Areas and Water Source

Water Source	Locality Name	No. on Map	Approx. Area (Ha)
(1) Al Swetat connection + (2) Sadaa well; supplied via Al Marah tank	Al Swetat & Marah Saad	1	70.3
	University Street	2	5.1
	Old Town	3	8.0
	Al Marah	4	10.1
	Al Marah High Area	5	13.3
	Al Dabous	6	11.4
	Al Saebar	7	8.0
	Halima Al Sadea	8	17.8
	Al Sharqia	9	34.4
	Al Ibrahimian	10	42.5
	Al Almania	11	48.9
	Industrial Area	12	46.6
	Al Basateen Ayyash Circle	13	37.0
(2) Sadaa well; supplied via Al Jabreyat tank	Wadi Barqeen	14	22.7
	Al Zahraa	15	42.5
	Name to be confirmed	16	20.6
	Al Ghoobas	17	3.9
	Kherbit As Soha	18	30.8
	Jabar Abu Daher High Area	19	21.8
	Abdullah Azzam	20	5.2
	Camp Yard and Shoor Khalid	21	4.2
	Al Alawneh Street	22	1.8
	Name to be confirmed	23	0.9
	Al Hawasheen	24	3.7
	Al Damaj	25	4.0
	New Camp	26	4.9
(3) Farahty well	Al Hadaf	27	23.2
	Al Hadaf	28	31.5
	Joret Al Dahab	29	0.6
	Al Somran	30	3.1
	Camp Street	31	6.9
(4) Abu Arraba con. + (9) Muamar Jarrar well; via Al Jamal tank and direct	Al Jabreyat Area (1)	32	35.4
	Al Jabreyat Area (2)	33	30.2
(4) Abu Arraba con. + (8) Alawneh well	Al Nabatar	34	9.8
	Abu Daher Low	35	7.9
	Al Sekan Street	36	18.9
(5) Al Jalameh con. (Makrot water) supplied via Sabah Al Khir PS	Sabah Alkher	37	25.1
	Kharoubeh	38	60.3
	Al Nasreh Street	39	74.6
	Al Basateen	40	72.8
	Palestine Housing	41	21.4
(6) Municipality well No. 1 (Al	Abu Baker & Faisal Street	42	10.0

Water Source	Locality Name	No. on Map	Approx. Area (Ha)
Mechanic well) + (7) Balama well	Al Karafat	43	5.6
	Al Nabarat	44	17.0
	Mahua Street	45	24.0
	Total		998.5

The total of these areas is about 1,000 hectares. Total area of Jenin municipality is about 2,167 hectares.

1.2 Current Facility Operation Method

1.2.1 Source Operation

Water sources for Jenin can be classified in to three types; own sources, private sources inside the municipality, and water imported from outside suppliers. The sources and their approximate production are summarized in Table 1.3. This has also been discussed in the beginning of this chapter.

Operation of the municipality's own sources (wells) is done through hired private operators. The pumps and motors of Saadeh well are rented from a private operator as getting permission from Israeli authority for the import of these machinery by Jenin municipality would take a long process and time.

Private wells inside the municipality are operated by the respective well owners. They extract water through their wells, collect in tanks and supply whenever enough water is collected. Basically, they are supposed to supply 24 hours a day.

Water imported from outside are operated and controlled by the respective water providers. These include water from an Israeli company (Mekorot) imported via two import points; Jalameh connection and Al Swetat connection, and water from West Bank Water Department imported via Abo Arraba connection.

Table 1.3 Water Sources to Jenin

S.N.	Name of source	Result of previous study (Diagnostic Study Report)				Result of site survey during Oct-Nov 2017	
		m ³ /h	m ³ /day	m ³ /year	Remarks	Meter status	Flow (m ³ /h) *
A	Own sources						
1	Al Saadeh well (Municipality well No. 2)	108	2,600	949,000		Meter working	
2	Al Mechanic well (Municipality well No. 1)	90	600	219,000	Working 6.5 hrs/day	Meter working BPS: 30 m ³ /h, 44.4 m H	
3	Balama well	20	400	146,000	Works 20 hrs/day	Meter working Pressure 9 bar	29
B	Water purchased from private operators from inside the municipality						
4	Farahty well (Private)		1,667	608,455		Meter working	83
5	Muamar Jarrar well (Private)		333	121,545		Meter working Pump: 24 m ³ /h	11
6	Alwaneh well (Private)		677	247,105	Supplies only in summer	Meter working	

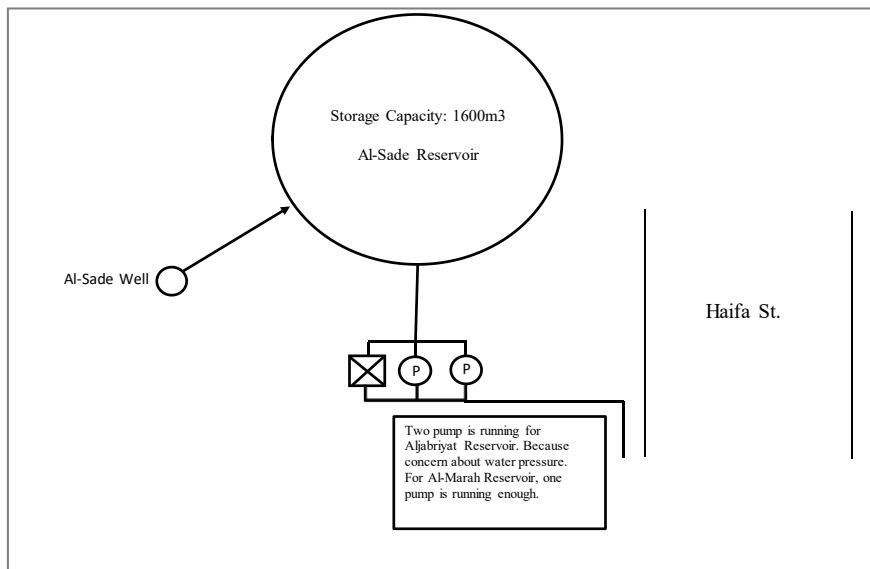
C	Water imported from outside						
7	Al Jalameh connection (imported from Mekorot Company)		833	304,045		Meter working	40
8	Al Swetat connection (Imported from Mekorot Company)		1,667	608,455		Meter working	87~90
9	Abo Arraba connection (Imported from West Bank Water Department)		1,080	394,200		Meter working	45#
	Total		9,857	3,597,805			

Source: Diagnostic Study, JICA Expert Team

Note: # from this 45 m³/h, 11 m³/h is supplied to another area not belonging to Jenin

Schematics of some of the above sources are shown in the following section.

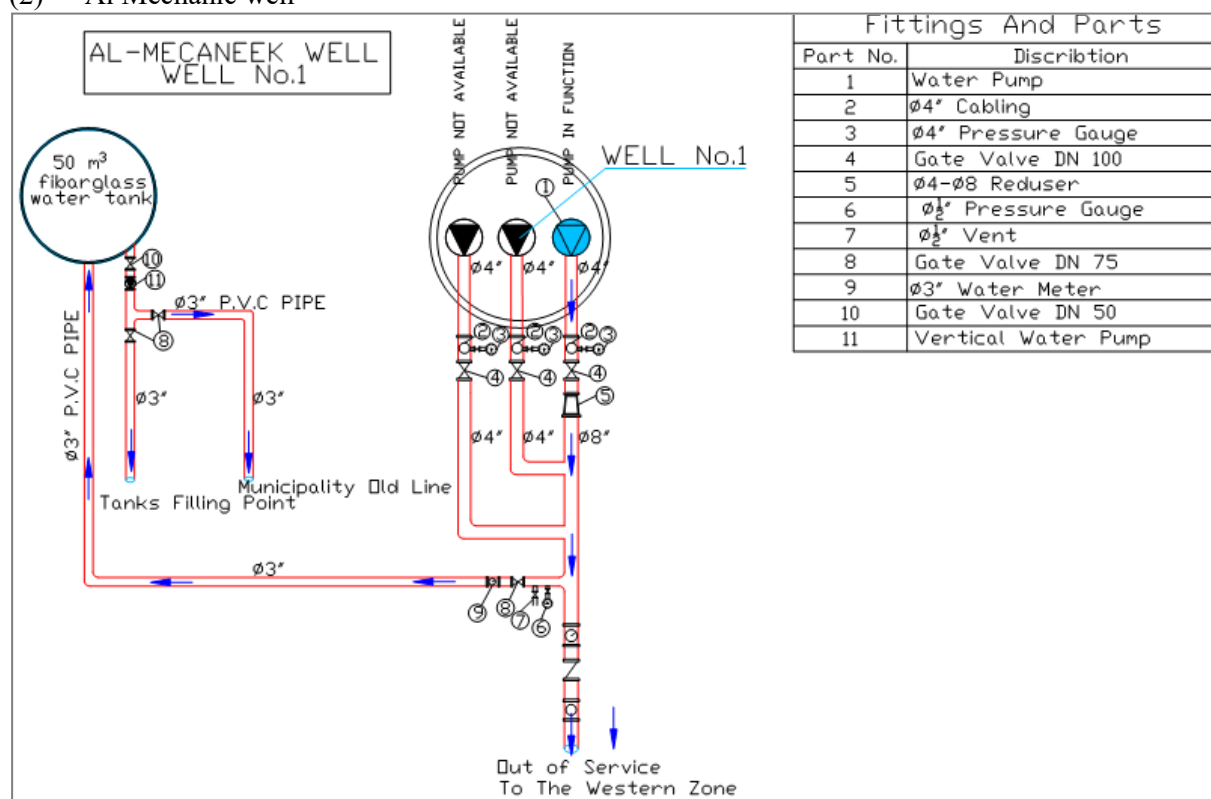
(1) Al Saadeh well



Source: JICA Expert Team

Figure 1.5 Al Saadeh well

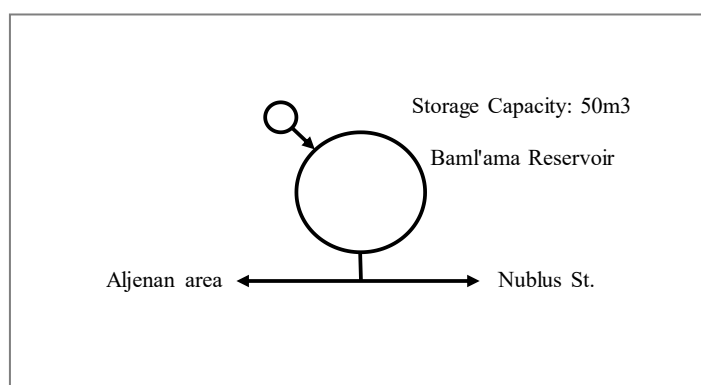
(2) Al Mechanic well



Source: Diagnostic Study 2016

Figure 1.6 Al Mechanic well

(3) Balama well



Source: JICA Expert Team

Figure 1.7 Balama well

(4) Farahty well (private)

No schematic drawing is available.

(5) Muamar Jarrar well (private)

No schematic drawing is available.

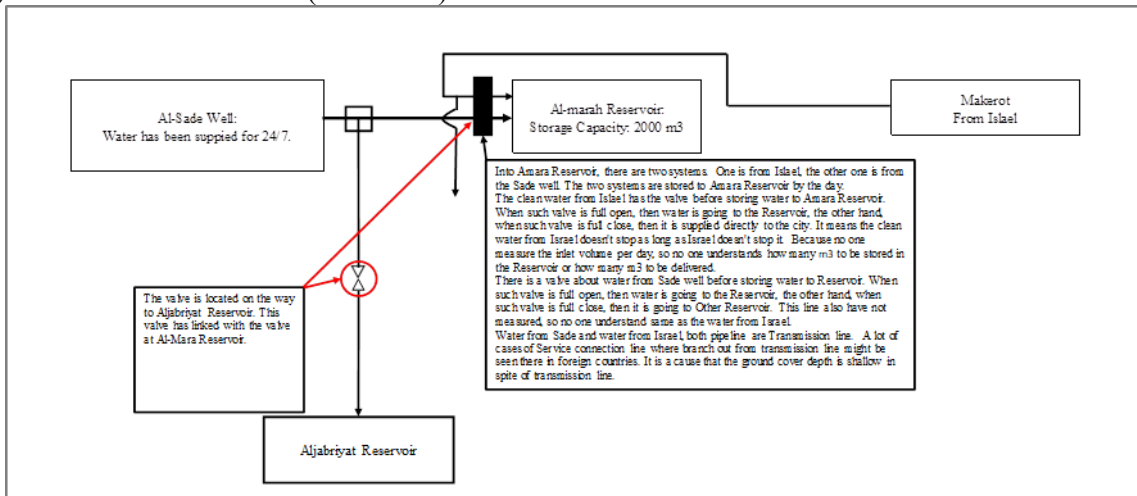
(6) Alwaneh well (private)

No schematic drawing is available.

(7) Al Jalameh connection (Mekerot 1)

No schematic drawing is available.

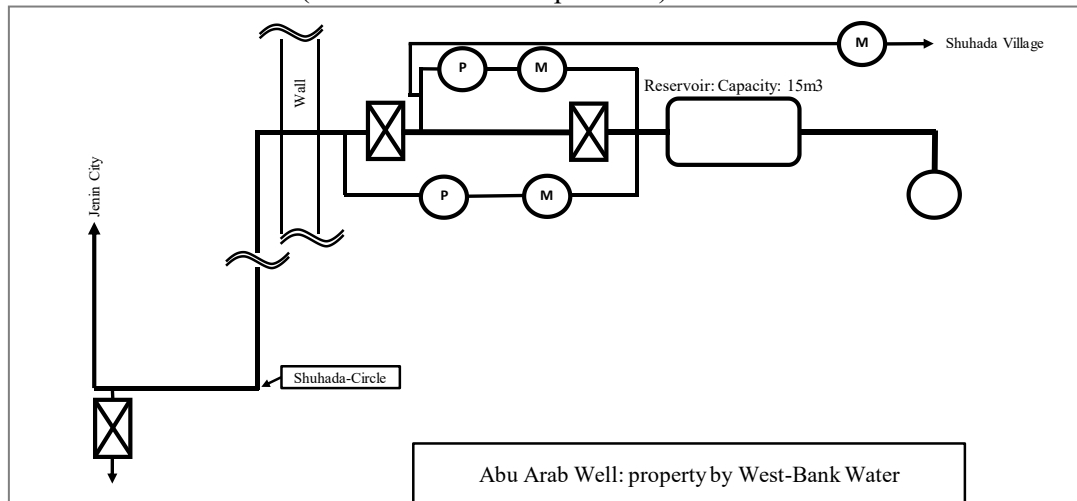
(8) Al Swetat connection (Mekerot 2)



Source: JICA Expert Team

Figure 1.8 Al Swetat connection

(9) Abo Arraba connection (West Bank Water Department)



Source: JICA Expert Team

Figure 1.9 Abo Arraba connection

1.2.2 Pump Operation

The pump operation in Jenin can be divided into two types; water source pumps and distribution pumps. The pumps are operated as follows.

(1) Al Mechanic well (Municipality well No. 1)

This well as well as all other municipal wells are operated by a private operator. This well is operated 24 hours in principle. Water is first collected in a 50 m³ tank near the well and then boosted (supplied) to areas by a booster pump. Sometimes, water from this well is sold to tankers. For this, the well water is first sent to a separate 50 m³ tank near the well and then given to tankers. The well is equipped with one pump that supplies maximum around 90 m³/h after recent rehabilitation. The distribution pump has a capacity of 30 m³/h and maximum head of 44.4 m.

(2) Saadeh well (Municipality well No. 2)

1) Well pump

The pump of this well is owned and operated by a private operator and rented by the municipality. Water from the well is pumped to storage tank located near the well site.

2) Transmission pump

Water from the tank is pumped to Al Jabreyat and Al Marah tanks. The pumping station is equipped with three KSB pumps. One of these is currently out of service.

(3) Balama well

This well belongs to the municipality but there is a private operator who takes care of operation of this well (and pump). Water is first collected in a small tank (50 m³ capacity) and then supplied to the network by pumping.

(4) Private wells (Faraty, Muamar Jarrar, and Alwaneh wells)

These wells (the pumps in these wells) are operated and maintained by their owners. They give water to the network depending upon the quantity available from wells (yield of wells).

(5) Sabah Al Khir PS

This PS has two 50 m³ tanks both connected to each other and equipped with altitude valve to close the inlet when the water level reaches the overflow level. This PS receives Mekerot water via Jalameh connection 24 hrs in principle. There are three pumps in this PS but currently one of these is working. The pumps in this station are variable speed pumps and are running automatically all the time except in case the tanks get empty (water level in the tanks goes below minimum level). Once the pump stops, it needs to be started manually. There is no dedicated watchman for this PS, so when a pump stops, it is known only when customers complain about not receiving water on their supply day. Occasionally the problem is found by WWD staff visiting the PS or nearby areas.

The pumps in this station are variable speed 15 kW Ebara pumps. Capacity of each pump is Q from 200-700 L/min at H from 172-75 m. Maximum head of the pump is 184 m.

(6) Al Swetat connection

Water from this connection is from Mekrot company and is available 24 hrs in principle. Some of this water is supplied directly to network in Al Swetat and Nablus road areas and some goes to Al Marah tank. Water from Al Marah tank is distributed by gravity to various areas including the city centre.

(7) Abo Araba well

This well belongs to the West Bank Water Department and is operated by them.

(8) Al Jamal PS

The old tank of Al Jamal has been abandoned and a new 50 m³ capacity tank along with new BPS has been constructed on the side of Nablus road. Water from Abo Arraba well and Alawneh well is collected in to this tank and boosted to Jabriyat and other nearby areas. Operation of this BPS is taken care by the WDD staff together with implementation of daily valve opening / closing program.

(9) Main booster pumping station

1) Al Shariqia booster

The booster is inside a small room and currently functioning and in a reasonable condition.

2) Halima Al Sadea booster

The booster is functioning. It is at open but protected by a fencing.

3) Al Sanuri booster

It is functioning but does not have any protection or shed.

4) Municipality booster

It is functioning but does not have any protection or shed.

- 5) Jabal Abu Daher booster
It is not functioning currently.

1.2.3 Valve Operation and Water Rationing System

Each area receives water from certain sources as shown in Figure 1.3. Due to weak hydraulic capacities of the water supply system, water is distributed intermittently to each area by daily valve operation.

(1) Valve operation workflow

Valves are operated manually twice a day in the morning (9:00 to 11:00) and in the afternoon (14:00 to 16:00) for the water rationing purpose. Due to unstable source water flow from connection point namely Al Jalameh connection, Al Swetat connection and Araba connection, the distribution program is often not followed. Valve operation schedule is prepared every morning with consideration for the water supply situation. The workflow of the process of valve operation is described in the Figure 1.10.

1) Gathering information on water supply situation

WWD has neither systemized procedure nor have equipment to investigate daily supply situation. They heavily rely on their private relationships with certain customers also called as “trusted customer”. Main means of grasping the water supply situation in different supply area is by getting feedbacks from these customers. In supply areas where the technicians reside, they also report the supply situation of their resident area to the head of water section.

Customers also make complains and request through customer service section or by directly calling the WWD. This information can also be taken into consideration for water rationing plan.

2) Arrangement of valve operation schedule

A meeting is held every morning at the WWD. In this meeting, all the information on supply situation is reported to the director of WWD. Valve operation task sheet Figure 1.6 is issued by the director, and it is given to the technicians who are in charge of valve operation. Although there is a GIS database on valves and the pipelines, the staff members mostly rely on their memory but sometimes take some help of online map provided by Ministry of Local Government which shows an aerial map and the pipelines and other assets. In the task sheet, the director lists the valve name or location and the required operation of valve (open or close). Along with the valve operation, the operation of any booster pump within the supply area is also specified so as to supply to the target areas.

3) Valve operation

One senior technician accompanied with one young technician goes to the site and operate valves indicated in the task sheet. As of November 2017, there are two senior technicians who fully understand pipeline network. Apart from these two senior technicians and the director, other technicians do not know much about pipeline network.



Photo 1.1 Valve Operation in a Chamber



Photo 1.2 Valve Operation on a Street

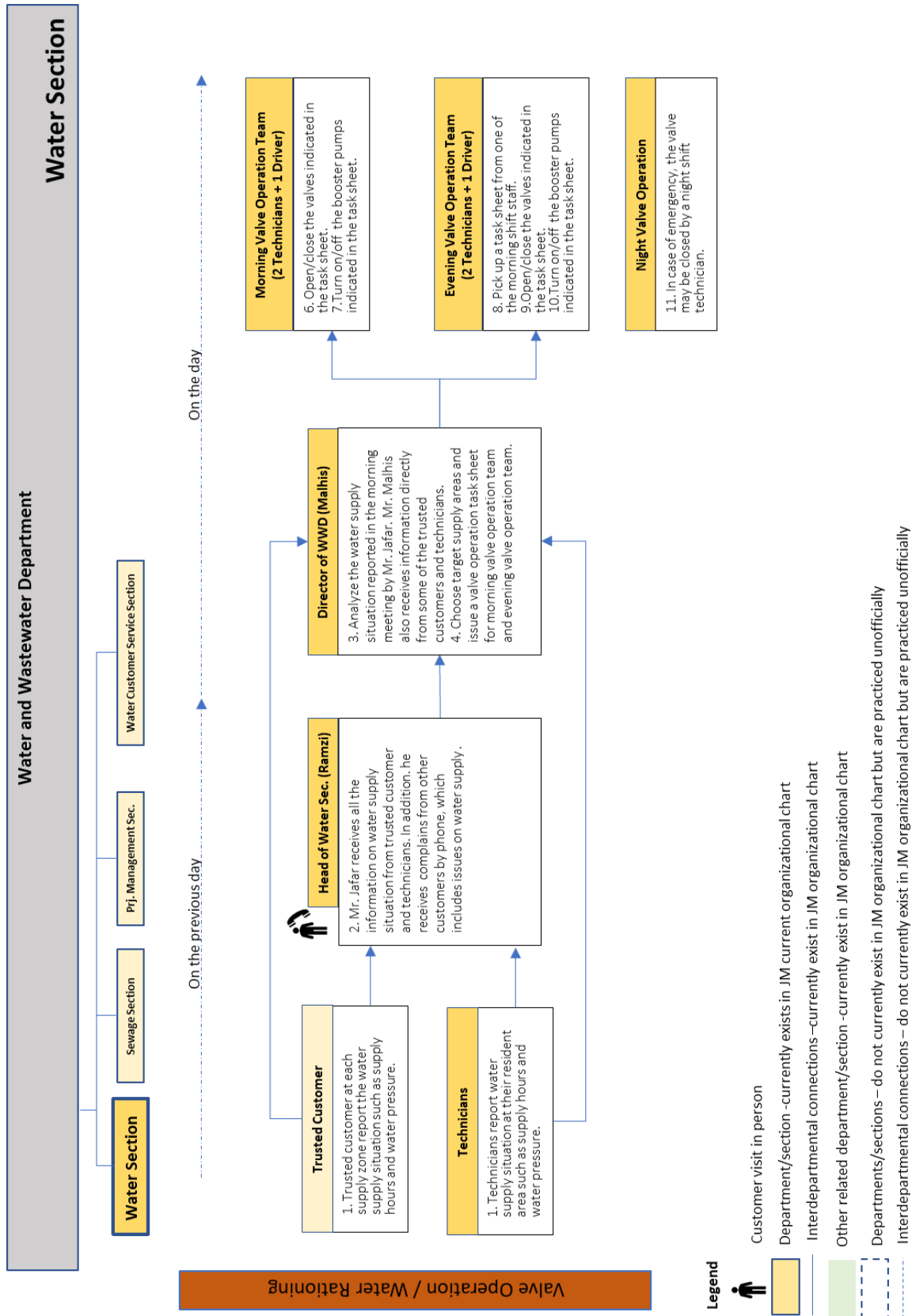


Figure 1.10 Workflow of Valve Operation



دولة فلسطين
وزارة الحكم المحلي
بلدية جنين
دائرة المياه والصرف الصحي



29/10/2017
AH

السيد/ مدير قسم المياه والصرف الصحي المحترم
تحية طيبة وبعد

الموضوع: يومية قسم المياه ليوم: الزهر بتاريخ: 29/10/17 الوردية: الصبح

الرقم	البيان	ملاحظات
1	اغضاء طلبة + اغلوص حاسبي + اغلوص حاسبي	
2	فتح صفة (ابو حازم) + فتح "البازيان" + فتح الزاير	
3	فتح فروج + اغلوص صبح الجند + فتح ابو فراس	
4	اغلوص ذر الرعي + اغلوص فلان منزل زهير كسر	
5	اغلوص الزغل	
6	اغلوص صفة البلدية + اغلوص الفرانقة تحت لوحة التحكم	
7		
8		
9		
10	1. Turn off Halima + close Mahbas valve + close Said Al-Nasser	
11	2. Turn on "4", "6" valves (Abu Hazem) + turn on "Albazyan" + turn on "Al-Zayed"	
12	3. Turn on "Kharoubeh" + Turn off "Sabah Al-Kheir"	
13	+ Turn on "Abu Franse"	
14	4. Turn off 3" - Damj + Turn off the valve beyond	
15	"Zuheir Al-mes'ad" house	

مسؤول قسم المياه

5. Turn off "Al-Zaghal"

6. Turn off beyond the municipality + Turn of the value of "Al-Farashah" below Al-Jamal's board. "Lawhat Al-Jamal"

Figure 1.11 Valve Operation Task Sheet issued on 29th Oct. 2017

Table 1.4 Description of Valve Operation Task Sheet issued on 29th Oct. 2017

No.	Description
1	Turn off Halima and close Said Al-Nasser
2	Turn on 4", 6" valves (Abu Hazem), turn on "Albazyan" and turn on "Al-Zayed"
3	Turn on "Kharoubeh", turn off "Sabah Al-Kheir" and turn on "Abu Franse"
4	Turn off 3" Damj and turn off the valve beyond "Zuheir Al-Mes'ad" house
5	Turn off "Al-Zaghal"
6	Turn off beyond the municipality, turn off the valve "Al-Farashah" below Al-Jamal's control panel

(2) Actual record of valve operation from October 29, 2017 to November 10, 2017

From Sunday, October 29th 2017 to Friday, November 10th 2017, operated valves locations for rationing purpose were taken using handy GPS. Those valves are shown in Figure 1.12. The number of operated vales is summarized in Table 1.5.

Table 1.5 Number of Operated Valves

No.	Date	No. of opened valves	No. of closed valves	Total
1	Sunday, October 29	10	15	25
2	Monday, October 30	6	7	13
3	Tuesday, October 31	22	8	30
4	Wednesday, November 1	9	9	18
5	Thursday, November 2	5	3	8
6	Friday, November 3	8	12	20
7	Saturday, November 4	4	10	14
8	Sunday, November 5	19	6	25
9	Monday, November 6	6	5	11
10	Tuesday, November 7	9	16	25
11	Wednesday, November 8	6	5	11
12	Thursday, November 9	7	11	18
13	Friday, November 10	4	11	15

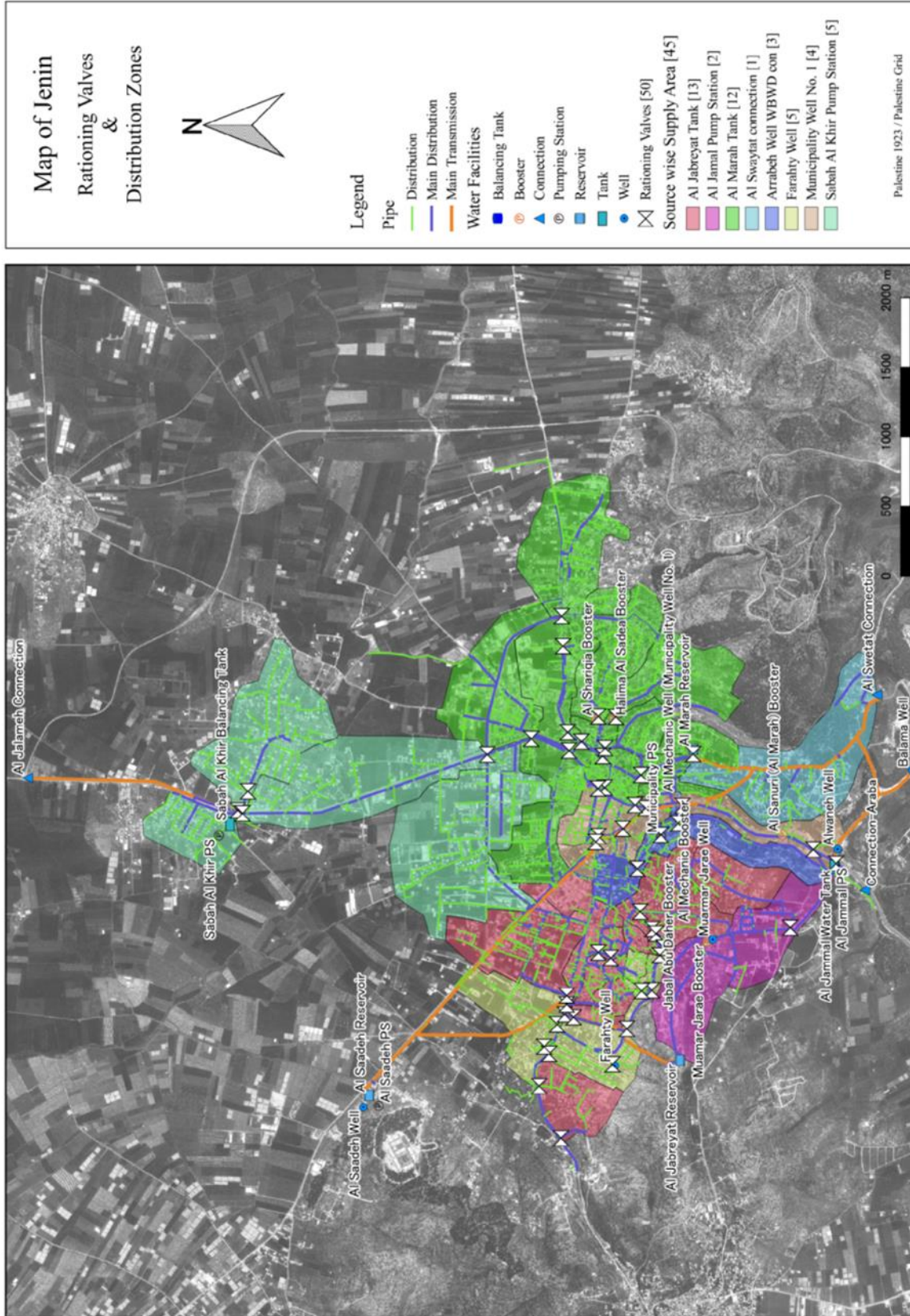


Figure 1.12 Rationing Valves and Distribution Zones

Source: JICA Expert Team

1.2.4 Water supply conditions and service level

Various general and technical indicators related to water loss and consumption of FY 2015 and 2016 are shown in the following Tables.

Table 1.6 General Indicators of FY 2015 and 2016

S. N.	Indicator	Unit	2015	2016	Remarks
1	Population served with water service	No	54,000	54,000	Does not include population of bulk customers
2	Population served with wastewater service	No	42,000	44,000	
3	Number of wastewater connections	No	7,100	7,200	
4	Number of served customers - Domestic class	No	7,000	8,037	
5	Number of served customers - Commercial class	No	1,500	1,378	
6	Number of served customers - Industrial class	No	90	90	
7	Number of served customers - Touristic class	No	-	-	
8	Water network length including mains	km	149	149	
9	Number of staff working on water service	No	57	57	Both water and wastewater sections

Source: WWD annual report 2015 & 2016

Table 1.7 Technical Indicators of FY 2015 and 2016

S. N.	Indicator	Unit	2015	2016
1	Average daily per capita water consumption at domestic level	l/c/d	63.95	68.61
2	Average daily water sold per capita based on total population	l/c/d	69.47	74.16
3	Consumption pattern:			
3.1	<i>Domestic water consumption as % of total consumption</i>	%	92.06	92.51
3.2	<i>Industrial water consumption as % of total consumption</i>	%	0.53	0.54
3.3	<i>Commercial water consumption as % of total consumption</i>	%	7.41	6.95
3.4	<i>Touristic water consumption as % of total consumption</i>	%	0.00	0.00
3.5	<i>Bulk water consumption as % of total consumption</i>	%	0.00	0.00
4	Non-Revenue Water by volume	%	49.08	49.31
5	Non-revenue water in (m ³) per km of network per year	m ³	8,856.60	9541.59

*Report on Baseline Survey
Project for Strengthening the Capacity of Water Service Management in Jenin Municipality*

6	Non-revenue water per connection per day	l/con/d	420.89	409.79
7	Wastewater Coverage	%	77.78	81.48

Source: WWD annual report 2015 & 2016

CHAPTER 2. FINANCIAL MANAGEMENT

2.1 Financial Balance of JM in 2012-2016

The financial statements in the JM have been prepared based on the traditional cash basis method (single entry bookkeeping), and the modified accrual method of accounting (double entry bookkeeping) that has been recommended by the MoLG for years has not yet been introduced. Thus, the annual financial statements are consisted of a breakdown of revenues and expenditures and not including a balance sheet and each accounting item is entered as of the date when cash payments are made or received. The revenues and expenditures in each department can be categorized and separated from each other based on a code system.

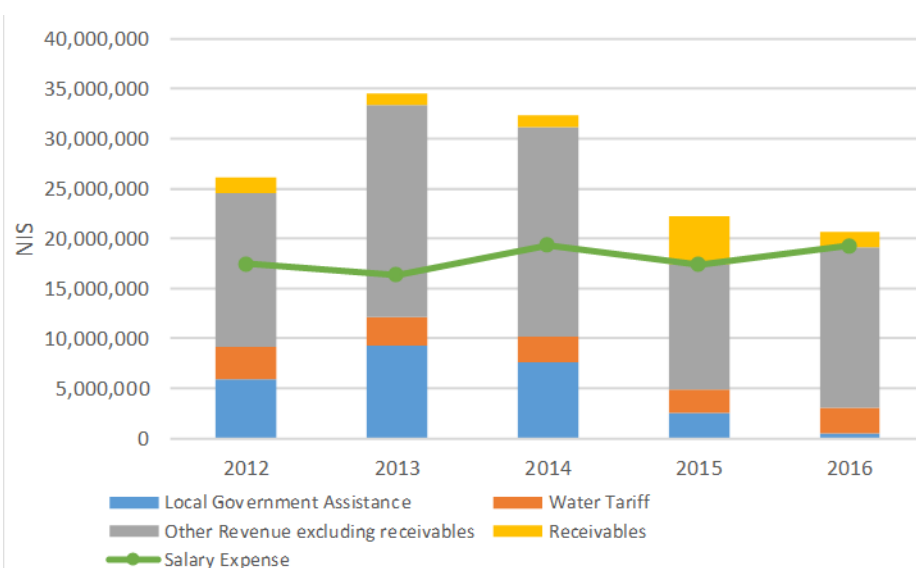
2.1.1 Whole Jenin Municipality

The financial balance of the JM in the past 5 years (2012 -2016) is shown in Table 2.1 through Table 2.5 and Figure 2.1 according to the financial statements of each year. The revenue (excluding receivables) has scarcely covered even salaries since 2015 as shown in Figure 2.1 and the total deficit amounts to over 8,000,000 NIS in both 2015 and 2016 as shown in Table 2.1. The deficit has been covered by (a) drawing cash from insurance reserves of customers; and (b) non-payment of debts to the Palestine Authority. In fact, the budget of the JM for the FY 2016 was not approved by the MoLG because of the non-improvement to reduce the salary expenses. Recently the official credit rating of the JM has been graded down from the previous B+ to the current C++.

Table 2.1 Financial Balance from 2012 to 2016

Item	2012	2013	2014	2015	2016	Total
Local Government Assistance	5,970,702	9,239,029	7,580,956	2,586,115	455,450	25,832,252
Water Tariff	3,188,158	2,847,284	2,562,345	2,300,735	2,540,842	13,439,364
Revenue Other Revenue excluding receivables	15,376,876	21,300,747	21,076,437	12,510,078	16,131,071	86,395,209
Receivables	1,561,222	1,172,209	1,131,732	4,890,573	1,512,520	10,268,255
Total Revenue in FS	26,096,958	34,559,268	32,351,470	22,287,501	20,639,882	135,935,080
Salary Expense	17,486,532	16,364,940	19,318,988	17,399,616	19,259,646	89,829,721
Expense Other Expense	12,289,263	18,301,744	17,170,960	13,449,983	9,571,044	70,782,995
Total Expense	29,775,794	34,666,684	36,489,948	30,849,599	28,830,690	160,612,716
Balance	-3,678,837	-107,416	-4,138,478	-8,562,098	-8,190,808	-24,677,636

Source: JICA Expert Team



Source: JICA Expert Team

Figure 2.1 Revenue Breakdown and Salary Expenses in JM Financial Statement

Table 2.2 Financial Statements of JM (1/4) - Revenues, Unit: NIS

Category	Code	Item	2012	2013	2014	2015	2016
Property Tax	410101	Current property tax		3,852,554	3,401,950		
Revenue of Licenses and Vacations	410201	Fees of crafts and industries	768,027	700,921	632,445	725,262	911,646
	410202	Building license fee	2,679,301	3,230,813	2,596,293	2,803,845	3,840,828
	410203	Other license fee				4,194	1,980
	410204	Animal market fee	17,000				
	410205	Rugs and street vendors	20,350			456,623	16,088
	410207	Banner	1,005,910	993,317	1,019,712	943,332	1,034,451
	410208	Fees are assigned and street identification	1,221	502	1,655		552
	410210	Eighth copies of bids	33,900	33,221	44,782	26,900	26,660
	410213	Site map and demarcation fee	80,253	76,156	83,489	84,707	84,661
	410214	Site Improvement fee	508,773	648,594	407,800	225,482	371,525
Revenue of Services Fee	410301	Current waste charge	1,756,966	1,952,880	2,000,375	2,105,472	2,074,414
	410302	Parking fee	1,428,119	1,198,772	1,010,619	68,632	1,229,552
	410303	Certificate authentication	36,995	38,615	41,644	47,203	42,862
	410304	Library subscriptions	1,471	1,132	1,884	1,695	1,694
	410305	Contributions	3,230	35,712			
	410306	Transfer fees and burial	3,840	3,220	3,520	1,510	2,030
	410307	Drawings of retaining walls	2,000				
	410308	Court fees	331	161	28		
	410310	Fees for Jenin Technological Center courses	4,319	1,680	1,400	200	
	410311	Share Center Fee	1,101	7,427	6,700	6,504	196
	410312	Residual waste charge	147,210	570,920	447,889	435,757	768,930
	410313	Parking fees are arched	3,920	45,260	27,225	21,450	20,367
	410318	Bus parking fee		337,995	371,190	6,680	385,528
	410320	Prepaid parking fee					140,000
Taxes and Other Local Fees	410401	The municipality's share of current road transport charge		1,080,748	984,291		500,000
	410402	Career licenses		697,240	622,200		
Government and International Aid	410501	Local government assistance	5,970,702	9,239,029	7,580,956	2,586,115	455,450
Revenue of Fines	410601	Court fines	36,283	16,505	67,034	57,941	50,235
	410603	Delay penalties	960				
Income from Property Use	410701	Benefit of balances	650,847	889,636	837,386	813,596	690,255
	410704	Current municipal property rent	1,002,803	806,337	795,687	1,010,798	1,151,918
	410711	Rents of late municipal property	1,025,876	810,811	298,063	577,718	609,814
Miscellaneous Income	410801	Donation and community contribution	63,062	25,008	46,950	31,050	
	410802	Sale of goods and supplies	53,379	5,904	22,675	138,014	29,750
	410805	Non-refundable	83,342	32,442	42,007	4,382	3,737
	410806	Return expenses	116,285	59,266	229,748	50,354	35,298
	410807	Retirement earnings	1,939,510	1,194,535	1,753,700	1,166,902	1,287,186
	410808	Miscellaneous	9,812		4,420	900	4,000
	410809	Individual donation	94,141	44,891	62,175		
Water Project Revenues	411001	Current water revenue	3,188,158	2,847,284	2,562,345	2,300,735	2,540,842
	411003	Water subscription fee	98,084	107,050	104,005	110,264	90,034
	411004	Eighth supplies of water subscriptions	28,758	34,807	69,043	38,007	31,807
	411005	Water tanker revenue	106,361	87,021	77,500	118,610	109,505
	411008	Contributions of Eighth Articles		8,000	5,755	3,938	8,325
	411009	Cutting fees and re-installation		1,767	1,829	1,092	1,651
	411012	Sewage fee	168,892	189,022	132,308	144,755	144,276
	411013	Previous debts that can be collected	1,346,652	1,045,614	1,131,732	4,890,573	1,477,370
Electricity Project Revenues	411106	Street lighting charge	100	15,800	6,250		
	411112	Previous debts that can be collected	214,570	126,595			35,150
	411113	Profit of the electricity project from the North by 10%			1,040,242		
Vegetable and Fruit Market Revenues	411201	Fee of vegetable and fruit market	1,121,000	1,184,200	1,464,871		228,948
	411202	Building permit fees				100,500	
Municipal Slaughterhouse Project Revenues	411301	Slaughtering of livestock	273,145	279,905	307,700	175,810	200,000
	99000000	Currency transformation					370
	Revenue	Total	26,096,958	34,559,268	32,351,470	22,287,501	20,639,882

Source: JICA Expert Team

Table 2.3 Financial Statements of JM (2/4) - Expenditures, Unit: NIS

Category	Code	Item	2012	2013	2014	2015	2016
Salary Expenses	510101	Employees salaries of financial administration and legal affairs	5,068,070	4,995,313	5,903,826	5,546,138	5,700,433
	510102	Worker' wage			12,300	70,552	365,706
	510103	Health insurance	6,631	21,902	89,430	148,820	131,238
	510104	Pensioners' salaries - Management and Finance	1,598,144	1,522,313	2,007,977	1,715,277	1,851,550
	510105	End of service indemnities	144,581	18,900	85,439		60,357
	510106	Rewards and incentives	1,000	700	39,500	38,400	451,400
	510108	Additional labor fees	2,192	11,063	33,185	49,597	33,633
	510109	Insurance against accidents and work injuries		22,160	95,000	52,590	102,300
	510110	Reward members of the municipal council	163,726	293,784	291,375	253,473	261,548
	510111	Mayor's salary	163,424	113,092	127,558	113,815	86,905
	General and Administrative Expenses	510201	Mail and telephone	54,010	120,029	144,275	127,984	156,149
510202		Stationary and prints	43,233	68,412	43,508	40,940	97,763
510203		Two hundred water and electricity	58				
510204		Protocols	107,175	78,016	51,812	50,237	107,815
510205		Advertising fees	27,151	25,371	27,863	45,703	20,452
510206		Judicial expenses	22,490	88,067	530	66,211	222,647
510209		Clothes	200	620	19,959	25,026	4,826
510210		Transport fees and travel allowances	7,057	90,927	29,847	41,174	19,969
510211		Advisory expenses		6,741			
510212		External Travel		20,916			
510213		Internal Movements	453		250		
510214		Other miscellaneous expenses	85,613	113,713	301,048	245,629	39,557
510215		Taxes on municipal property	422	106			
510216		Computer hardware maintenance and supplies	110,255	131,734	13,376	39,147	14,683
510217		Interest and bank commissions	28,118	23,490	19,139	45,850	558,010
510218		Maintenance and services of wireless devices	880				
510219		Re-imports from previous years	2,094,603	207,959	166,126	12,055	33,209
510220		Oils and motor fuels	88,636	86,644	47,427	49,836	29,365
510221		Car maintenance	23,072	5,783	31,019	14,733	15,345
510222		Car insurance	31,599	23,515	27,486	3,485	
510224		Donations and subsidies	4,197	8,100	31,854	10,300	77,820
510225		Furniture and maintenance	48,843	31,098	22,513	25,921	40,703
510301		Staff salaries of Health Dept	1,544,360	2,015,039	1,965,239	1,661,751	1,805,994
510302		Health workers' wages			26,000		14,784
510303		Health insurance	1,782	5,200	16,450		2,655
510304		Retirees salary: Health Dept	230,035	238,052	278,016	246,780	263,655
510305		End of service indemnities	1,570,826	64,579	46,734		4,494
510306		Rewards and incentives		5,100	22,100	2,896	15,366
510307		Insurance against accidents and work injuries	4,712	23,073			13,818
510309		Additional labor fees	3,726	8,098	100,483	45,881	29,581
510401		Mail and telephone	90	2,937	3,703	3,354	1,864
510402		Arrayed	2,170		2,440	3,430	
510403	Stationary and prints	6,427	5,086	2,790	620	6,480	
510404	General maintenance and repairs	28,270					
510405	Advertising fees	3,353	294	294	2,994	4,180	
510407	Transport fees and travel allowances	400	750	150	200	250	
Operating Expenses	510501	Malaria and rabies control	13,470	13,675	26,144	25,975	266
	510502	Cleaning expenses		18			
	510503	Maintenance of sewage and latrines	3,101	37,167		1,636	
	510505	Pesticide	15,790				18,140
	510506	Maintenance of water pumps	1,658	112	420		
	510509	Waste disposal fees	2,920,561	3,061,241	3,600,000	2,410,000	3,170,000
	510510	Oil and fuels	53,900	39,787	53,589	52,992	39,061
	510511	Car maintenance	14,642	8,252	8,147	21,851	5,801
	510512	Car insurance	2,555	2,555	6,500	6,814	
	510513	Furniture and maintenance	1,335		1,150	3,100	400
	510514	Equipment			600		
	510515	Maintenance of waste containers				850	
	510601	Staff salaries of Dept of Engineering and	1,032,035	1,591,151	1,959,404	1,885,509	1,901,566
	510602	Wages of workers in Engineering Dep.		186	25,808	151,694	207,764
	510603	Health insurance	9,786	7,855	34,939		9,498
510604	Retired: Engineering Dep.	913,828	470,147	356,650	271,373	289,747	

Source: JICA Expert Team

Table 2.4 Financial Statements of JM (3/4) - Expenditures, Unit: NIS

Category	Code	Item	2012	2013	2014	2015	2016
Operating Expenses	510605	End of service indemnities	163,554	56,833	59,198		
	510606	Rewards and incentives		300	3,800	2,350	7,636
	510607	Insurance against accidents and work injuries	19,035	24,775	1,140		75,406
	510609	Additional labor fees	1,601	17,480	55,599	58,805	72,931
	510610	Maintenance workers' wages			23,897		
	510701	Mail and telephone	1,814	7,889	4,973	4,858	435
	510702	Arrayed	1,480	8,710	90	999	3,047
	510703	Stationery, printing and price lists	2,726	2,689	1,551	4,922	2,175
	510704	Advertising fees	41,831	20,756	27,838	20,144	54,315
	510705	Judicial expenses					750
	510706	Transport fees and travel allowances	1,940	5,420	5,193	4,444	1,350
	510801	Maintenance of streets and sidewalks	1,261,679	1,283,036	1,216,844	2,111,473	1,640,712
	510802	Building maintenance	44,626	232,299	192,997	258,347	205,676
	510803	Maintenance of machinery	5,610			240	
	510804	Maintenance of gardens	8,053	28,216	7,691	14,244	16,250
	510805	Maintenance of graves	990	380		2,694	5,090
	510806	Maintenance of retaining walls	20,284	1,631	1,964	154,964	8,257
	510810	Oil and fuels	283,338	261,722	244,529	128,197	92,405
	510811	Car maintenance	154,768	189,747	150,424	164,029	81,598
	510812	Car insurance	30,563	40,774	36,075	15,718	
	510813	Maintenance of drawers	24,303		30,563		
	510814	The salaries of retirees - Electricity			500		
	510815	Maintenance of municipal property					29,057
	510816	Maintenance of light signals	30,950				
	510818	Maintenance of air conditioners	600		2,000	250	
	510820	Supplies of metalworking workshop and	11,876	9,601	2,815	6,733	1,726
	510821	Maintenance of municipal stadium	922	750		973,507	
	510822	Furniture and maintenance	2,468	2,000	1,405	1,800	5,385
	510823	Office equipment and tools		74,270			
	510824	Label and numbering supplies and equipment	1,804	144		370	
	510825	Land				22,061	
	510901	Staff salaries of security and fire dep.	665,774	650,692	851,057	798,507	875,102
	510903	Health insurance	796				
	510904	Salaries of retirees - security and firefighters		188,181	3,203	1,964	1,521
	510905	End of service indemnities		4,581	17,981		19,651
	510907	Insurance, accidents and work injuries	827				
	510909	Additional labor fees		69	329	12,312	
	511003	Stationery and prints			62		
	511209	Clothes			152		
	511301	Mail and telephone	1,450	211			
	511303	Stationery and prints	122		220	246	
	511401	Buy books, newspapers and periodicals for the library	1,534	13,915			
	511403	Binding and numbering of books		80			
	511411	Expenditures of Jenin Technological Center	4,398	3,837			
	511412	Share Center expenses	6,343	4,704			
	511501	Staff salaries of WWD	2,051,688	2,302,517	2,676,311	2,357,320	2,445,875
	511502	Wages of water and sanitation workers	140	35,446	52,413	38,178	53,359
	511503	Health insurance	6,950	7,725	4,244		2,655
	511504	Retirement earnings: WWD	731,917	601,368	672,324	642,179	711,818
	511505	End of service indemnities	132,328	1,321	28,771	48,769	24,403
511506	Rewards and incentives			13,900		5,400	
511507	Insurance against accidents and work injuries	30,902	22,460			21,346	
511509	Additional labor fees	1,122	4,062	3,716	19,014	11,645	
511510	Sewage worker' wage			8,323	12,768	51,637	

Source: JICA Expert Team

Table 2.5 Financial Statements of JM (4/4) - Expenditures, Unit: NIS

Category	Code	Item	2012	2013	2014	2015	2016
Operating Expenses	511601	Oils and motor fuels	68,446		18,518		
	511602	Maintenance of pumps	141,814	139,600	461,530	590,424	624,765
	511603	Water network maintenance	117,010	104,698	158,594	120,006	242,041
	511604	Water purchase	791,043	1,467,838	1,378,078	899,555	1,279,097
	511605	Water disinfection	26,380	9,050	14,648	17,855	33,994
	511607	Maintenance of meters	280	100		4,229	
	511608	Number and supplies	1,850	265	10,430		
	511610	Oils and motor fuels	182,760	247,083	200,203	231,315	156,612
	511611	Car maintenance	61,736	143,666	74,573	43,572	142,473
	511612	Car insurance	30,540	41,368	29,289	11,423	
	511613	Spare parts	105				
	511614	Equipment					200
	511615	Maintenance, extension and drainage lines	290,905	335,602	254,742	118,155	103,472
	511616	Redemption of previous debts	1,509,051	3,731			
	511701	Mail and telephone	45,006	11,089	8,318	5,646	3,098
	511703	Stationery and prints	18,864	11,885	11,575	17,697	14,305
	511704	The Protocols			150		
	511705	Advertising fees	21,117	11,372	10,890	7,340	6,600
	511706	Clothes	980	1,786		100	
	511707	Transport fees and travel allowances	1,500	1,550	3,475	17,106	14,936
	511708	Furniture and maintenance	2,959	21,255	8,090	1,230	17,446
	511801	Staff salaries of Elec. Dep	839,050	177,393	228,227	200,557	209,883
	511803	Health insurance	5,090				
	511804	Retirement salary: electricity	79,057	530,259	771,186	669,276	736,071
	511805	End of service indemnities	6,138	39,070		1,022	
	511806	Rewards and incentives				1,000	
	511807	Insurance against accidents and work injuries	2,283	22,460			
	511809	Additional labor fees		180			55
	511902	Maintenance of electricity network	1,703				
	511903	Maintenance of the electricity project		21,441	5,020		
	511909	Oils and motor fuels	3,706				
	511910	Car maintenance	150	335	26,029		
	511911	Car insurance	890				
511912	Redemption of previous debts		5,663,260	5,025,096	3,883,719		
511913	Street lighting and maintenance	103,047	104,861	130,107	66,678	57,084	
Building Cultural and Development Centers	512007	Transport fees and travel allowances	100	150			
	512101	Staff salaries of Slaughterhouse Sec.	289,420	228,060	325,958	281,049	329,263
	512107	Salaries of the employees of the Slaughterhouse Sec.		22,000			
	512204	Furniture and maintenance				140	
	512207	Car maintenance	1,200				
	512303	Stationary and prints		180			
	512402	Drilling of ponds for purification	132,864		35,400		
	512403	Buy a divider		180			7,575
	512404	Municipal slaughterhouse	112,241	17,041	37,554	13,479	20,038
	512405	Personal program	7,995	39,826	66,774	61,837	14,328
	512406	Purchase the land of Hesba	37,864				
	512407	Construction of an external transport complex			34,610		
	512408	Buying a boring land	93,810				
	512409	Buying the land of Nawaf Abdul Hadi	468,900		2,014,500		
	512410	Development of accounting programs	47,191				
	512411	Buying cars	173,000		19,674	70,190	
	512412	Purchase Land of Samer Hawassin		62,138			
512413	Buying a land owned by Jamal Abdul Hadi		2,506,774				
512414	Buying the land of Taha Mohammed Jarrar		26,945				
512415	Contribution of the municipality in the construction of the purification plant			500,000			
512416	Buying the land of Hisham Ahmed Samoudi		479,076				
512417	Buying the land of Suleiman Mari			21,250			
99000000	Currency transformation		331,703				
Expenses	Total		29,775,794	34,666,684	36,489,948	30,849,599	28,830,690
Deficit			-3,678,837	-107,416	-4,138,478	-8,562,098	-8,190,808

Source: JICA Expert Team

2.1.2 Water and Wastewater Department

The financial balance of the Water and Wastewater Department separated from the financial statements of the whole JM is shown in Table 2.6 in the same past 5 years (2012 -2016). Table 2.7 shows an abbreviated financial balance with the revenue excluding the receivables, because under the cash basis accounting method the receivables should not be counted in. Figure 2.2 was prepared based on Table 2.7.

The total expenditure has not been covered by the total revenue and the coverage ratio remains to be 54% averagely in the last 5 years (excluding receivables) as shown in Table 2.6. The deficit has been covered by (a) drawing cash from the insurance reserves of customers (e.g. new connection); and (b) non-payment of debts to the Palestine Authority (e.g. the water purchase cost from the West Bank Water Department).

Table 2.6 Financial Statements of Water and Wastewater Department (Unit: NIS)

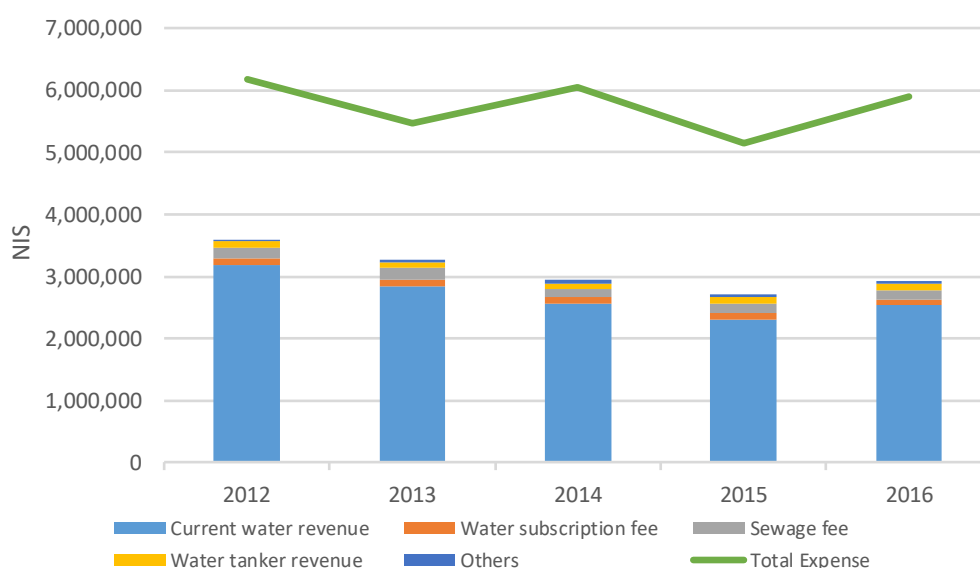
Code	Item	2012	2013	2014	2015	2016
411001	Current water revenue	3,188,158	2,847,284	2,562,345	2,300,735	2,540,842
411003	Water subscription fee	98,084	107,050	104,005	110,264	90,034
411004	Eighth supplies of water subscriptions	28,758	34,807	69,043	38,007	31,807
411005	Water tanker revenue	106,361	87,021	77,500	118,610	109,505
411008	Contributions of Eighth Articles	0	8,000	5,755	3,938	8,325
411009	Cutting fees and re-installation	0	1,767	1,829	1,092	1,651
411012	Sewage fee	168,892	189,022	132,308	144,755	144,276
411013	Previous debts that can be collected	1,346,652	1,045,614	1,131,732	4,890,573	1,477,370
	WWD Revenue total	4,936,906	4,320,564	4,084,517	7,607,974	4,403,809
	WWD Revenue total (excluding 411013)	3,590,254	3,274,951	2,952,785	2,717,401	2,926,439
511501	Staff salaries of WWD	2,051,688	2,302,517	2,676,311	2,357,320	2,445,875
511502	Wages of water and sanitation workers	140	35,446	52,413	38,178	53,359
511503	Health insurance	6,950	7,725	4,244	0	2,655
511504	Retirement earnings: WWD	731,917	601,368	672,324	642,179	711,818
511505	End of service indemnities	132,328	1,321	28,771	48,769	24,403
511506	Rewards and incentives	0	0	13,900	0	5,400
511507	Insurance against accidents and work injuries	30,902	22,460	0	0	21,346
511509	Additional labor fees	1,122	4,062	3,716	19,014	11,645
511510	Sewage worker' wage	0	0	8,323	12,768	51,637
511601	Oils and motor fuels	68,446	0	18,518	0	0
511602	Maintenance of pumps	141,814	139,600	461,530	590,424	624,765
511603	Water network maintenance	117,010	104,698	158,594	120,006	242,041
511604	Water purchase	791,043	1,467,838	1,378,078	899,555	1,279,097
511605	Water disinfection	26,380	9,050	14,648	17,855	33,994
511607	Maintenance of meters	280	100	0	4,229	0
511608	Number and supplies	1,850	265	10,430	0	0
511610	Oils and motor fuels	182,760	247,083	200,203	231,315	156,612
511611	Car maintenance	61,736	143,666	74,573	43,572	142,473
511612	Car insurance	30,540	41,368	29,289	11,423	0
511613	Spare parts	105	0	0	0	0
511614	Equipment	0	0	0	0	200
511615	Maintenance, extension and drainage lines	290,905	335,602	254,742	118,155	103,472
511616	Redemption of previous debts	1,509,051	3,731	0	0	0
	WWD Expenses total	6,176,967	5,467,901	6,060,606	5,154,763	5,910,790
	Surplus / Deficit (including 411013)	-1,240,062	-1,147,336	-1,976,089	2,453,211	-1,506,981
	Surplus / Deficit (excluding 411013)	-2,586,714	-2,192,950	-3,107,821	-2,437,362	-2,984,351

Source: JICA Expert Team

Table 2.7 Financial Balance of Water and Wastewater Department from 2012 to 2016

Item		2012	2013	2014	2015	2016	Total	
Revenue (excluding receivables)	Current water revenue	3,188,158	2,847,284	2,562,345	2,300,735	2,540,842	13,439,364	86.9%
	Water subscription fee	98,084	107,050	104,005	110,264	90,034	509,437	3.3%
	Sewage fee	168,892	189,022	132,308	144,755	144,276	779,253	5.0%
	Water tanker revenue	106,361	87,021	77,500	118,610	109,505	498,998	3.2%
	Others	28,758	44,574	76,627	43,037	41,783	234,779	1.5%
	Total Revenue	3,590,254	3,274,951	2,952,785	2,717,401	2,926,439	15,461,830	100.0%
Expense	Staff salaries of WWD	2,051,688	2,302,517	2,676,311	2,357,320	2,445,875	11,833,712	41.1%
	Water purchase	791,043	1,467,838	1,378,078	899,555	1,279,097	5,815,611	20.2%
	Retirement earnings: WWD	731,917	601,368	672,324	642,179	711,818	3,359,607	11.7%
	Maintenance of pumps	141,814	139,600	461,530	590,424	624,765	1,958,133	6.8%
	Water network maintenance	117,010	104,698	158,594	120,006	242,041	742,348	2.6%
	Oils and motor fuels	182,760	247,083	200,203	231,315	156,612	1,017,973	3.5%
	Redemption of previous debts	1,509,051	3,731	0	0	0	1,512,782	5.3%
	Others	651,684	601,065	513,565	313,963	450,583	2,530,862	8.8%
	Total Expense	6,176,967	5,467,901	6,060,606	5,154,763	5,910,790	28,771,028	100.0%
	Deficit	-2,586,714	-2,192,950	-3,107,821	-2,437,362	-2,984,351	-13,309,198	-
	Total Revenue/Total Expenses (%)	58.1%	59.9%	48.7%	52.7%	49.5%	53.7%	-

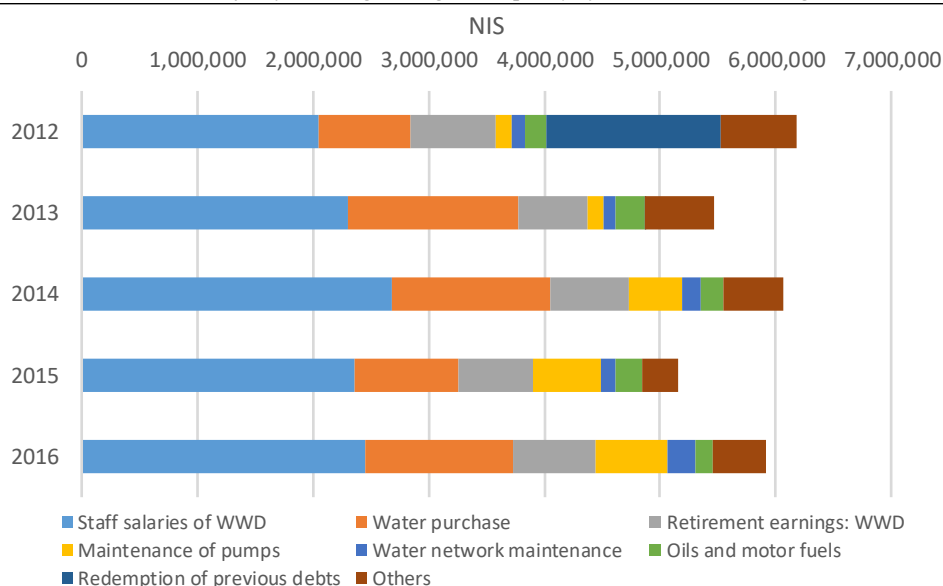
Source: JICA Expert Team



Source: JICA Expert Team

Figure 2.2 Revenue Breakdown and Total Expenditures in Water and Wastewater Department

Figure 2.3 shows a breakdown of expenditures, where the share of staff salaries and the water purchase cost is around 40% and 20% respectively in average from 2012 to 2016. The operation and maintenance of main pumps and wells have been outsourced since 2015 (accounting for 10.6% of the total expenditures in 2016), while the maintenance cost of water network has been kept at minimum (4.1% of the total expenditures in 2016, though it was doubled to 242,041 NIS from the previous 120,006 NIS in 2015).



Source: JICA Expert Team

Figure 2.3 Breakdown of Expenditures in Water and Wastewater Department

2.2 Main Revenues of JM

The main revenue resources of the JM are listed in Table 2.8, which comprise “building license fee” (#410201); “water tariff” (#411001); “waste charge” (#411301 and #410312); “property rent” (#410704 and #410711) and others. Since there is a yearly drastic increase /decline in the 3 items namely “current property tax” (#410101), “local government assistance” (#410501) and “fee of vegetable and fruit market” (#411201) that can affect the stable budgetary management in the future, the reasons are clarified as below. A problem related to the waste charge (#410301 and #410312) is also stated.

Table 2.8 Main Revenues of JM (Unit: NIS)

Code	Accounting Item	2012	2013	2014	2015	2016	Sum	
410101	Current property tax	0	3,852,554	3,401,950	0	0	7,254,504	5.3%
410201	Fees of crafts and industries	768,027	700,921	632,445	725,262	911,646	3,738,300	2.8%
410202	Building license fee	2,679,301	3,230,813	2,596,293	2,803,845	3,840,828	15,151,081	11.1%
410207	Banner	1,005,910	993,317	1,019,712	943,332	1,034,451	4,996,722	3.7%
410301	Current waste charge	1,756,966	1,952,880	2,000,375	2,105,472	2,074,414	9,890,107	7.3%
410302	Parking fee	1,428,119	1,198,772	1,010,619	68,632	1,229,552	4,935,693	3.6%
410312	Residual waste charge	147,210	570,920	447,889	435,757	768,930	2,370,706	1.7%
410501	Local government assistance	5,970,702	9,239,029	7,580,956	2,586,115	455,450	25,832,252	19.0%
410704	Current municipal property rent	1,002,803	806,337	795,687	1,010,798	1,151,918	4,767,542	3.5%
410711	Rents of late municipal property	1,025,876	810,811	298,063	577,718	609,814	3,322,282	2.4%
411001	Current water revenue	3,188,158	2,847,284	2,562,345	2,300,735	2,540,842	13,439,364	9.9%
411201	Fee of vegetable and fruit market	1,121,000	1,184,200	1,464,871	0	228,948	3,999,019	2.9%
	Sum	20,094,071	23,535,284	20,409,254	13,557,667	14,846,792	92,443,068	68.0%
	Receivables	1,561,222	1,172,209	1,131,732	4,890,573	1,512,520	10,268,255	7.6%
	Other Revenue	4,441,665	9,851,775	10,810,484	3,839,261	4,280,570	33,223,756	24.4%
	Total Revenue	26,096,958	34,559,268	32,351,470	22,287,501	20,639,882	135,935,080	100.0%

Source: JICA Expert Team

2.2.1 Property Tax (#410101)

This is one of the reallocation of taxes collected by the Palestine Authority, and it was disbursed in 2013 and 2014 before the Palestine Authority stopped the provision from 2015, when the Ministry of Finance and Planning is said to have discovered problems in the value of properties estimated by the JM. But the Ministry of Finance and Planning itself allegedly has a lot of wrongs in the estimation of the property tax, and no clear rule has been shown to the JM on the calculation basis of the amount, which has brought the JM difficulty to expect the amount and prepare and execute its budget in a proper and timely manner.

Thus, it is recommended that the JM should be enabled to calculate the tax, to compare it with the actual payment by the Palestine Authority and to know the reason of the deduction if any. According to the policy of the Palestine Authority, it takes the 90% of the property tax while reallocating the remaining 10% to the JM, until the JM pays off the debts to the Palestine Authority.

The revenues allocated to the JM by the Palestine Authority comprises (a) the municipality's share of current road transport charge (code #401401); and (b) career licenses (code #410402) in addition to this current property tax (code #410101). The same problem of the Palestine Authority stated above exists for these 2 revenue items in the determination process of the reallocated amount to the JM i.e. there is no explicit rule on the calculation basis. It is recommended that the Palestine Authority shall disclose /show an explicit program for the tax reallocation to the JM and the debt redemption of the JM.

2.2.2 Local Government Assistance (#410501)

This is related to the establishment of the Electricity Distribution Company of the North (NEDCO) separated from the JM in 2010. This is the payment by the NEDCO in installment from 2012 to 2016, as the agreed compensation to the amount that the JM paid before 2012. This amount of money was paid as the end of service allowance for the 726 transferred /retired employees¹ from the former Electricity Department of the JM to the NEDCO. Since it is the decision of the Palestine Authority to create the NEDCO after separating the Electricity Department of the JM and to make the 726 employees of the JM retired and transferred to the NEDCO, the paid amount by the NEDCO is categorized in this item "Local Government Assistance". Since the payment in installment by the NEDCO finished in 2016, there shall be no further revenue from 2017 onwards.

2.2.3 Fee of Vegetable and Fruit Market (#411201)

In 2015 there was no income for this item because farmers went to the court and won a legal decision not to pay the fee. In 2016 the JM succeeded in retaking it, but since the JM gave a discount to the farmers the income was reduced up to 228,948 NIS compared with those before 2014.

2.2.4 Fee of Waste Charge (#410301 and #410312)

The NEDCO collects the fee of solid waste on behalf of the JM and transfers it to the JM from customers together with its electricity charge. The NEDCO has the database of 26,000 customers but the resident database of the JM is not linked to it and hence has not been updated. Thus, when a customer visits the JM to do a clearance of his/her debts, the JM has no data on how much waste charge has been paid and unpaid by this customer. To avoid the risk of duplicated payment, the NEDCO should regularly submit a detailed report showing the amount and breakdown of money paid by the customers and transferred to the JM.

¹ The 726 employees did many strikes resisting the forced transfer or early retirement, and around 236 labors were back to the JM as its employees.

2.3 Main Expenditures of JM

2.3.1 Personnel Expenditure

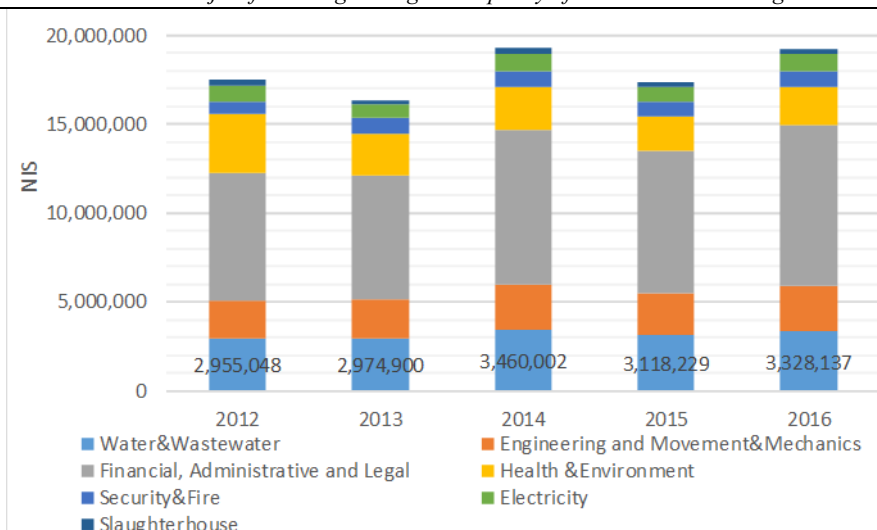
A breakdown of the personal expenditure according to the purpose of expenditure and the concerned department /unit is shown in Table 2.9. The salary accounts for around 70% of the total personnel cost, followed by the pensioners' salary around 20%. And the share of the Financial Department, Administration Department and Legal Unit is the largest (around 45%) followed by the Water and Wastewater Department (around 17%) of the total personnel cost (refer to Table 2.9 and Figure 2.4).

The personnel cost under the category of the Electricity Department means the salary, retirement salary and the end of service that the JM still pays for the employees who returned to the JM even after the decision by the Palestine Authority stated in 2.2.2.

Table 2.9 Breakdown of Personnel Expenditure (Unit: NIS)

	Category	2012	2013	2014	2015	2016	Sum	
Purpose of Expense	Salary	11,490,397	11,982,165	13,910,023	12,730,832	13,268,116	63,381,532	70.6%
	Wage	140	35,633	148,740	273,191	693,249	1,150,952	1.3%
	Health Insurance	31,035	42,682	145,063	148,820	146,045	513,645	0.6%
	Pensioner's Salary	3,552,981	3,550,321	4,089,356	3,546,849	3,854,361	18,593,869	20.7%
	End of Service	2,017,428	185,283	238,123	49,792	108,905	2,599,530	2.9%
	Reward and Incentive	1,000	6,100	79,300	44,646	479,802	610,848	0.7%
	Additional Labor Fee	8,641	40,952	193,311	185,609	147,846	576,358	0.6%
	Injury Insurance	57,759	114,928	96,140	52,590	212,870	534,287	0.6%
	Mayor's Salary	163,424	113,092	127,558	113,815	86,905	604,794	0.7%
	Rewards for Municipality Council Members	163,726	293,784	291,375	253,473	261,548	1,263,906	1.4%
	Sum	17,486,532	16,364,940	19,318,988	17,399,616	19,259,646	89,829,721	100.0%
Department	Water&Wastewater	2,955,048	2,974,900	3,460,002	3,118,229	3,328,137	15,836,316	17.6%
	Engineering and Movement&Mechanics	2,139,840	2,168,726	2,520,433	2,369,731	2,564,547	11,763,278	13.1%
	Financial, Administrative and Legal	7,147,767	6,999,226	8,685,589	7,988,661	9,045,070	39,866,314	44.4%
	Health &Environment	3,355,441	2,359,142	2,455,021	1,957,308	2,150,346	12,277,258	13.7%
	Security&Fire	667,397	843,523	872,570	812,783	896,274	4,092,547	4.6%
	Electricity	931,618	769,363	999,413	871,856	946,008	4,518,257	5.0%
	Slaughterhouse	289,420	250,060	325,958	281,049	329,263	1,475,750	1.6%
	Sum	17,486,532	16,364,940	19,318,988	17,399,616	19,259,646	89,829,721	100.0%

Source: JICA Expert Team



Source: JICA Expert Team

Figure 2.4 Breakdown of Personnel Expenditure into Department/Section

2.3.2 Maintenance Expenditure

Table 2.10 shows the main items (listed from bigger amount to smaller) and total of the maintenance expenditure. The total maintenance expenditure accounts for only around 10% of the total expenditure (refer to Table 2.1 and Table 2.10), and the maintenance for streets and sidewalks implemented by the Engineering Department is the biggest, followed by the maintenance of pumps and the maintenance and extension of drainage lines implemented by the Water and Wastewater Department.

Table 2.10 Key Items of Maintenance Expenditure (Unit: NIS)

No.	Cod	Item	Department	2012	2013	2014	2015	2016	Sum
1	510801	Maintenance of streets and sidewalks	Engineering	1,261,679	1,283,036	1,216,844	2,111,473	1,640,712	7,513,744
2	511602	Maintenance of pumps	Water and Wastewater	141,814	139,600	461,530	590,424	624,765	1,958,133
3	511615	Maintenance and extension of drainage lines	Water and Wastewater	290,905	335,602	254,742	118,155	103,472	1,102,875
4	510821	Maintenance of municipal stadium	Engineering	922	750		973,507		975,179
5	510802	Building maintenance	Engineering	44,626	232,299	192,997	258,347	205,676	933,945
6	511603	Water network maintenance	Water and Wastewater	117,010	104,698	158,594	120,006	242,041	742,348
7	510811	Car maintenance	Engineering	154,768	189,747	150,424	164,029	81,598	740,566
8	511611	Car maintenance	Water and Wastewater	61,736	143,666	74,573	43,572	142,473	466,021
9	510216	Computer hardware maintenance and supplies	Financial, Administration and Legal	110,255	131,734	13,376	39,147	14,683	309,194
10	510806	Maintenance of retaining walls	Engineering	20,284	1,631	1,964	154,964	8,257	187,099
11	510225	Furniture and maintenance	Financial, Administration and Legal	48,843	31,098	22,513	25,921	40,703	169,077
12	510221	Car maintenance	Financial, Administration and Legal	23,072	5,783	31,019	14,733	15,345	89,952
13	510804	Maintenance of gardens	Engineering	8,053	28,216	7,691	14,244	16,250	74,454
14	510511	Car maintenance	Health & Environment	14,642	8,252	8,147	21,851	5,801	58,693
15	510813	Maintenance of drawers	Engineering	24,303		30,563			54,866
16	510503	Maintenance of sewage and latrines	Health & Environment	3,101	37,167		1,636		41,904
17	510816	Maintenance of light signals	Engineering	30,950					30,950
18	510815	Maintenance of municipal property	Engineering					29,057	29,057
Sum				2,356,962	2,673,277	2,624,976	4,652,009	3,170,832	15,478,057
Others				45,143	24,368	36,024	13,303	10,875	129,713
Total				2,402,105	2,697,645	2,661,001	4,665,312	3,181,707	15,607,770

Source: JICA Expert Team

2.4 Financial Accounting System

A computer application software named Al-Shamel has been used as the key software in the JM. This software has various modules in addition to the main module of financial accounting e.g. bill collection management for water tariff, waste fee and crafts and industries fee and procurement management. Its manufacturer is Al-Israa Company in Nablus.

In 2015 the MoLG developed and announced a standard /unified account code system and all the municipalities must use this for the preparation of annual budget. An extract of the new account codes by the MoLG is shown in Table 2.11. Since there are some mismatches between this new code system and the account code system that has been used in the JM based on the Al-Shamel, a collation work is necessary corresponding each item one by one to enable the JM to link the budget and the financial statements, and the budgets up to 2014 and the budgets from 2015 onwards.

Table 2.11 Extracted New Account Code System by MoLG

Code	Item	Notes
510xxx	Retirement Fund Revenue	
610xxx	Property Tax Revenue	
611xxx	Tax and Other Local Fee	
620xxx	License and Vacation	
621xxx	Service Revenue	
631xxx	Restricted Grant Revenue	Conditional grants from donors
632xxx	Various Revenue	
640xxx	Revenue from Property and Fund	
660xxx	Restricted Revenue	Conditional revenues for specific expense
670xxx	Operational Revenue (Solid Waste)	
700xxx	Operational Revenue (Water and Wastewater)	
750xxx	Operational Revenue (Slaughterhouse)	
850xxx	Health & Public Safety	
855xxx	Public Work Expense	
857xxx	Income Tax on Local Government Activities	
860xxx	Security and Fire Expense	
865xxx	Cultural & Civilized Service	
875xxx	Society Planning & Improvement	
880xxx	Engineering Expense	
900xxx	Water Service Expense	
902xxx	900001 Operational Expenses	
904xxx	900002 Development and Construction	
	902001 Water Purchase	
	904001 Pumps and Motors Maintenance	
	904002 Water Network Maintenance	
	904003 Water Project Maintenance	
	904004 Water and Springs	
	904005 Developing Water Network	
	904006 Water Project Insurance	
	904007 Miscellaneous	
	904008 Lab Equipment	
	904009 Disinfection of Potable Water	
	904010 Electricity for Water Pump	
	904011 Water Meter Maintenance	
	904013 Cost of Water Meter	
	904014 Water Reservoir Maintenance	
	904015 Pumping Station Maintenance	
	904016 Oils and Fuels	
906xxx	Sewerage Maintenance and Establishment of Sewer Network	
917xxx	Solid Waste Expense	
940xxx	Expense of Slaughterhouse	
990xxx	Retirement Fund Expense	

Source: JICA Expert Team

2.5 Water Tariff

2.5.1 Current Water Tariff

The current water tariff in the JM is shown in Table 2.12, which comprises the minimum charge, volumetric charge and water network maintenance charge. The collection of wastewater tariff (already decided to be 0.5 NIS/m³) has not been started yet. The data of connected households to sewer

network has been kept in the Engineering Department and not been integrated into the customer database of water supply in Al-Shamel. Thus, the customers that are connected to the sewer network should be identified in this customer database, and the bill of sewerage tariff should be added on the current invoice of water tariff. Refer to Table 2.7 for the image of current water tariff invoice.

Table 2.12 Current Water Tariff in JM

Category		Tariff	Notes
Minimum (Fixed) Charge		17.36 NIS/month	Equivalent to the use of minimum quantity of 4 m ³
Volumetric Charge	0-50m ³	4.34 NIS/m ³	Billing cycle is once per month.
	Over 50m ³	6.2 NIS/m ³	
Water Network Maintenance		6.2 NIS/month	

Source: JICA Expert Team

Jenin Municipality
Water and Sewerage Dept.
Jenin - Nazareth St. - Industrial Circle
Tel: 042502023, Fax: 042502024
Website: www.emunicipal.ps/jenin
Email: waterdep@yahoo.com

بلدية جنين
دائرة المياه والصرف الصحي
جنين - شارع الفسرة - دور الصناعة
هاتف: 042502023 - فاكس: 042502024
الموقع الإلكتروني: www.emunicipal.ps/jenin
بريد الإلكتروني: waterdep@yahoo.com

فاتورة مياه
Water Invoice

(Original)

رقم الفاتورة: 10094791	رقم المشترك: W4597
فاتورة شهر: أيلول	رقم المواطن: 0970375960
تاريخ الفاتورة: 30-09-2017	
آخر موعد لدفع الفاتورة: 15-10-2017	

اسم المشترك:
موسى فزيس موسى مغير - مياه - 30110

العنوان:
حي شرقي - خرويه-3

رقم المنطقة:
00011 3 11

مبلغ الاستهلاك	كمية الاستهلاك	القراءة السابقة	القراءة الحالية
17.36	4	1219	1223

نوع الاشتراك: منزلي	فئات الاستهلاك:
	من 0 إلى 50 : 4.34
	من 51 إلى 999999 : 6.2

مبلغ الفاتورة الحالية:	مبلغ الفاتورة السابقة:
23.56	188.48
اجمالي الاثمان السابقة:	اجمالي البقائيس:
188.48	282.72
اجمالي المستحقات:	
494.76	

Receipt Voucher

رقم الفاتورة: 10094791	نوع الاشتراك: منزلي	رقم المشترك: W4597
فاتورة شهر: أيلول	رقم المواطن: 0970375960	اسم المشترك: موسى فزيس موسى مغير - مياه - 30110
تاريخ الفاتورة: 30-09-2017		العنوان: حي شرقي - خرويه-3
تاريخ استحقاق الدفع: 15-10-2017		رقم المنطقة: 00011 3 11

الرجاء احضار الفاتورة عند الدفع

مبلغ الفاتورة الحالية: **23.56**

Source: Jenin Municipality

Figure 2.5 Current Water Tariff Invoice

The Water Service Regulatory Council proposed in late October 2017 to the JM a revision draft of the current water tariff as shown in Table 2.13.

Table 2.13 Revision Draft of Water Tariff by WSRC

Category		Domestic	Commercial	Industrial	Tourism
Minimum (Fixed) Charge		15 NIS/month			
Volumetric Charge	0- up to 10m ³	5.5 NIS/m ³	6.0 NIS/m ³	1.3 NIS/m ³	6.0 NIS/m ³
	11- up to 20m ³	6.0 NIS/m ³	6.5 NIS/m ³	1.4 NIS/m ³	6.5 NIS/m ³
	21- up to 30m ³	6.5 NIS/m ³	7.0 NIS/m ³	1.5 NIS/m ³	7.0 NIS/m ³
	Over 30m ³	7.0 NIS/m ³	7.5 NIS/m ³	1.5 NIS/m ³	7.5 NIS/m ³

Source: Mr. Abdullah Murrar working for Water Service Regulatory Council

As per the request of the C/P, the Expert team has given the C/P the following comments on this revision draft:

- Service improvement should come first; since the activities in PA-1 are still under planning, it may be hard to justify the necessity of raising tariff now;
- Recovery of unpaid bills should come first; otherwise the English proverb honesty does not pay” will come true; and almost 100% of the O&M cost can be covered by the current tariff if the collection ratio reaches 100%;
- The increasing rate, the user category and the usage volume blocks should be theoretically justified; for this purpose, a dataset of the number of connection and the volume of supplied water in the JM is necessary to calculate a theoretical unit price by allocating the fixed & variable cost to each volume category;
- An increasing block tariff can cause discontent when a prepaid water meter is introduced according to a World Bank report².

2.5.2 Bill Collection Ratio

The bill collection status as of the end of September 2017 is shown in Table 2.14. The bill collection ratio in the whole service area of water supply in Jenin remains to be 39.3%, while the receivables amount to as much as 35 million NIS. Whereas in the PA-1 (the areas of Saba Alhair and Kharoubeh) the collection ratio is higher as over 60%.

Table 2.14 Bill Collection Status up to the end of September 2017 (unit: NIS)

Item		All Area	SabaAlhair	Kharoubeh
Number of Subscribers	a	10,220	193	408
Receivables at the end of 2016	b	33,797,240	438,179	756,567
Billed in 2017	c	5,648,310	158,842	278,975
Collected in 2017	d	4,322,735	157,457	248,983
Allocated to bills 2017	e	2,219,946	98,106	167,799
Allocated to bills before 2016	f	2,102,812	59,351	81,184
Current Balance (Receivables)	g	35,086,085	439,563	791,078
Collection Ratio (Current Year)	h=e/c	39.3%	61.8%	60.1%
Average Debt per Subscriber	i=g/a	3,433	2,278	1,939

Source: JICA Expert Team

There are not a few countermeasures to improve the low bill collection ratio, but based on a series of

² “Prepaying customers are much more aware of what they pay and what they get for what they pay. Most buy more than once a month. They are keenly aware of the impact of rising block tariffs within a monthly billing cycle, yet few understand why the same amount of money might buy different amounts of water. “The cost per unit is not consistent,” said a woman from Lusaka. “You find that today you buy for K100 and they give you this number of units. When you go next time, they give you less for the same K100.” Zambia’s regulator recommends a uniform tariff for prepayment, not a rising block tariff, so customers know in advance how much water they can buy with a particular sum of money, without the amount being determined by the volume they have already consumed that month.” (“*The Limits and Possibilities of Prepaid Water in Urban Africa: Lessons from the Field*”, August 2014, World Bank)

interviews and meetings with the Customer Service Section, the Collection Unit, the Public Service Center and the Revenue Division in the Financial Department, the following points can be suggested:

- The workflow and the job description should be rearranged and optimized among the Customer Service Section, the Collection Unit, the Public Service Center and the Revenue Division;
- The organization structure should be revised if necessary and the employees should be reallocated and re-trained accordingly; e.g. some of the 25 Security Guards in the Security & Guards Division (in the Administration Department) may be transferred to the Collection Unit or other departments/units in exchange of introducing some modern tools such as web cameras and a remote monitoring system;
- An SMS (Short Mail Service) reminder system for bill payment and a mobile billing system can be introduced as a transitional measure before the introduction of prepaid water meters;
- It should be noted that late payment penalties, early payment discounts, persuasive materials and incremental tariff blocks reportedly do not work well³.

Table 2.15 shows the worst 20 debtors of water tariff as of the end of September 2017. The 6 among the 20 debtors are governmental institutions, and the 4 are the JM itself.

Table 2.15 Worst 20 Debtors of Water Tariff

Subscriber's name	Receivables at the end of 2016	Billed in 2017	Collected in 2017	Current Receivables	Notes	
					National /Local Government	JM
1 JSC-JWV	1,669,779	-	-	1,669,779	1	
2 Khalil Suleiman Governmental Hospital	257,295	112,360	-	369,655	1	
3 Dep of Agriculture	158,410	7,378	-	165,788	1	
4 Civil Prison Police	85,230	30,834	-	116,064	1	
5 JM Mechanics Dep	102,207	6,510	-	108,717		1
6 Jenin Youth School	74,458	23,304	-	97,762	1	
7 Salah al-Din Zayed Jabr Jabr	94,699	2,843	-	97,542		
8 JM	86,583	6,293	-	92,876		1
9	86,885	-	-	86,885		
10 Yousef Ali Yousef Al - Jazra	83,130	3,427	-	86,557		
11 Association of rehabilitation and care of the blind	81,576	2,552	-	84,128		
12 Ahmed Jabr Zayed Jabr / Mishmah	61,591	5,199	1,605	65,185		
13 Red Crescent Society	60,376	3,220	-	63,596		
14 Mosque of the Great Camp	56,802	4,277	-	61,079		
15 Association of the elderly home	59,207	1,137	-	60,345		
16 JM Slaughterhouse	52,176	3,906	-	56,082		1
17 National Security	43,243	12,646	-	55,889	1	
18 Tawfiq Sulaiman Mashayek / Concrete Factory	56,061	212	3,500	52,773		
19 JM Cemetary	46,221	2,604	-	48,825		1
20 Yousef Abdullah Saleh Abu Qatnah	46,702	1,975	-	48,677		

Source: JICA Expert Team

2.6 Financial Workflow of Bill Collection and Debt Recovery

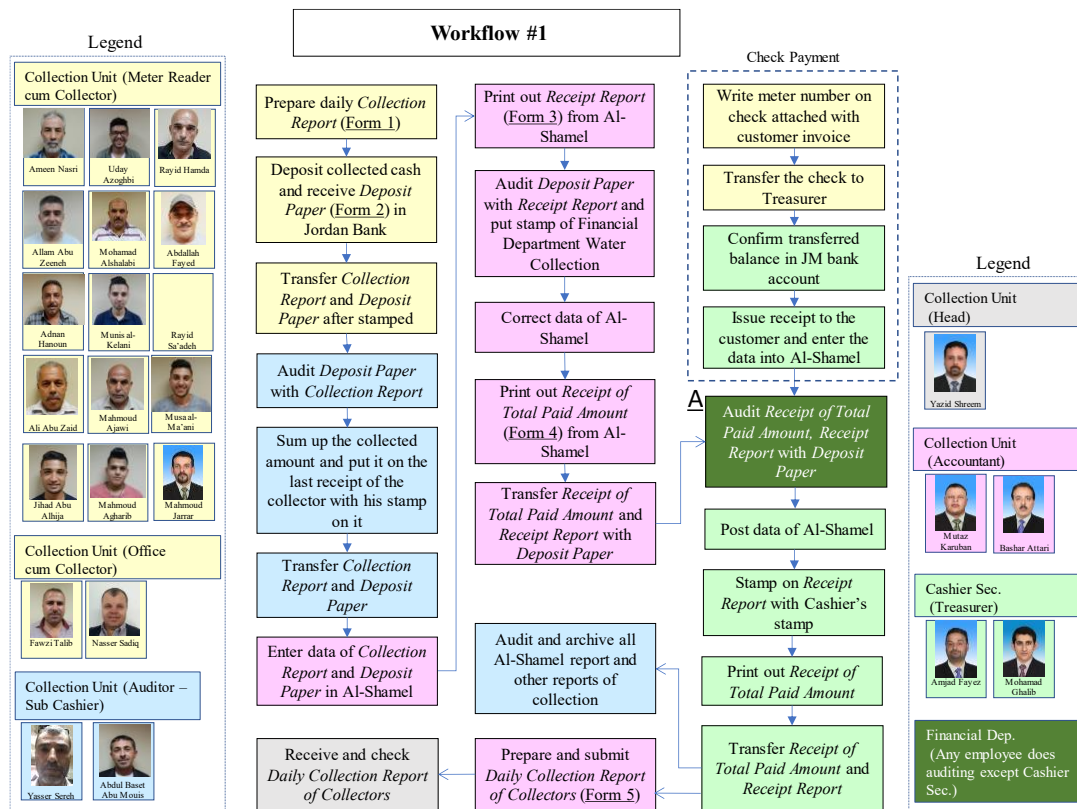
To rearrange and optimize the current workflow related to the bill collection activities shall be necessary as was suggested in 2.5.2, in order to make the chain of activities work more effectively and efficiently and to increase the bill collection ratio. From this viewpoint, the Expert team developed the financial workflow charts based on the intensive interviews with related employees, trying to visualize the flow of activities and the concerned employees. (refer to Figure 2.6, Figure 2.7, Figure 2.8 and Figure 2.9.)

³ Abdullah Murrar: "The Water Invoices and Customers Payment Motivational Strategies: An Empirical Study on Palestinian Water Services Providers", *EPRA International Journal of Economic and Business Review*, Volume 5, Issue 1, January 2017.

Figure 2.6 shows the detailed workflow of the bill collection focusing on the financial transactions. While regarding the debt recovery from customers except governmental institutions, there are 2 steps: the first one is the initial stage with the main activities done by the JM; the second one is the next step with main activities done by a hired private lawyer in case of no response from the customer in the first step; the workflows of both steps are shown in Figure 2.7 and Figure 2.8. The workflow of debt recovery from governmental institutions is shown in Figure 2.9.

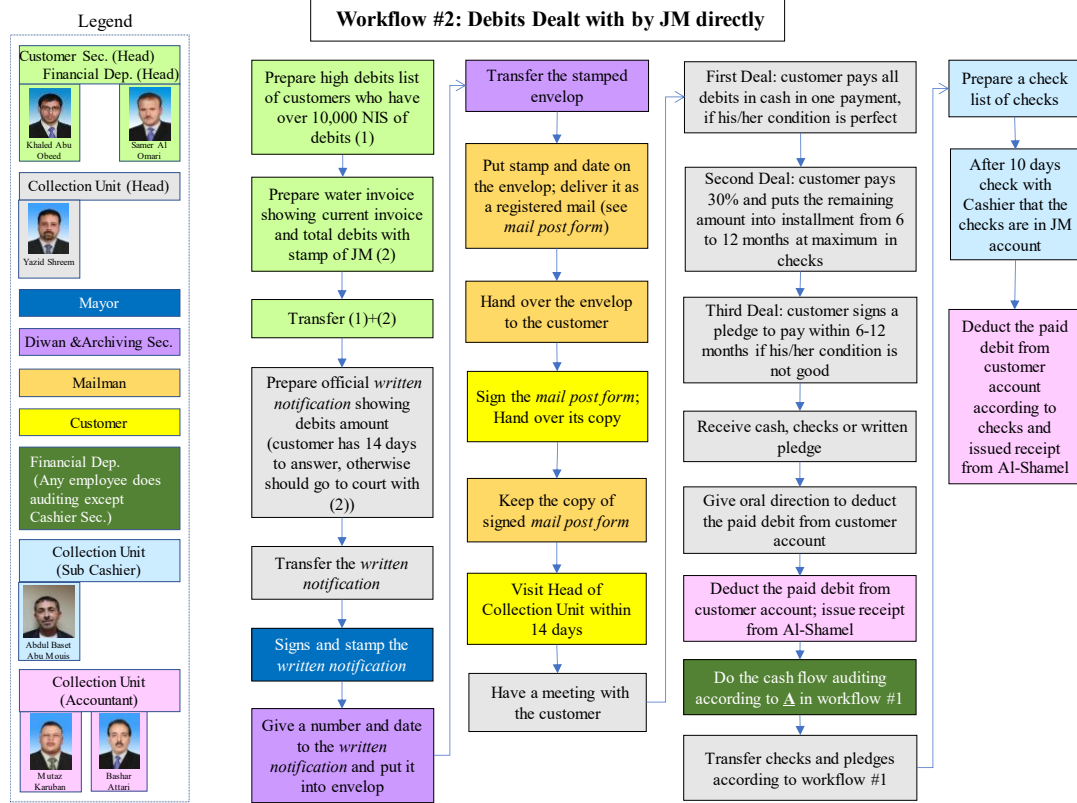
The following points can be suggested as challenges from these workflow charts and the preceding interviews with concerned departments /units:

- The work load of the Director of the Financial Department should be reduced, so that he can commit himself more to setting up the policy to improve the collection ratio, identifying targeted debtors and monitoring the achievements of the Collection Unit, as a controlling tower to increase revenues and recover past debts of customers;
- An incentive and motivation mechanism and a fair performance evaluation system of collectors should be established;
- The job title, job description and position of accounting personnel in the Collection Unit should be more clearly defined, where “the position” means the creation of a specific division for example;
- The duties of the Customer Service Section, the Public Service Center, the Collection Unit and the Services & Archiving Section should be well demarcated, in terms of providing customers with appropriate interface with the JM and hopefully one-stop service.



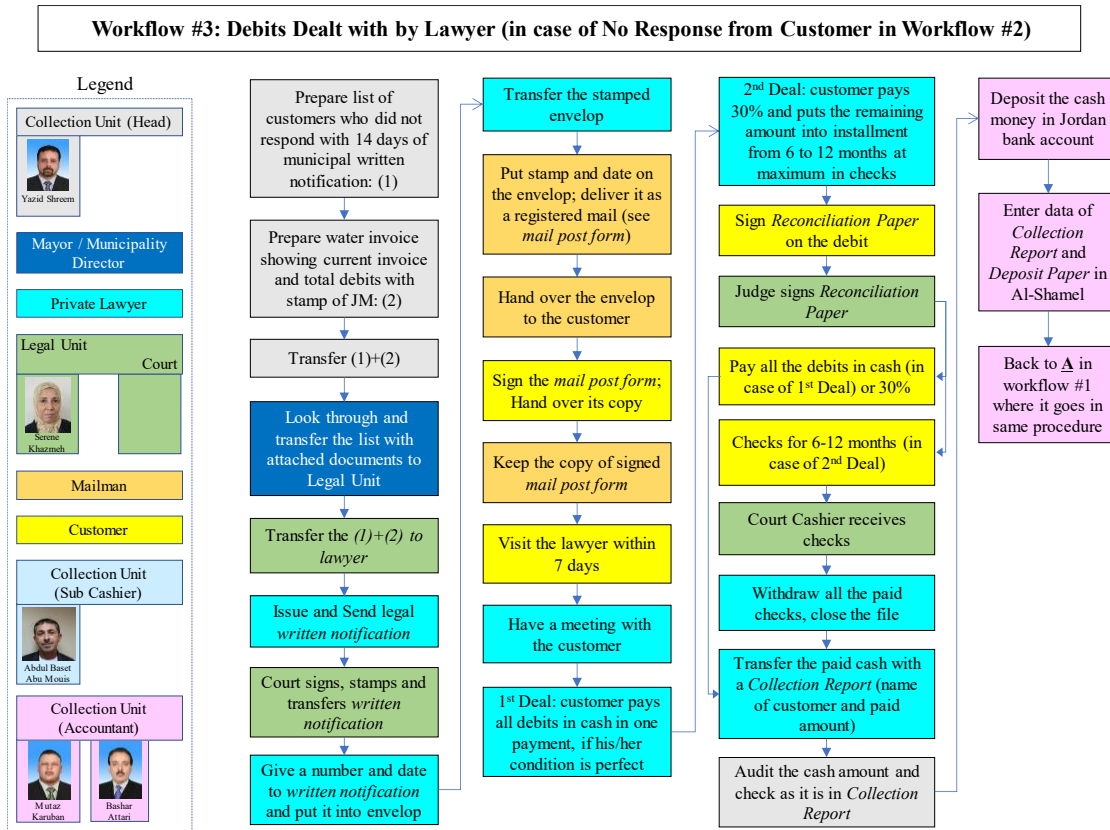
Source: JICA Expert Team

Figure 2.6 Financial Workflow on Bill Collection



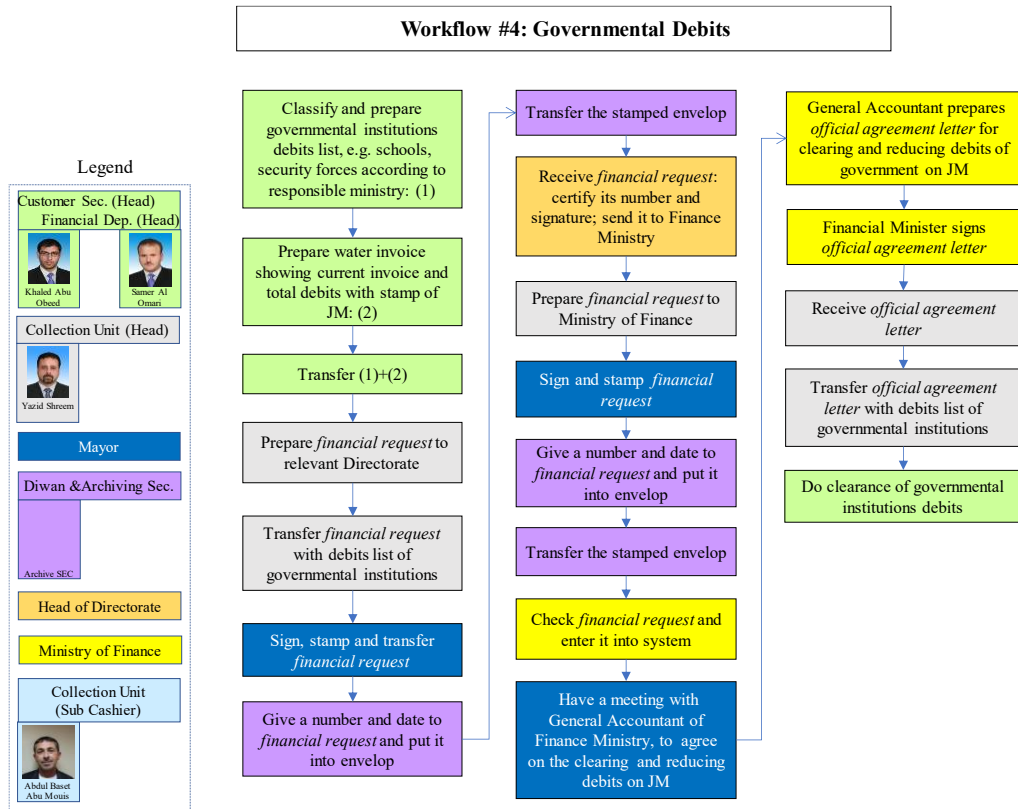
Source: JICA Expert Team

Figure 2.7 Financial Workflow on Debt Recovery (by JM Itself)



Source: JICA Expert Team

Figure 2.8 Financial Workflow on Debt Recovery (by Hired Lawyer)



Source: JICA Expert Team

Figure 2.9 Financial Workflow on Debt Recovery (Governmental Debt)

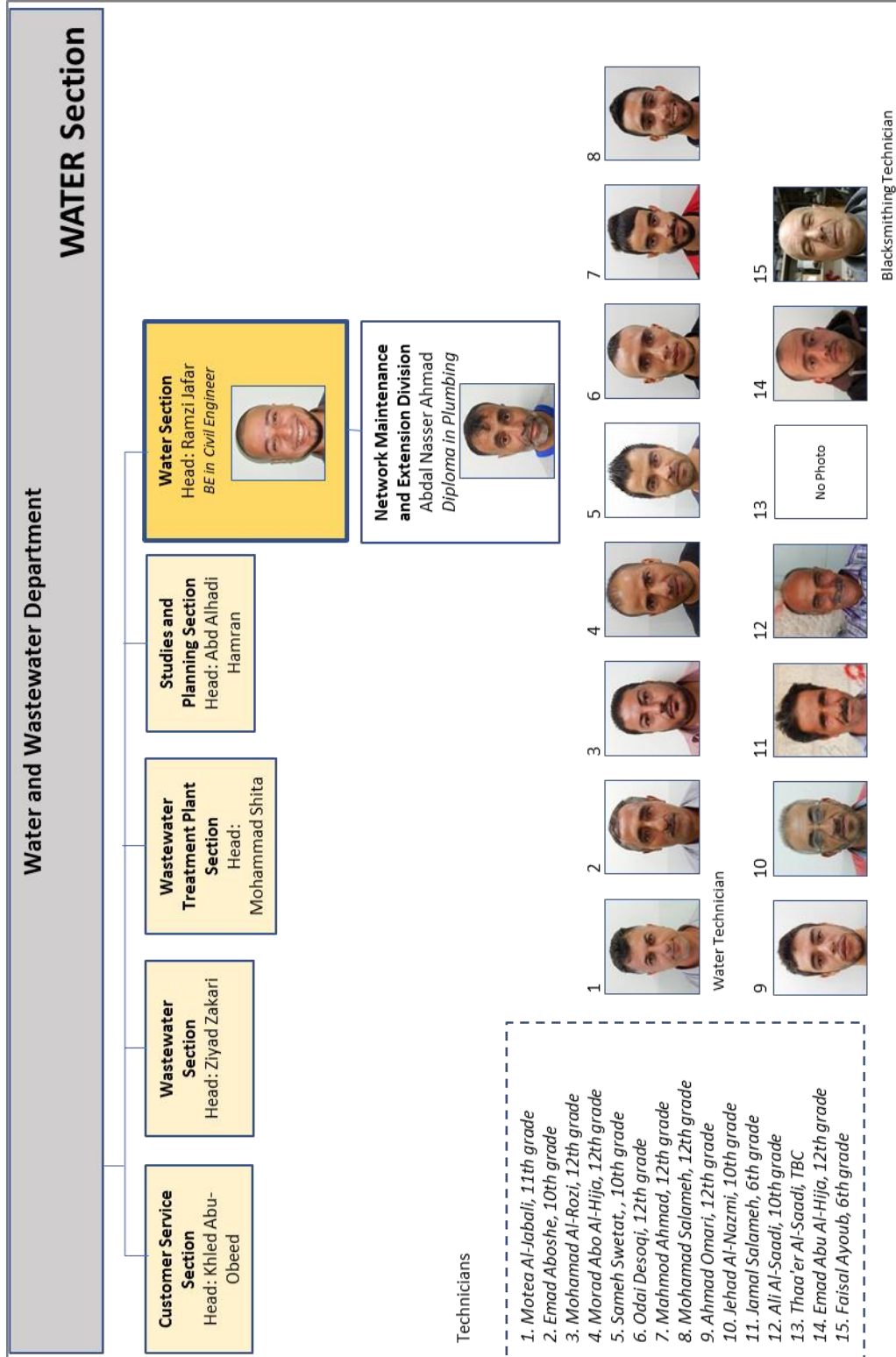
CHAPTER 3. NON-REVENUE WATER MANAGEMENT

3.1 Organization for NRW Management

3.1.1 Personnel (Maintenance Staff)

The main duty of the staff in WD is distribution management and network maintenance. They do not have any water treatment plant to look after. The water they get from outside or within the municipality is ready to be supplied.

There a total of 57 staff members in the Water and Wastewater Department. The number of staff members in water section is 28 excluding the director of WWD. Under the water section, there is a network maintenance and extension division. There are 17 staff members in this division. As the title implies, the staff members in this division are assigned to the task of distribution management, pipe network maintenance, and network expansion. Their tasks also include the tasks related to physical loss component of NRW reduction.



Source: JICA Expert Team

Figure 3.1 Organization Chart of Water Section

3.1.2 Job Description

Official job descriptions of Director of WWD, Head of water section, Head of planning and studies, and Head of wastewater section are prepared and available (Attachment 1). The job descriptions of the first two positions have NRW reduction as one of their main tasks.

Job descriptions of staff members other than above are not available. The technical staff members in

water section have various job titles; O&M water technician, plumbing technician, and water technician, blacksmithing technician. Earlier, there was also one more title of ‘pumps technician’ but since the operation of major pumps is outsourced, there is no more pump technician in WWD.

The main tasks these staff members perform are as shown in Table 3.1. This is based on interviews with individual technicians (total 16 numbers). Some technicians performed multiple tasks, so the sum of the number is more than the number of staff.

Table 3.1 Main Tasks of Sub-ordinate Staff Members in Water Section

S.N.	Main Tasks	Nos of staff who do this task
1	Network repairing activities	11
2	Following water distribution schedule / open-close valves	9
3	New pipes / connections installation works	7
4	Staff direction and monitoring / Following maintenance progress	2
5	Leakage detection	2
6	Checking ahead for new connections	2
7	Procurement for fittings and equipment	1
8	Pumps installation / maintenance	1
9	Reinstatement works	1
10	Communications / transfer correspondences	1
11	Office works	1
12	Pipe welding	1

3.2 Status of Connections and Pipe Network

3.2.1 Customer Numbers and Types

There are three types of customers in Jenin. They are domestic, commercial, and industrial. Their numbers in 2015 and 2016 are summarized in Table 1.6.

3.2.2 Pipe Network

Black steel and galvanized steel are the main pipe materials used in Jenin. Recently use of HDPE has also started. The black steel pipes are cement mortar lined from inside and coal tar coated from outside. The smaller pipes are GI pipes and they are PVC coated from outside.

Existing pipe network length of different pipe material as extracted from the GIS map is shown below in Table 3.2. Total length of pipe network as per this information is 163,154 m.

Table 3.2 Material wise pipe length

Dia (Inch)	Black Steel	Galvanized Steel	HDPE	Steel	Total	Percentage
0.25				350	350	0.2%
0.5			42	4,904	4,947	3.0%
0.75			193	6,750	6,943	4.3%
1	9	16,631			16,641	10.2%
2		64,841			64,841	39.7%
3		5,233			5,233	3.2%
4	18,610				18,610	11.4%

*Report on Baseline Survey
Project for Strengthening the Capacity of Water Service Management in Jenin Municipality*

5	47				47	0.0%
6	28,345				28,345	17.4%
8	8,098				8,098	5.0%
10	8,126				8,126	5.0%
12	372				372	0.2%
14	602				602	0.4%
Total	64,209	86,706	236	12,004	163,154	100.0%
	39.4%	53.1%	0.1%	7.4%	100.0%	

Source: WWD GIS data

The GIS database and also the above table shows 0.25, 0.5, and 0.75 inches pipes as ‘steel pipe’ without specifying into either black steel or GS. This should have been specified as GS. Similarly, the 3 inch pipe is categorized as GS but as it should have been ‘black steel’.

Based on pipe use type (transmission or distribution) the pipe length is as shown in Table 3.3.

Table 3.3 Pipe length based on pipe use type

Dia (Inch)	Distribution	Main Distribution	Main Transmission	Total	Percentage
0.25	350			350	0.2%
0.5	4,947			4,947	3.0%
0.75	6,943			6,943	4.3%
1	16,641			16,641	10.2%
2	64,841			64,841	39.7%
3	5,233			5,233	3.2%
4		18,610		18,610	11.4%
5		47		47	0.0%
6		25,226	3,118	28,345	17.4%
8		6,479	1,619	8,098	5.0%
10		2,250	5,876	8,126	5.0%
12		372		372	0.2%
14			602	602	0.4%
Total	98,954	52,984	11,216	163,154	100.0%
	60.7%	32.5%	6.9%	100.0%	

Approximate age of pipe is also available on GIS database. Percentage distribution of pipe by age (as of 2016) is shown in Figure 3.2. The weighted average age of pipeline is 14.1 years as of 2016.

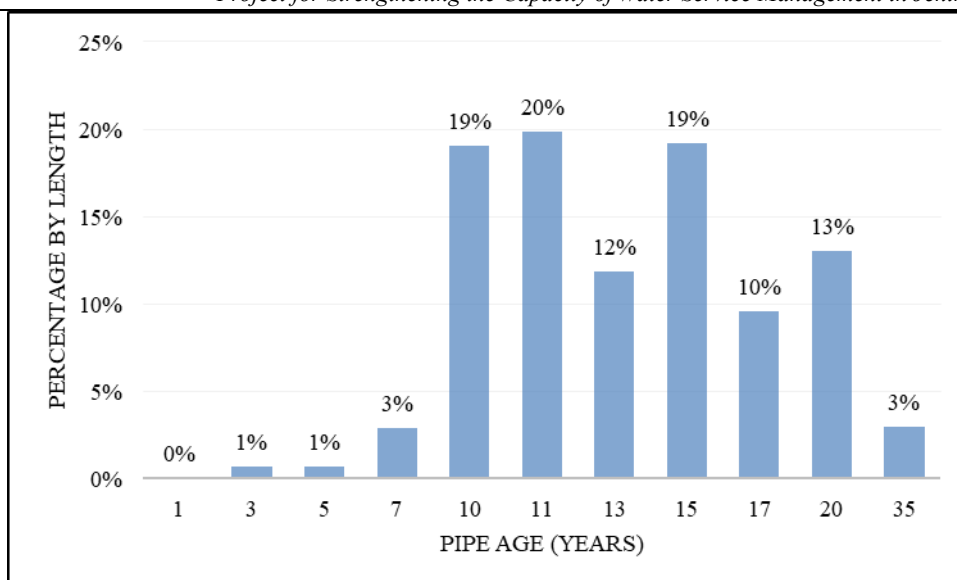


Figure 3.2 Pipe Percentage by Age

3.3 Current Real Loss Management System

3.3.1 Existing Tools and Equipment Including Existing Repair Materials

The following photos (Photo 3.1 and Photo 3.2) show the situation of store room in WWD where tools and equipment are stored. Inventory record of the store was obtained as of Oct 2017. The whole list is given as Attachment 2. The stock of essential materials for pipeline maintenance and repairing leaks as of end of October 2017 summarized in Table 3.4.



Photo 3.1 WWD Store (view 1)



Photo 3.2 WWD Store (view 2)

Table 3.4 Existing Stock of Essential Items for Pipe Network Maintenance and Leak Repair

S.N.	Description	Unit	Stock as of Oct 2017
1	Coupling 4 inch	Nos	1
2	Flange Dresser 2 inch	Nos	90
3	Isolated Pipes 1/2 inches, 6 meters	Nos	100
4	Isolated pipes 3/4 inches, 6 meters	Nos	50
5	Isolated pipes 1 inch, 6 meters	Nos	15
6	Isolated pipes 2 inches, 6 meters	Nos	65
7	Joint 3/4 inch	Nos	50

8	Joint 1 inch	Nos	31
9	Joint 2 inches	Nos	31
10	Joint 3 inches	Nos	142
11	Stopper 3/4 inches	Nos	270
12	Stopper 1 inch	Nos	310
13	Stopper 2 inch	Nos	120
14	Water Dresser 2 inch	Nos	8
15	Water Dresser 3 inch	Nos	2
16	Water Dresser 4 inch	Nos	4
17	Water Dresser 6 inch	Nos	6
18	Water Dresser 10 inch	Nos	2
19	Water Dresser 12 inch	Nos	5

Source: Compiled by JET

3.3.2 Work Flow of Leak Detection, Repair and Recording System

All the report concerning leakage from distribution pipe or through service pipe are from the resident. So far, there is no system of a regular leakage survey. The following (Figure 3.4) shows the process flow of water leak repair practiced by WWD. This is a typical symptomatic treatment. Pipe depth varies in different location because there is no regulations about the ground cover of laid water pipe. After the leakage is reported (by anybody including general public or government employees) one of WWD staff confirms the location, an urgent report is needed to arrange the excavator when the underground depth of pipe is deep. If the excavator is necessary, request for its use is immediately done to Movement Section in JM from WWD staff. Unfortunately, pipe depth is not uniform in Jenin city. For instance, the ground cover of six-inch water pipe may be 30 cm at some place and 2 m or more in other. So, the site confirmation work is needed by WWD staff.

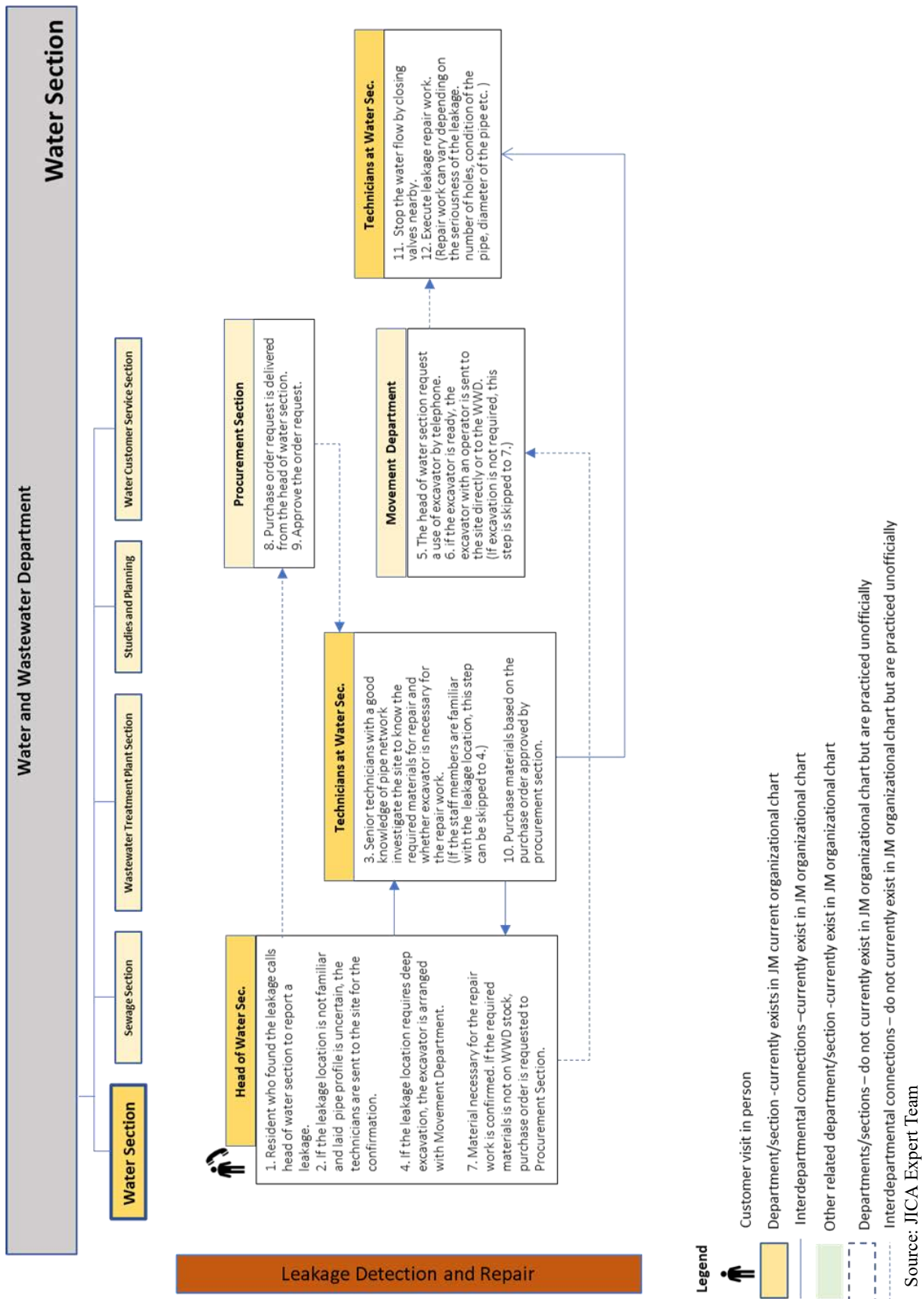


Figure 3.3 Workflow of Leak Detection, Repair and Recording System

The following photos show a typical situation of leak repair by WWD staff.



Photo 3.3 Digging for Leak Repair



Photo 3.4 Excavated Soil




Photo 3.5 Cause of Leak (pin hole in the pipe)

When the water leak repair and the backfilling finished, another leak occurred on the same pipe. WWD decided to cancel this section of pipe by inserting a smaller (1 inch) PE pipe into existing two inches GS pipe. It was considered a good judgment from the following viewpoint.

- The repair work takes time because the road is busy with a heavy traffic,
- It saved the cost for purchase of backfilling material, disposal cost of excavated soil and cost of road asphalt after leakage repair, and
- Only three houses are supplied by this pipe, so the pipe size of 1 inch should be big enough, even though it was not supported by any hydraulic calculation.

3.3.3 Records of Leak Repairs

The below is a record of water leak repair report for a certain day. Unfortunately, the matter that relates to the cost is not recorded at all.


 دولة فلسطين
 وزارة الحكم المحلي
 بلدية جنين
 دائرة المياه والصرف الصحي

السيد/ مدير قسم المياه والصرف الصحي المحترم
 تحية طيبة وبعد
 WWD daily record
 الموضوع: يومية قسم المياه ليوم: 11/11/15
 بتاريخ: 2017/11/15 الوردية: 4

الرقم	description	البيان	ملاحظات
1	repairing broken pipe near Atlantas	صيانة خط مياه مكسور مقابل اتلانس	
2	repairing broken pipe near Khansaa school	صيانة خط مياه مكسور مدرسة الخنساء	
3	repairing broken pipe at lyman school entrance	صيانة خط مياه مكسور عند مدخل مدرسة اليمان	
4		صيانة خط مياه مكسور قرب مكسور الصرف الصحي وادير/مبنى العاقبة	
5		صيانة خط مياه مكسور عند ابراهيم خلف كراميتا النفاي	
6		صيانة بريس دار القردارو	
7		صيانة خط مياه مكسور قرب دار الغانم اول طلبة الجابري /مبنى العاقبة	
8		صيانة خط مياه مكسور اسكفة طلبة دار التلاميذ	
9			
10	4-repairing broken pipe-wadi Burqeen		
11	5-repairing broken pipe near Abu Sarya hous/besides Naffa tile shop		
12	6-maintainance for HDPE pipe -Qarawi hous		
13	7-repairing broken pipe near Ghanem hous-begining of Jabriat ramp		
14	8-repairing broken pipe -Alshinnawi ramp(road)		
15			

مسؤول قسم المياه

Figure 3.4 Leak Repair Record by WWD Staff

The following table shows the number of leak repairs in 2016 and 2017 in the proposed three pilot areas.

Table 3.5 Number of Leak Repairs in PAs in 2016 and 2017

Year	Pilot Area 1	Pilot Area 2	Pilot Area 3
2017	59	41	34
2016	72	56	43

For year 2017 the total number of pipe repairs are 445. Area wise details are summarized in Table 3.6.

This shows an average of 1.5 repairs per day considering 5.5 working days per week.

Table 3.6 Number of Leak Repairs in Jenin in 2017

Area	No. of repairs	Area	No. of repairs	Area	No. of repairs
Kharoubeh	59	Wadi Ez Aldeen	8	Abu Dhair	19
Sabah Al Khir		Wadi Berqeen	40	Nabulas Road	21
Al Naserah Street		Al Hadaf	8	Al Jabreyat	14
Industrial Area	20	New Camp	41	Marah Sa'd	7
Al Almania	15	Al Zahraa		Al Swetat	6
Al Sharqia	34	Al Muqataa	13	Al Jenan	0
Haifa Road	6	Old City	16	Balama	0
Al Amreki	5	Al Dabos	9	Jannet	0
Al Basateen	30	Al Soha	11	Al Saadeh	0
Al Bayader	17	Al Marah	23	Jenin Camp	23
Total			445		

3.3.4 Existing Repair Materials and Stock Management System

JET team interviewed the manager of store room in WWD. The points of the interview were as follows.

(1) How to take an action in the emergency case

The WWD engineers inform the central stock section and/or purchase section by telephone and they permit him to take the required material from specific suppliers. The above-mentioned procedure takes 3, 4 hours to 3, 4 days. As our comment, it is a long time which affect their leakage repairing works.

(2) How the stock management been managed so far

There was MS Access file that was stopped since one year due to technical problem and all the saved data were deleted. Since then, list of stock and request for new materials (missing material) have been written by hand. When a large number of spare parts are required, the tendering process is done by JM central stock and procurement and purchase section once or twice per year. JM central stock ask to WWD engineer regarding to what kind of spare parts and how many numbers are required before the tender.

(3) Daily work

According to the manager of store room, availability of equipment and fittings in the store was honestly out of control for this issue. WWD send request order form which is shown in the following for missing fitting upon requirements to the central stock for their confirmation and then approval by purchase and procurement section. After that procure from the supplier.

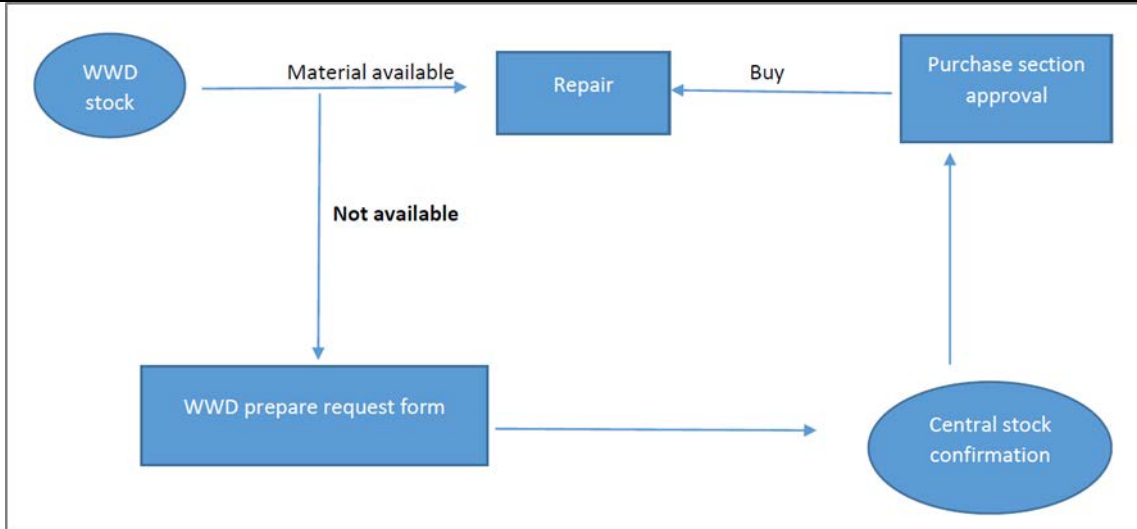


Figure 3.5 Flow Chart of Existing Purchase Order System in JM

Form for material request

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
دولة فلسطين
وزارة الحكم المحلي - بلدية جنين
نموذج طلب لوازم

to JM stock manager.
Please to provide the mentioned materials for:

Required equipment/technician: Sameh

رقم مسلسل	رقم الصنف	نوع وأوصاف المادة المطلوبة	الكمية المطلوبة		نوع المادة
			العدد	الوحدة	
	Threading machine	آلة خيوط 1/2 بوصة كاملة	1	عدد	والله
	Setscrews key 12"	مفاتيح مسمكة 12"	1	عدد	والله
	Setscrews key 14"	مفاتيح مسمكة 14"	1	عدد	والله
	saw	منشار كهربائي كامل	1	عدد	والله

موافقة رئيس القسم: *Sameh* its OK
Stock manager approval:
اسم الطالب: رقمه: توقيعه:

التاريخ: 2017/12/13
ملاحظة: يجب أن يعيد أمين المستودع الطلبات الغير متممة أو المكتوبة بصورة غير صحيحة
ملاحظات أمين المستودع:

تاريخه: / / 2017 : BS
تاريخه: / / 2017 : HS
التاريخ: / / 2017 : توقيع أمين المستودع:

تعليمات رئيس البلدية:
التاريخ: / / 2017 : توقيع رئيس البلدية:

Figure 3.6 Purchase Request Form

3.3.6 House Connection

(1) Materials

Most of the house connections are galvanized iron (GI). Recently the trend is changing from GI to high density polythene (HDPE) pipes. Use of HDPE pipe for house connection is increasing worldwide because of its several advantages over GI pipe. The most important are its flexibility (easier installation), light weight, corrosion proof, and avoidance of joints due to long length. Nominal Diameter (ND) 3/4” of the pipes is used for domestic class (ordinary household), and 1” is used for commercial class.

(2) By-laws related to ownership and O&M of service pipes

The customer buys the service pipe required to connect from nearest distribution pipe after getting approval of specification of the service pipes such as diameter, material, etc from the municipality. The municipality has the ownership of the service pipes from the connection at distribution pipe up to the end of public area. The customer has a responsibility for the maintenance of the service pipes within private estate.

(3) Size and condition of existing house service connections

The GIS system has records of pipe size and condition of existing house service connections for most of the HSCs. Its summary is shown in Table 3.7.

Table 3.7 Sizes and Condition of Existing House Connection Pipe

Dia (Inch)	Bad	Fair	Good	Not known	Total (Nos.)	%
0.5	127	578	2,200	2	2,907	46.0%
0.75	32	102	1,751	2	1,887	29.9%
1	3	63	993		1,059	16.8%
1.5			1		1	0.0%
2		6	54		60	0.9%
3			1		1	0.0%
Not known	10	3	5	388	406	6.4%
Total (Nos.)	172	752	5005	392	6,321	100.0%
%	2.7%	11.9%	79.2%	6.2%	100.0%	

Source: Adopted from existing GIS system

3.3.7 Equipment, Tools, and Materials for Leakage Repair

Currently available equipment and tools at WWD for leak detection and repair and their status are summarized in Table 3.8.

Table 3.8 Existing Equipment Related to Leak Detection and Repair

Category	S. N.	Items	Existing Equipment	
		Specification	Q'ty	Evaluation in terms of condition of operation
Equipment for Leakage Detection/ Survey	1	Portable Ultrasonic Flowmeter (PFM)	2	The existing flowmeters are 15 to 18 years old. All existing flowmeters are not in use because of frequent break down.
	2	Pressure (and flow) Data Logger	2	Both of the loggers are out of order.
	3	Leak Noise Correlator	0	-

Category	S. N.	Items	Existing Equipment	
		Specification	Q'ty	Evaluation in terms of condition of operation
	4	Pipe Locator (Metallic)	3	One is too old, and the others have problem in transmitter and display. They are not in use.
	5	Pipe Detector (Non-Metallic)	0	
	6	Diaphragm Listening Stick	0	
	7	Ground Microphone (GM)	2	One is workable, and the other one is out of order.
	8	Hammer Drill (with 1.3 m Drill)	3	All of these are almost out of order.
	9	GPS (handy type)	0	-
	10	GPS (high accuracy type)	2	Purchased recently.
	Pipe Cutter with Manual Ratchet Threader	11	Pipe Cutter	1	It is almost out of order.
12		Ratchet Threader	9 (manual) 2 (powered)	Two of manual ones are out of order, and the others are workable. Both of powered threaders are out of order.
Welder	13	Frequency 50Hz, Diesel Powered Engine with Turbo Charger, for Electric Welding	1	It is almost out of order.
	14	Potable type, Frequency 50Hz, Voltage 220V	1	It is almost out of order.
Test Bench	15	Meter Test Bench	1	WWD has an almost new full scale test bench but has not used.
Vehicle for Leak Detection	16	Pickup type	2	One is for pipe repair team and the other is old but workable, and used for valve operation team and general use.
Backhoe	17	Wheel Type Machine with Hydraulic Breaker, Weight 8t, Bucket Width 600/400mm	0	There are two backhoe loaders in Jenin Municipality, but they are owned by other departments.

3.4 Current Apparent (Commercial) Loss Management System

3.4.1 Bulk Metering

Jenin has a complete source metering. All the water produced within the municipality, purchased from private wells, or imported from outside supplier is metered with bulk meters. All the bulk meters are mechanical type, accuracy Class B or Class C. The bulk meter at Jalameh and Abu Arraba transfer points (for water brought from outside) are installed in well protected chambers. The bulk meter at Al Swetat transfer point is in open chamber. The bulk meters of private wells are within the private premises at open except the Alwaneh well which is installed in a protected chamber. The bulk meters on its own sources are sometimes at open (Sa'ada well, Balama well) and sometimes under a roof (Al Mechanic well). The bulk meters have been installed with adequate upstream and downstream straight pipe sections. This assures the accuracy of measurement. Strainers have also been installed upstream of the meters to protect the meters from debris or suspended particles which may enter the pipeline by various reasons.

In contrary to production metering, supply metering is not widely practiced. Bulk meters are installed at outlets of major reservoirs (Al Jabreyat and Al Mahraa reservoirs) but they are not working. Since water supply zones are not hydraulically isolated and some supply areas get water from more than one source, flow measurement at reservoir outlet does not have much meaning.

3.4.2 Customer Metering

(1) Connection numbers

The Population served with water service was estimated at 54,000 in 2016. The customers can be divided into three classes: 1) domestic class, 2) commercial class, and 3) industrial class. Registered numbers of each class are summarized as follows.

Table 3.9 Numbers of Customers by class

Class	Registered customers
Domestic	8,037
Commercial	1,378
Industrial	90
Total	9,505

It is expected that number of the customers increase gradually, because residential area is expanding year by year and the buildings for apartment or commercial purpose are increasing, too. The household at the expanded area cannot access the existing distribution lines due to not extended distribution lines. Those households are depending on private water vender or the owner who has a private well.

(2) Metering ratio

All the water sources (production) are metered. Similarly, all the consumption is also measured, i.e., all the connections in Jenin are metered. However, accuracy of the customer meters is classified as low. This is based on the perception and not supported by any meter test data. The meters are used without any maintenance until they show the sign of malfunction. Thus, customer meters' accuracy has deteriorated greatly. It is suggested to create checkup system for customers' water meters regularly.

(3) Meter types

Traditional velocity type mechanical meters are used. The customers themselves purchase and install the meters at their connection. Thus, they have the ownership of the meters. The Municipality usually suggests Baylan brand of meter to the new customers as a referential brand. But it is up to the customers to select any brand. Naturally, the customers tend to purchase the cheapest brand available in the market.

However, selection of volumetric or velocity type will be depending on the Water Providers. For instance, volumetric is used in Jerusalem Water Undertaking (JWU). Both types are used in Nablus Municipality. The majority of meter type seems to be volumetric type in Palestine. It is pointed out that the customer often adjust gate valve to make water flow slow on purpose in Palestine.

The features of volumetric and velocity type meters are summarized below.

Table 3.10 Feature of Volumetric and Velocity Meter

Particular	Volumetric Type	Velocity Type
Measuring system	Pistons' rotation by water flow	Propeller's rotation by water flow
Installation position	Vertical and/or horizontal	Horizontal
Structure	Complicated structure	Simple structure
Accuracy	Good at any speed	This will not function precisely if water flow is slow
Sensitivity	Good at any speed	
Others	This will get damaged quickly and not function precisely in case the water contains the particle	

(4) Replacement policy

The Municipality has a right to check and reset the customer meter, but does not have a right to replace without any request from the customers. Current policy is unfavorable to the Water Provider, because the customer meters have poor accuracy as stated in above. In order to improve bill collection ratio, it is suggested to change current policy.

(5) Testing and maintenance policy, facilities

As mentioned in the Regulations, Jenin Municipality can conduct testing and maintenance of customer meters with the request of the customers. However, it is quite difficult to conduct due to insufficient capability at this moment.

Jenin Municipality owns a test bench for testing, but the complete system is yet to be set up. No expert is deployed for testing facilities. Furthermore, the requests for testing meters from the customers are not many. For these reasons, the Municipality might not set up the complete system of test bench.

(6) By-laws related to ownership and O&M of customer meter

The customer has the ownership of the customer meter according to current Regulations, but the responsibility of O&M is not mentioned in the Regulation. The customer has the responsibility of O&M for the customer meters according to the Water Agreement between the Ministry of Local Government and Jenin Municipality.

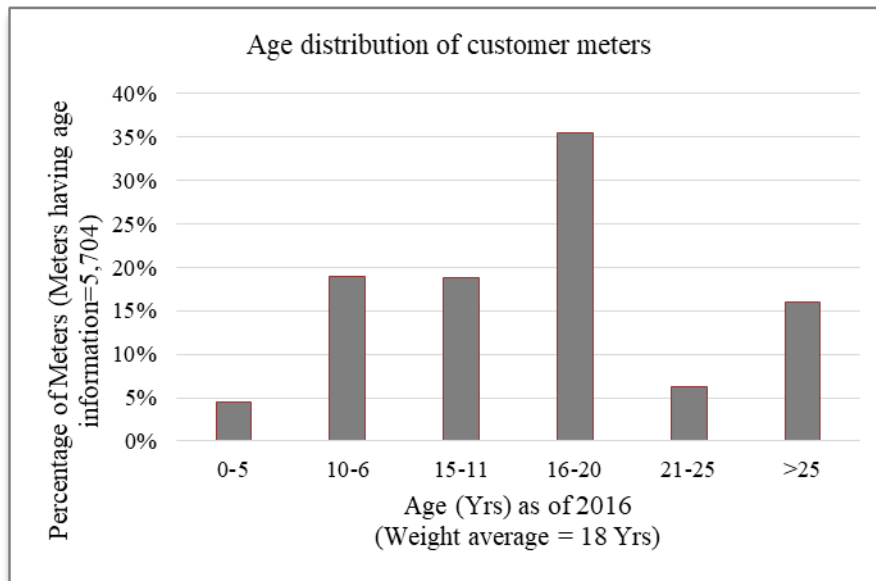
Regarding the ownership of the customer meters, whether to follow the Regulation or not depends on the water providers. For instance, Jerusalem Water Undertaking and JSC-JWV have the ownership of the meters. Their meters are not traditional mechanical meters, but special types. Those are costlier than traditional types and unacceptable to the customer from the cost aspect. For this reason, the water providers made application to PWA when they try to start new types.

Above providers set up maintenance section or made a contract with the suppliers on maintenance service in order to secure accuracy of customer meters in parallel.

(7) Age and condition of existing customer meters

The GIS system has records of age and condition of existing customer meters but not for all. Of the total 6321 meter points on GIS map, 5704 meter points have age information. Similarly, 5930 meter

points have condition information which is categorized into bad, fair, or good. Age distribution of the meters is shown in Figure 3.8 and condition of meters is summarized in Table 3.8 and Figure 3.9.



Source: Adopted from existing GIS database of WWD

Figure 3.7 Age Distribution of Customer Meters

Table 3.11 Condition of Existing Customer Meters

Meter Condition	Count	
	Nos.	%
Bad	186	3%
Fair	1,575	25%
Good	4,169	66%
No information	391	6%
Grand Total	6,321	100%

The condition of meter seems to be not much correlated to the age. Table 3.11 shows the condition of meter in each age bracket. Surprisingly, the meters classified as good are about 70% or more in all age groups except the oldest age group of over 25 years.

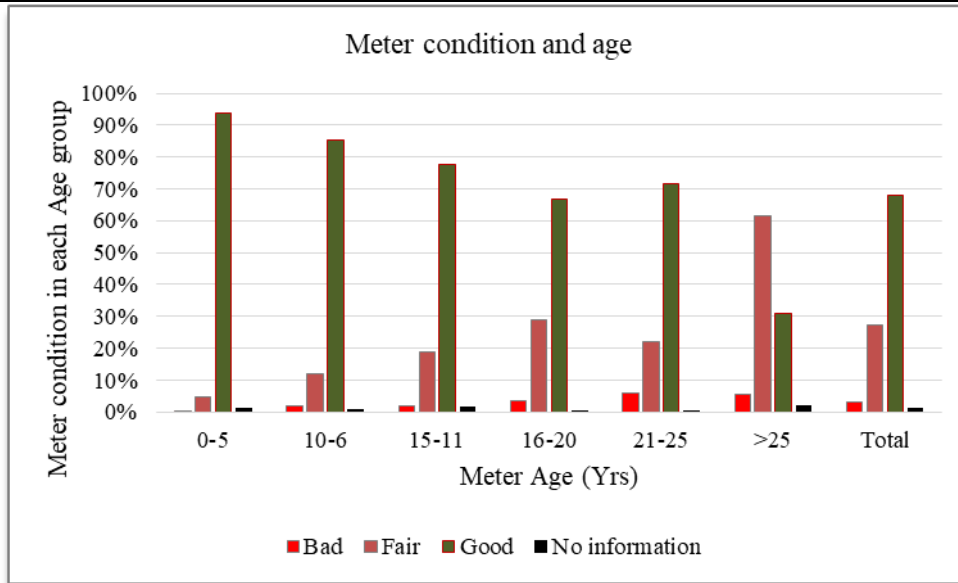


Figure 3.8 Customer Meters Age versus Condition

3.4.3 Workflow of Domestic Metering System

The section of customer service is in charge of metering work. The works from meter reading up to bill collection is conducted as shown in Figure 3.1.

Meter reading is conducted by 15 staffs of “Meter reading & bill collection” section every month. After meter reading, the data is transferred to the staffs in charge of “Connection and data entry”, and these staffs input the data to Water Bill Formats. Finally, the section head prints out the water bills, and the staff in charge of “Meter reading & bill collection” deliver the water bills.

The customers pay water bills at three payment stations of the Municipality or the meter readers of the department collect water bills directly from the customers. To collect water bills directly from the customers is very significant work. Current bill collection ratio is about 50%, but it was less than 30% at the specific area when meter readers in charge of such area quit the jobs.

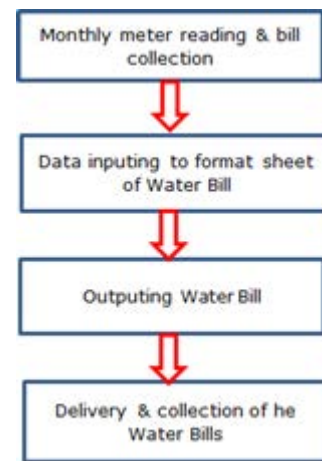


Figure 3.9 Work Sequence

The works from meter reading to bill collection for about 9,500 customers have been conducted by 15 staffs. For this reason, it is suggested to take action for introducing more efficient way of meter reading and bill collection in order to save the time.

3.4.4 Issues and challenges

Water supply in Jenin Municipality has the problems of bill collection ratio and water resource. Regarding water resources, it will not be solved easily due to international treaty on water resource development. Thus, solving bill collection ratio must be the most realistic issue.

A lot of insufficient factors resulted in low bill collection. The factors related to “Current apparent (commercial) loss” may be accuracy of existing customer meters and inefficient way of bill collection. In order to improve current situation, it is recommended to consider the following subjects in advance:

- To make the system such that the municipality has the ownership of customer meters,
- To create system to check accuracy of customer meters regularly and replace by more accurate ones if necessary,
- To strengthen existing section in order to conduct improvement of accuracy of customer meters, and
- To create recording system on checking up accuracy of the customer meters for monitoring.

Regarding collecting bill much efficiently, pre-paid water meter system seems to be an attractive choice. Actually, pre-paid system is already introduced in the electricity sector in Palestine and has a lot of advantages from the managerial aspect. However, pre-paid system in water system is skeptical as compared to in electricity.

Electric supply in Palestine is more or less stable nation-wide, but water supply in Jenin Municipality is not stable. This is not a matter of system, but matter of quantity aspect. Electric supply basically has a good grounding for the introduction of pre-paid system from the beginning.

However, it is worthy to challenge introducing the pre-paid water meter system in Jenin Municipality as a trial case. The followings are essential works to be tackled in advance.

- 1) To recognize new job descriptions for pre-paid meter system from the overall managerial aspects,
- 2) To make a road map including timeline for the introduction of pre-paid meter system,
- 3) To budget for pre-paid meter system,
- 4) To deploy the human resources to new job descriptions, and
- 5) To provide newly assigned personnel with adequate trainings.

The customer metering and reading system of Jenin has several issues and challenges which need to be addressed to reduce apparent loss component of NRW. The followings are some of the most critical issues:

- Ownership of the meter is on customer. This makes difficult for the municipality to check or replace as it likes.
- Less accurate meter type. The Class B velocity type meters which are mostly used in Jenin are less accurate at low flow rates.
- Meters are sometimes installed inside house or in difficult or high places. This makes it difficult to read the meters, easy to steal water and difficult for technical person to check.
- Sometimes people intentionally do not open gates for meter readers.
- Careless customers, water meter is dirty, hidden between grass, or unreadable.
- Water meter in the name of expired person or person who has already left the building. Heirs don't care to pay, and no direct responsibility for water meter and tariff.
- Some people travel abroad for a long time without informing WWD.
- Abandoned houses especially in the old city. In such cases, water meters are damaged and there is no one to review. The meter readers read the meter but do not know who to give the bill or who is the new owner.
- Unclear procedure for implementing the existing regulation about illegal connections.
- There are no technical teams specialized in illegal connections.
- No system of supervision or check on readers in the field.
- The Municipality's response is slow or sometimes no response when readers or collectors inform about any cases of water leak or water theft. This increases NRW.
- Meter readers fear attack if they report any illegal connection. Municipality doesn't provide any such protection needed.

3.5 Water Balance and NRW Studies

3.5.1 Water balance

Water balances in IWA format for latest two financial years (FY 2015 and 2016) are shown below.

Table 3.12 Water Balance for Financial Year 2016 (365 days)

System Input Volume (SIV) 2,883,388 m ³ 100%	Authorized Consumption (AC) 1,461,691 m ³ 50.69%	Billed Author. Cons. (BAC) 1,461,691 m ³ 50.69%	Billed Metered Cons. (BMC) 1,461,691 m ³ 50.69%	Revenue Water (RW) 1,461,691 m ³ /a 50.69%	
			Billed Unmetered Cons. (BUC) 0 m ³ 0.00%		
			Unbilled Author. Cons.(UAC) 0 m ³ 0.00%	Unbilled Metered Cons. (UMC) 0 m ³ 0.00%	Non-revenue Water (NRW) 1421697 m ³ /a 49.31%
				Unbilled Unmetered Cons. (UUC) 0 m ³ 0.00%	
	Water Losses (WL) 1,421,697 m ³ 49.31%	Apparent Losses (AL) 568,679 m ³ 19.73%	Unauthorized Cons. (UC) 213,255 m ³ 7.40%	Metering Inaccuracies (MI) 355,424 m ³ 12.33%	
		Real Losses (RL) 853,018 m ³ 29.58%	Leakage and Overflows at Utility's Storage Tanks 0 m ³ 0.00%		
				Leakage on Transmission Mains / Distribution Pipes and Service Connections upto point of Customer Metering 853,018 m ³ , 29.58%	

Source: Adopted from WWD data

Table 3.13 Water Balance for FY 2015 (365 days)

System Input Volume (SIV) 2,688,822 m ³ 100%	Authorized Consumption (AC) 1,369,189 m ³ 50.92%	Billed Author. Cons. (BAC) 1,369,189 m ³ 50.92%	Billed Metered Cons. (BMC) 1,369,189 m ³ 50.90%	Revenue Water (RW) 1,369,189 m ³ /a 50.92%	
			Billed Unmetered Cons. (BUC) 0 m ³ 0.00%		
			Unbilled Author. Cons.(UAC) 0 m ³ 0.00%	Unbilled Metered Cons. (UMC) 0 m ³ 0.00%	Non-revenue Water (NRW) 1,319,633 m ³ /a 49.08%
				Unbilled Unmetered Cons. (UUC) 0 m ³ 0.00%	
	Water Losses (WL) 1,319,633 m ³ 49.08%	Apparent Losses (AL) 527,853 m ³ 19.63%	Unauthorized Cons. (UC) 200,000 m ³ 7.44%	Metering Inaccuracies (MI) 327,853 m ³ 12.19%	
		Real Losses (RL) 791,780 m ³ 29.45%	Leakage and Overflows at Utility's Storage Tanks 0 m ³ 0.00%		
				Leakage on Transmission Mains / Distribution Pipes and Service Connections upto point of Customer Metering 791,780 m ³ , 29.45%	

Source: Adopted from WWD data

Comparison of water balance for two years shows similar trend and no drastic change in any of the components.

3.5.2 Flow and Pressure Measurement System

All the water produced inside the Municipality or purchased from outside are measured. Water production inside the Municipality is measured at source points. Water input from outside is measured at the boarder of the Municipality.

The bulk meters used to measure the water volume are mechanical type, accuracy Class B or Class C. The bulk meters at transfer points (for water brought from outside) are installed in chambers, some are well protected and some open. The bulk meters are installed with adequate upstream and downstream straight pipe sections. This assures the accuracy of measurement. Strainers have also been installed upstream of the meters to protect the meters from debris or suspended particles which may enter the pipeline by various reasons. Bulk meters for wells sources are installed at open, not in chambers.

Water meters are also installed at outlets of major reservoirs (Al Jabriyat and Al Marah reservoirs) but they are not working. Since water supply zones are not hydraulically isolated and some supply areas get water from more than one source, flow measurement at reservoir outlet does not have much meaning.

There is no pressure measurement system in the supply areas. Pressure gauges at BPSs are also often out of order.

3.5.3 Review of System Input Volume (Existing Sources and Production)

Since all the water production and import are equipped with working bulk meters and visual condition of the bulk meter is satisfactory, accuracy of the system input volume can be assumed reasonably good. Error margin of the SIV in the water balance of 2015 prepared by the Diagnostic Study is stated as +/- 5.0% which seems reasonable.

3.5.4 Review of Components of the Water Balance (Reliability of Data and Method)

(1) Billed authorized consumption

The billed authorized consumption amount is extracted from the monthly billing record. Thus, the data is reliable and accurate to the extent that the customer meters' accuracy is within the acceptable range.

(2) Unbilled authorized consumption

There is no unbilled authorized consumption in both years. This means all authorized consumptions are billed.

(3) Water losses

Components of water losses (real and apparent losses) are just wise guess, estimated by the WWD based on experience. They are not based on any measurement of leakage level (MNF) or meter accuracy test.

The Diagnostic Study (2016) attempted to measure apparent loss in two small areas by measuring water supplied and reading customer meters. The result it found is summarized in Table 3.14.

Table 3.14 NRW Study Result of Diagnostic Study

S. N.	Name of Area	Number of customer meters	Study duration (Days)	Difference of bulk meter and customer meter readings	Remarks
1	Palestinian housing	66	10	28%	Majority of this loss may be 'apparent' loss including meter error and illegal connection.
2	Al Shu'on	20	13	78.3%	It says the majority of NRW comes from

	housing				metering under registration and illegal uses. But the division between real and apparent losses (how much from real and how much from apparent losses) are not supported by any calculation or data.
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In order to estimate the extent of ‘real’ (or ‘physical’) loss component, the study measured minimum night flow (MNF) in 6 supply zones. The result is reproduced below.

Table 3.15 MNF Results Summary and Findings of Diagnostic Study

No.	Zone	Study Date	Main Network Length	No. Meters	No. of HC	MNF (m ³ /hr)	Detectable Leakage (m ³ /day)	% Water Loss	Loss m ³ /km length	Loss m ³ /house connect.
1	Al Marah	12-Nov	29,692	1468	1174	59.43	1194.5	56.4%	40.2	1.0
2	Jabreyat	16-Nov	10,632	754	603	61.84	1383.0	59.2%	130.1	2.3
3	Farahty	10-Nov	8,339	811	649	4.8	0.1	0.1%	0.0	0.0
4	Sabah Alkher1	15-Nov	7,337	738	590	17.73	337.7	34.8%	46.0	0.6
5	Sabah Alkher2	15-Nov	5,622	218	174	8.6	172.8	54.7%	30.7	1.0
6	Alawneh	22-Nov	1,916	52	42	12.37	288.6	39.5%	150.6	6.9

Source: Diagnostic Study Report (2016)

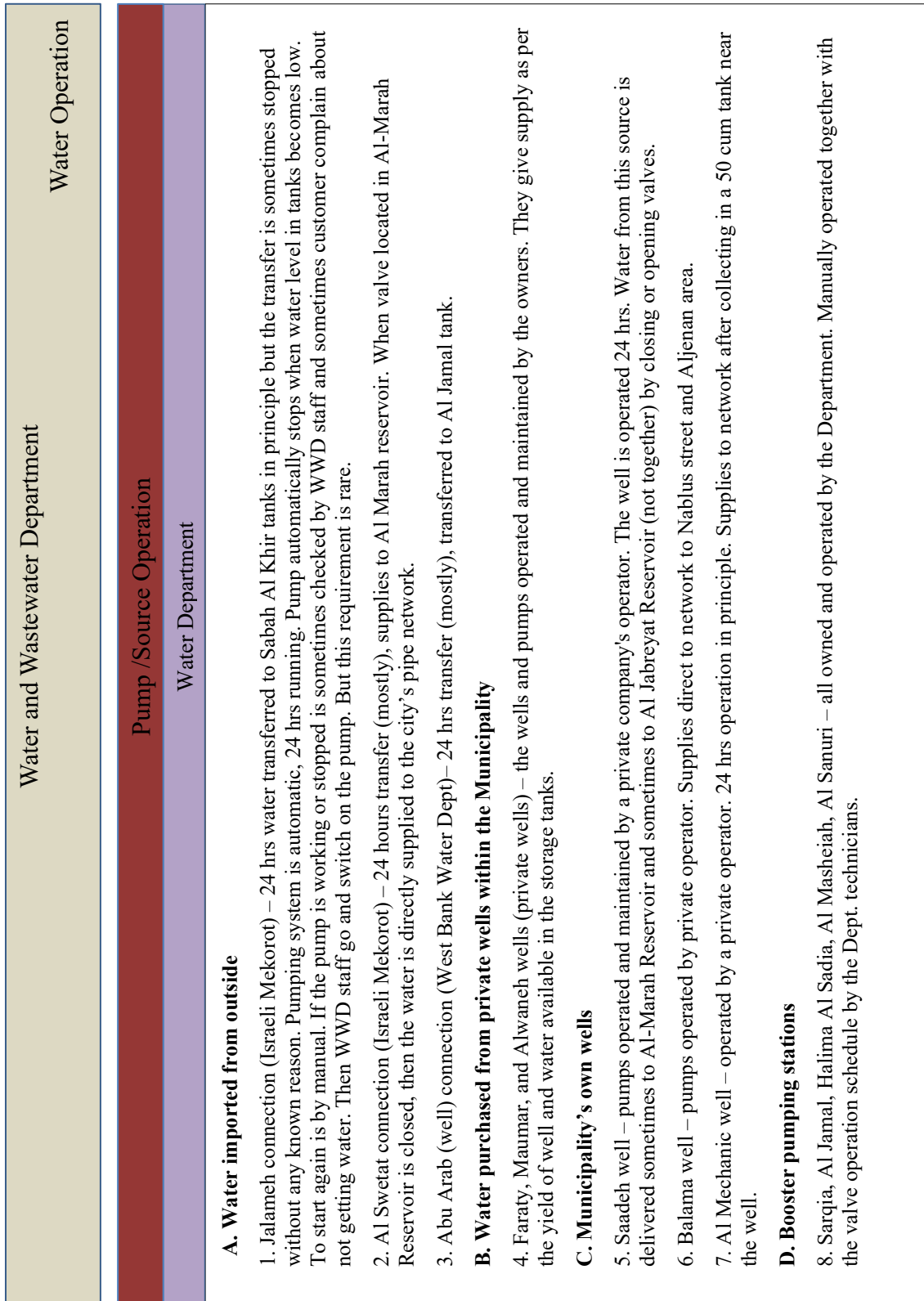
Given the conditions of water supply system in Jenin, i.e., hydraulic isolation of distribution zones are not perfect, supply is intermittent, and customers have storage tanks, the chances of MNF to occur is less. And the reliability of MNF data is questionable. The results also show the same. For example, it shows no physical loss at Farahty zone, which is difficult to believe.

3.5.5 Issues and Challenges

The followings are the main issues and challenges in relation with NRW management and water balance:

- How to calculate consumption for customers whose meters are not working,
- How to check accuracy of bulk meters which measure system input,
- How to check accuracy of customer meters,
- If the water balance can be prepared on monthly basis, it would help to reduce data errors,
- Challenges to estimate Unauthorized Consumption, how to know it,
- Maintaining pressure gauges at all pumping stations is essential.

Workflow of three processes, namely source operation, new house connection (technical part), and water connection termination and renewal process are shown in Figure 3.10, Figure 3.11, and Figure 3.12 respectively.



Source: JICA Expert Team

Figure 3.10 Workflow of Source Operation

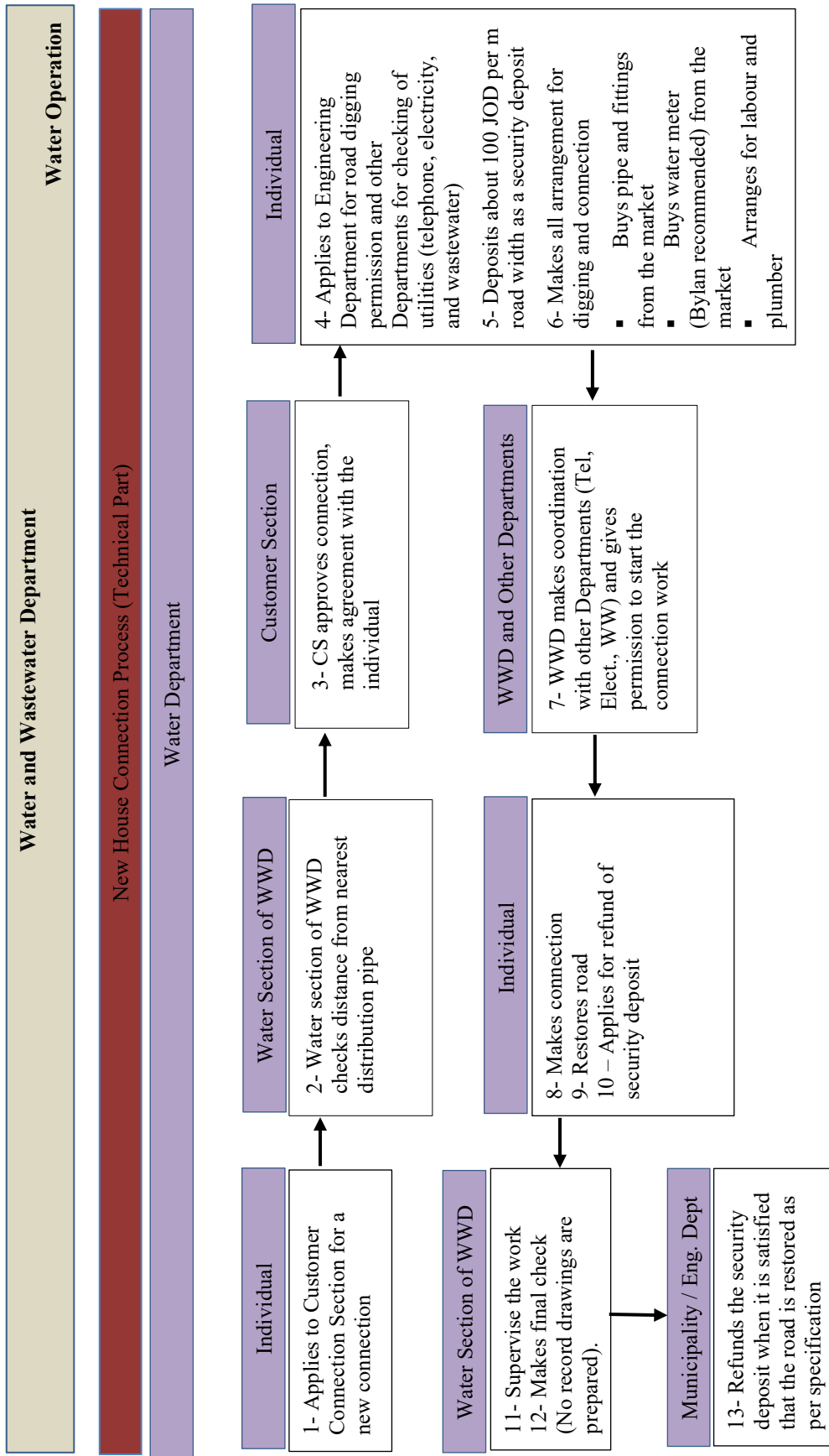
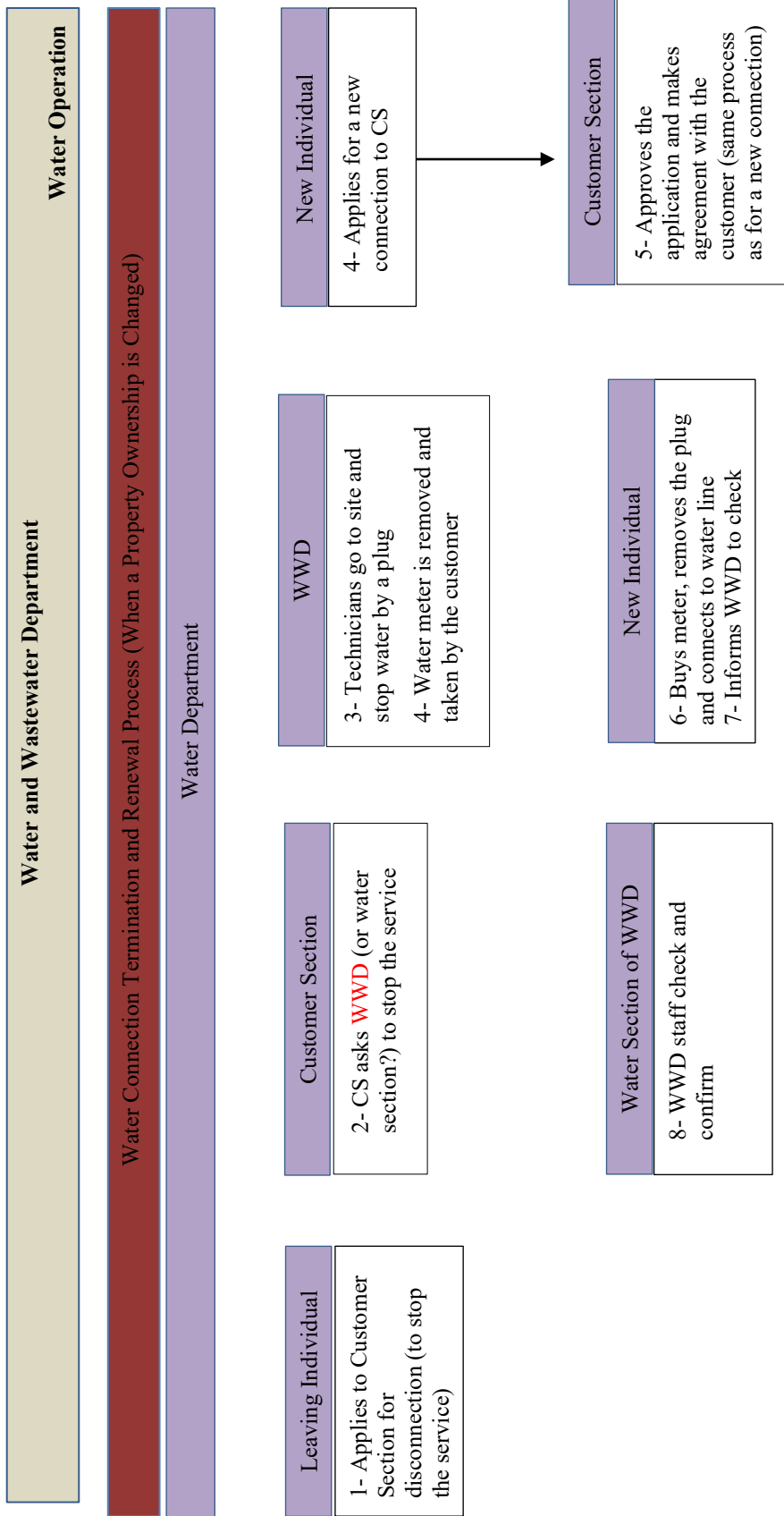


Figure 3.11 Workflow of New House Connection (Technical Part)

Source: JICA Expert Team



Source: JICA Expert Team

Figure 3.12 Workflow of Water Connection Termination and Renewal Process

3.6 Reports and Programs for NRW Reduction

3.6.1 Reporting System

(1) Leakage reporting system

When the customers find the leakage of their service pipe or distribution pipe, they call the WWD directly or through customer service section. The calls are taken by the head of water section and then reported to the director. If the customer has a personal connection with one of the staffs at WWD, he or she calls the person directly.

(2) Reporting in the meeting

Morning meeting among director and the staff members plays the major reporting role at WWD. They discuss their schedule of the day and also report the completed tasks including leakage repair. No written reports are used nor submitted.

(3) Water balance related information

System input volume is calculated based on monthly meter reading at the own sources, monthly bills for connection points (for water imported from outside), and monthly bills for private sources. Consumption volume is collected from customer center that gathers the customer meter readings.

3.6.2 GIS and Drawing

The WWD has only limited number of drawing. They own a CAD drawing of the whole city but they do not have any drawing for pipeline nor for their facilities such as chamber and reservoir. No drawings in the process of design and construction are available.

The latest GIS database was created in the project, “Diagnostic Study for Water and Wastewater Systems in Jenin City financed by Val de Mame and Seine-Saint-Denis in 2016”. The accuracy is relatively high and it contains detail information shown in Table 3.16. This GIS data is now managed and updated by GIS Section, Department of Engineering. At WWD, GIS software with the facility data is available but most technicians use the online interactive aerial map website provided by MoLG which can display all the Municipality’s assets. Most of the technicians are not familiar with the use of GIS.

Table 3.16 GIS Data and their Attributes

No.	Item	Description
1	Well	Name, Depth, Year, Flow, Dia., Type
2	Pumping Station	Name, Pressure, Type, Condition, Year
3	Tank/Reservoir	Name, Volume, Dia., Shape, Year, Condition, Material
4	Pipeline	Material, Age, Type, Length
5	Chamber	Type, Depth, Shape, Size, Condition. Material
6	Meter	Billing zone, Owner’s name, Age, Condition, Dia., Protection Box, Fitting
7	Valve	Type, Dia, Visibility, Status.

3.6.3 Monthly and Annual Reports

Information on water consumption and inlet volume from connection sources is collected monthly but there is no monthly report. Annual report on water balance is submitted to Water Service Regulatory Council in the data format and WSRC issues a water balance report annually.

3.6.4 Ongoing and Future Programs for NRW Reduction

There is no other ongoing NRW reduction program except this project.

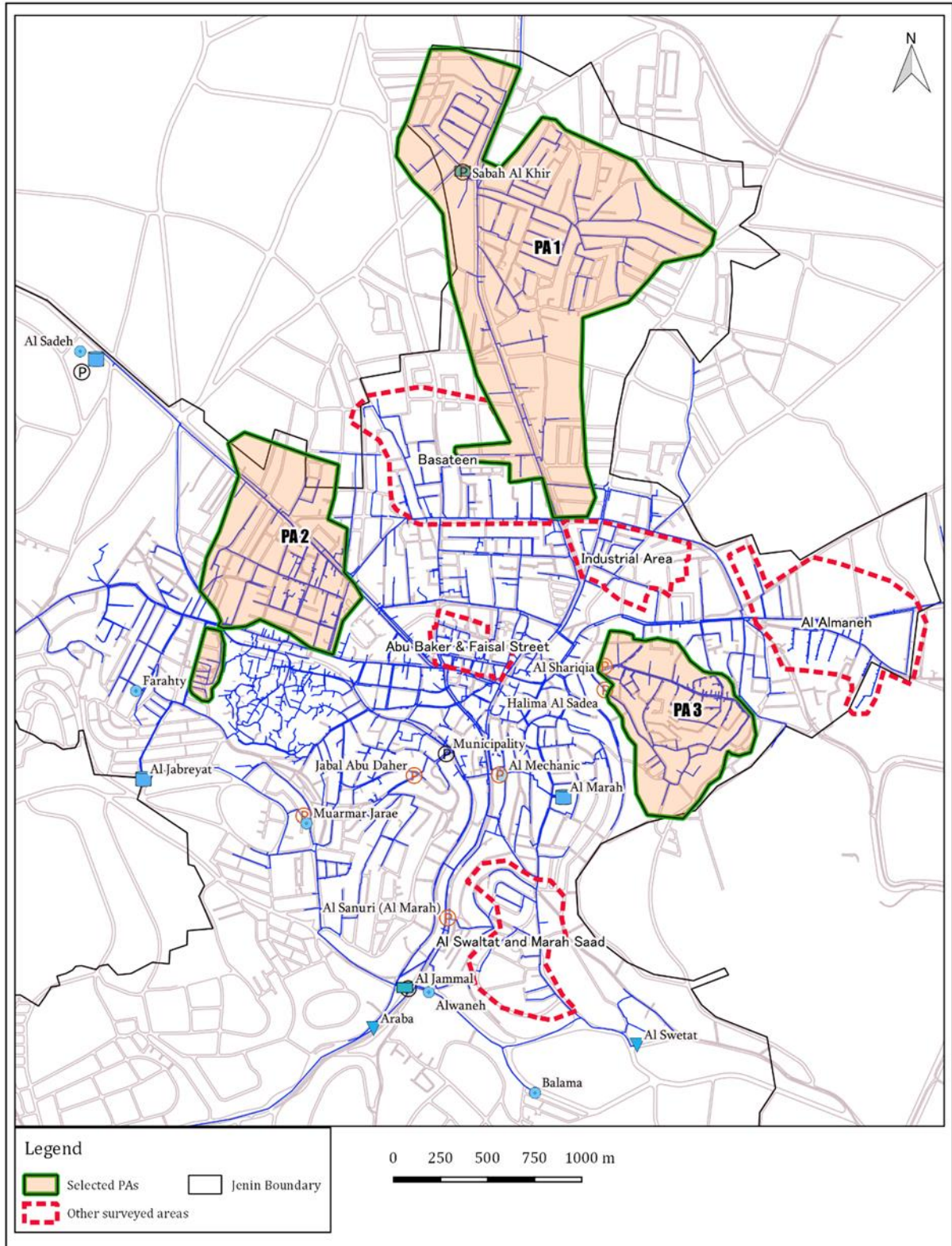
3.7 Pilot Project for NRW Reduction

3.7.1 Candidates for Pilot Areas

Several other areas in addition to PAs proposed during JICA preliminary survey were selected as candidates of pilot area of non-revenue water reduction (Figure 3.14). These were selected by the counterparts (C/P) of Water and Wastewater Department and JICA experts. All areas were surveyed. The following are evaluation results. As a result, 3 PAs have been selected by the C/P and JICA Experts (Figure 3.15). Basically, 3 different areas of topographic, water supply and social condition are selected.

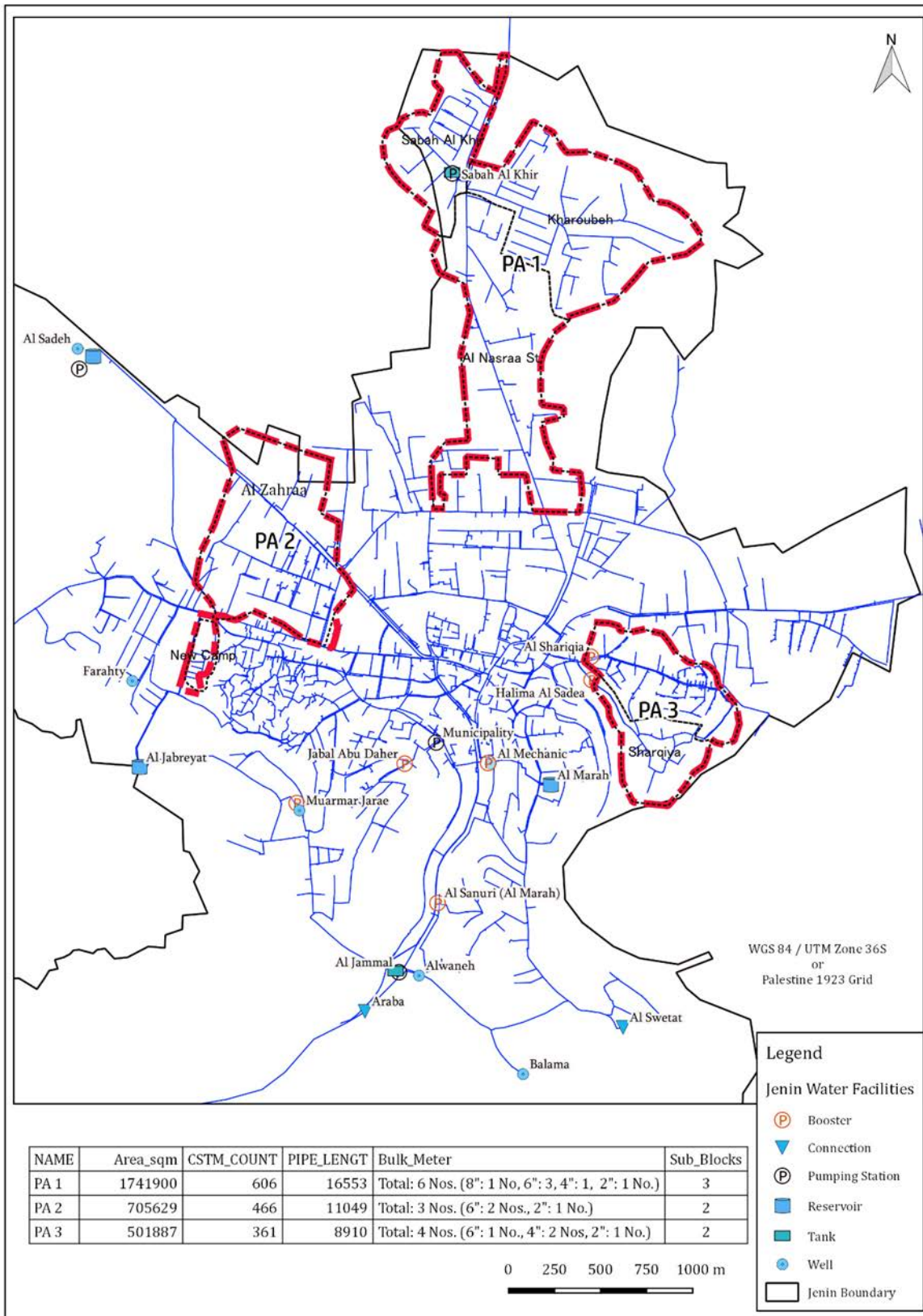
- (1) Proposed sites
 - 1) PA1: Sabah Al Khir, Kharoube, and Nasraa Street: Selected
 - 2) PA2: Al Zahraa, and Jenin Camp (new): Selected
 - 3) PA3: Sharqiya: Selected
 - 4) Industrial area - customer number is less (134)
 - 5) City Centre (Abu Baker and Faisal street) – customer number is about 300 but it is difficult to isolate network and work because of congestion
 - 6) Al Almaneh – customer number is less (102)
 - 7) Al Swatat – customer number is less (111)
 - 8) Basateen – customer number is less (172) and also connected to PA1
- (2) JICA preliminary survey sites
 - 1) PA1 is the almost same area as proposed during JICA survey (Kharouba, Sabah Al Khir, and Nasraa street).
 - 2) Northern Orchards proposed during JICA survey - the selected PA2 includes some part of this area. The selected PA2 also includes a part of Jenin Camp (new camp). Study of situation in Camp area will be important to manage NRW.
 - 3) Palestine housing proposed during JICA survey - this area is not considered because of two reasons: customer number is less (only about 116 whereas the RD says between 300-1000) and this area is adjoining the PA1 area and has similar nature as PA1.

No.	Area	Number of connections
JICA 1	Kharoubah & Sabah Al-Kheir	447
JICA 2	Northern Orchards	306
JICA 3	Palestinian Housing	116



Source: JICA Expert Team

Figure 3.13 Areas Surveyed for Selecting Pilot Areas



Source: JICA Expert Team

Figure 3.14 Three Selected Pilot Areas and their Details

3.7.3 Candidates for Pilot Areas

PA1: Sabah Al Khir, Kharoube, and Nasraa Street

PA2: Al Zahraa and Jenin Camp (new)

PA3: Sharqiya and Halima Al Shadia

Table 3.17 Evaluation of PA Based on Criteria

Criteria	PA1	PA2	PA3
1. Pipe network is easy to separate	<ul style="list-style-type: none"> ○ Main pipe is connected with other zone at one location only. About 10-15 houses are on boarder line with other zones and need survey to confirm which side of network they are connected to. We can understand it by result of water pressure measurement. So we will be able to control the flow after installing the valve as PA area. 	<ul style="list-style-type: none"> ○ Existing pipe network drawing seems to be not so correct in this area as understood from field survey with the Engineers / technicians. In order to isolate the area, some isolation valves are required. We should investigation more such as water pressure measurement to be able to make sure the isolation, how many inlet and outlet points they need as well. 	<ul style="list-style-type: none"> ○ There are two bigger and two smaller main pipes going into the PA as per GIS map. Main pipes do not cross to other zones, so the area is easy to isolate. But there are many houses on boarder line with other zones. They need to be surveyed and confirmed which side of network they are connected to. We should investigation more such as water pressure measurement to be able to make sure the isolation, how many inlet and outlet points they need as well.
2. The amount of water used at night is small	<p>△ The whole city is almost all residential and night time water use is not significant but people store water even at night when water is available, which may affect to measure minimum night flow (MNF). This is the same condition in whole city.</p>		
3. Water supply method inside the PA can be changed (Measure the minimum flow rate at night by filling the water storage tank)	<ul style="list-style-type: none"> ○ It is possible to measure the MNF at inlet and out of PA and also individually at each sub-area. Continuous supply for 3 days for whole PA may not be possible in summer but possible in winter. 	<ul style="list-style-type: none"> ○ It is possible to measure the MNF but continuous supply for 3 days is possible only in winter. 	<ul style="list-style-type: none"> ○ It is possible to measure the MNF but continuous supply for 3 days is possible only in winter.
4. Water supply change in PA does not affect other areas	<ul style="list-style-type: none"> ○ It is possible to supply only this area without affecting supply to other areas by closing a valve at the border with another zone. 	<ul style="list-style-type: none"> ○ The area is supplied by gravity from Al Zabreyat reservoir. Other areas are also supplied by the pipe line which supplies this area. However, valves to other lines can be closed if required to supply only this area. We should investigate more such as water pressure measurement to 	<ul style="list-style-type: none"> ○ This area gets water from Al Marah reservoir. The area lies at the end of distribution system. Distribution main from reservoir to this PA has several branches supplying other areas. Thus, supplying only this area without supplying other areas is not possible. We should investigate more such as water pressure

Criteria	PA1	PA2	PA3
		be able to make sure the isolation and also to determine exactly how many inlet and outlet points are required.	measurement to be able to make sure the isolation and also to determine exactly how many inlet and outlet points are required.
5. The pipe network drawing is well maintained	○ Network map is about 95% correct. (Now we are checking network at site)	○ Network map is available; information may be less accurate than in PA1.	○ Network map is available, correctness not known yet.
6. We can do night time work on leakage survey	○ Yes, no problem to work at night.	△ In one part (New camp area) night time work cannot be done after 10:00 pm. Other part is OK.	○ Yes, no problem to work at night.
7. Training for reduction measures can be done. The effect of reducing non-revenue water is expected to be high.	○ Good for OJT of pipe location, hidden valve location. NRW ratio of this area only is not known yet. As per record of Water and Wastewater Department, number of leak repair was 72 in 2016 and 59 so far in year 2017.	○ NRW ratio of this area only is not known yet. As per record of Water and Wastewater Department, number of leak repair was 56 in 2016 and 41 so far in year 2017.	○ NRW ratio is not known yet. As per record of Water and Wastewater Department, number of leak repair was 43 in 2016 and 34 so far in year 2017.
8. Collection ratio	Collection ratio of Jan - Oct 2017 period is 57%.	Collection ratio of Jan-Oct 2017 period is 47% for Al Zahraa and 17% for New Camp area. When combined both, the ratio is 42%	Collection ratio of Jan-Oct 2017 period is 50%.

Table 3.18 Characteristics of PA

PA	Area	Characteristics	Area (m ²)	Nos of Customers ¹
1	Sabah Al Khir, Kharoube, and Nasraa Street	<ul style="list-style-type: none"> • The area is mainly residential with some commercial • The area is slightly hilly, not perfectly flat • The area is separated into 3 sub-areas • Main supply source is by a pump, but there is some possibility that water also enters from adjoining area when the pump is not operating • The area is newly developing, new connections will increase in future • The total area is relatively large 	1,741,900	606
2	Al Zahraa, and Jenin Camp (new)	<ul style="list-style-type: none"> • The PA consists of two parts; Al Zahraa area and New Camp area • Al Zahraa area is flat and big, New Camp area is at the back side and steep hilly • The Al Zahraa area is mixed of both residential and commercial types whereas the New Camp area is residential 	705,629	466

		<ul style="list-style-type: none"> Al Zahraa area is newly developing area, it has a good scope of future population growth 		
3	Sharqiya and Halima Al Shadia	<ul style="list-style-type: none"> The area is hilly Water is supplied by online booster pumps from lower to higher elevation There are two separate distribution mains and booster pumps It is almost all residential area Future population growth potential is not so much 	501,887	361

Note: 1; the numbers are based on GIS database. Latest customer records for whole Jenin show about 35% more number of customer connections compared to the numbers in GIS. So, the number of connections at present will likely increase in all these PAs by about 20-40%.

The DMA in Pilot Area 1 will have 3-sub areas. The outline of bulk meter requirement is as summarized in the following table.

Table 3.19 Summary of bulk meter requirement

Location	Description	Size	Proposed type	Remarks
Location 1	Replacement of source meter (at inlet of Sabah Al Khir pumping station)	200 mm	Mechanical	Existing meter is not working
Location 2	New meter at outlet of pumping station	150 mm	Electromagnetic	New chamber is required
Location 3	New meter for small branch supplying parts of Sabah Al Khir area	50 mm	Mechanical	New chamber is required
Location 4	Replacement of existing meter at distribution main supplying to Sabah Al Khir area	150 mm	Mechanical	Existing meter is not working. Chamber is existing, so the meter can be replaced at the same location.
Location 5	New meter for distribution main to supply Kharoube area	100 mm	Mechanical	The meter can be installed in existing chamber
Location 6	New meter for distribution main at Nasraa street going out from PA to supply other zones	150 mm	Electromagnetic	New chamber is required

3.8 Summary of Issues and Challenges

The water balance of Jenin municipality water supply for financial year 2016, estimated by WWD is shown in the Table 3.12. The system input is actual measurement of source water meters and the billed authorized consumption is billed water amount, both of which come from actual data. However, apparent loss and real loss are estimate. The current NRW is about 50 %, of which 30 % is assumed as real loss.

In light of the values on the above-mentioned table and overall data information collected so far, the following is the summary of issues and challenges in Jenin's overall water system.

3.8.1 Issues and Challenges Related to Overall Water Supply Conditions

- (1) Irregularity of supply schedule- water imported from outside source (from Mekerot company) is sometimes stopped suddenly and as a result Jenin cannot maintain its supply schedule. The

irregular supply schedule is pointed out to be one of the most crucial issues by customers and recognized by the WWD.

- (2) The source water flow is not monitored periodically. The demand and source of water balance by area is not clear. They need to use more flow volume data for distribution control.
- (3) The supply is intermittent and supply duration is short (we should know actual supply condition and how many hours it is by area). This raises customers' dissatisfaction and also makes difficult for any underground leak detection work,
- (4) The supply is rationed by daily opening and closing valves. This consumes substantial work time of technicians and accelerates wear and tear of valves. The function of valve is originally not for exercise of rationing water supply. (We should analyze why it is rationing supply and why it is necessary.)
- (5) Distribution flow is neither monitored nor managed since bulk metering does not exist in distribution network and are not working at distribution reservoirs.
- (6) Similar to flow, pressure in the network is also neither monitored nor managed. Since pressure zones do not exist, it is likely that pressure variation is significant within supply areas.
- (7) In the absence of flow and pressure monitoring, the supply is often inequitable.

3.8.2 Issues and Challenges Related to Real Loss Reduction (RL)

- (1) Leakage prone pipe materials
 - 1) Almost all pipe materials are metallic which are easily corroded, and increase leakage.
 - 2) Most pipes are black steel pipe (BSP) for distribution mains and galvanized pipe (GIP) for service pipe and distribution sub-main which are old-fashioned and nowadays not popular in other countries. Any connection points of these pipes such as pipe to pipe, pipe to valve and pipe size change should be welded, which need higher skill of welding and need pressure test after welding. Otherwise, leakage could likely occur. In addition, GIP has threaded ends, and the connections to fittings can be particularly unstable, resulting in rust and leaks. GIP is also prone to corrode. Type of pipes to be used for water supply system will be reviewed considering workability, transportation, and leakage prevention.
- (2) Long leakage unattended time
 - 1) Findings of leakage point after developing surface leakage seemingly take time because exact pipe location and depth (earth cover) is unknown as no as-built drawing is available, excavator is not easily available for digging, and more planned digging method is required with accurate direction. The more time it takes, the more leakage increases.
- (3) Lack of proactive leakage control
 - 1) Reported leaks are repaired but planned survey for surface leakage is not conducted.
 - 2) Underground leak detection survey becomes difficult whenever the supply system is intermittent and supply duration is short,
 - 3) There is no special team or section for leak detection,
 - 4) Leakage detection equipment is insufficient,
 - 5) There is no special vehicle for leakage survey.
- (4) Insufficient leak repair method
 - 1) One of leakage repair method in Jenin is welding. This method is old-fashioned and most of waterworks do not adopt it. After leakage repair by welding, pressure test is required. Leakage

repair method should be reviewed. It needs more clamp and dresser for replacement of leakage pipe.

- 2) Last year, WWD implemented "Inserting Technique", inserting a smaller pipe into the existing leaked pipe, which reduces damage of pavement and excavation. However, this method reduces hydraulic capacity of pipe.
 - 3) Technicians have rich experience in leakage repair, but they should learn more methods of repair and need more training.
 - 4) Depending on introduction of new pipe types, they should learn appropriate technique for connecting and repair of pipe.
- (5) Insufficient leakage repair materials
- 1) The materials are sometimes not available in stock so that it takes time to repair leakage. If repairing time is longer, the repair costs increase and long leakage made inconvenience for customers to use water.
- (6) Non-standard method of service connection
- 1) The standard drawing for house connection is not available. House connections are sometimes laid improperly. Instead of shortest distance possible from tapping point, sometimes house connections are made long in the private property. This increases the chances of leakage and illegal water connection,
 - 2) House connections are made by non-standard method, welding. This increases the chance of leakage,
 - 3) No pressure tests are conducted to confirm welding performance after new connections are made.

3.8.3 Issues and Challenges Related to Meter Inaccuracy (MI)

- (1) Less accurate meter type. The Class B velocity type meters which are mostly used in Jenin are less accurate at low flow rates,
- (2) There is no working test bench for checking water meter accuracy. Accuracy of aged consumer meters may be unacceptably low but we don't know for sure,
- (3) Although not very common, some velocity meters are not installed horizontally. This increases meter inaccuracy,
- (4) Ownership of the meter is on customer. This makes difficult for the municipality to check or replace as it likes,
- (5) There is no replacement policy or regulation of inaccurate customer meter,
- (6) There is no meter maintenance team,
- (7) Existing GIS database has the age and status information of about 90% of the 6321 customer meters but the accuracy of this information is doubtful and needs confirmatory update,

3.8.4 Issues and Challenges Related to Unauthorized Connections (UC)

- (1) Unclear procedure for implementing the existing regulation about illegal connections,
- (2) There are no technical teams specialized in illegal connections,

- (3) The Municipality's response is slow or sometimes no response when readers or collectors inform about any cases of water leak or water theft,
- (4) Meter readers fear attack if they report any illegal connection. Municipality doesn't provide any such protection needed,
- (5) Water from private water providers and private wells are used commonly mixed with municipal water system. It makes identifying illegal connection difficult.

3.8.5 Issues and Challenges Related to Reporting System

- (1) Monthly and annual reports of O&M are not prepared,
- (2) NRW reduction program requires systematic recording and reporting system. Currently, both reporting system and recording system are not at satisfactory level for the implementation of the NRW reduction activities,
- (3) Reporting is done mostly in oral form and some in hard copy written format. Computerized reports are not available which could help to plan O&M and preventive maintenance. The hand-written reports are rarely used for improving O&M,
- (4) Current reporting system of repair works needs to be improved in order to make the collected information more useful.

3.8.6 Issues and challenges related to data management system

- (1) There is no easy availability of basic information on facilities especially the as-built drawings, pump specifications, source flow data and so on,
- (2) Since as-built drawings are not available, details of pipe depth, accurate pipe location, etc are not available which are needed for NRW reduction activities. This lack of pipe depth and accurate pipe location also increases leak repair time.
- (3) Inventory list is not updated regularly and repair materials are not always available in stock.

3.8.7 Challenges Identified as Most Important by Technicians of Water Section

S. No.	Main challenges for the water sector in the city	Number of staff who think this is among the top 5 problems (total staff 16)
1	Many water leaks	13
2	Insufficient materials and equipment	9
3	Insufficient water source	8
4	Illegal connection	7
5	Customers' dissatisfaction for water supply	7
6	Water shortage	7
7	Old pump station	6
8	Inadequate water supply network	4
9	Insufficient staff	4
10	Low tariff collection rate	3
11	Weak management	3
12	No motivation to work	2
13	Low salary	2

S. No.	Main challenges for the water sector in the city	Number of staff who think this is among the top 5 problems (total staff 16)
14	Bad water quality	2
15	Meter malfunction or inaccuracy	1
16	High operation and maintenance cost	1
17	No operation and maintenance plan	1
18	Low water tariff	0
19	High cost of bulk water purchase	0
20	Less skill and technology of staff	0
21	Low water revenue	0

3.8.8 Awareness on NRW

- (1) Many of the staff members are not aware of how much water is supplied to Jenin and how much is actually consumed by the customers. Some of them see additional water source as the solution of water problems in Jenin. It may be correct partially but given the difficult situation of Jenin in terms of acquiring new water sources, reducing NRW and utilizing the available water sources at maximum efficiency is most important. It is necessary to bring this awareness to the staff in Water Department.
- (2) Awareness that ‘water is money’ and water leakage is wastage of money needs to be instilled on each and every staff member. It is felt that the current awareness level is not enough.
- (3) WWD technicians indicated that they have no motivations to work for leakage detection at night time hours when it is needed.

CHAPTER 4. CUSTOMER MANGEMENT

4.1 Organization for Customer Management

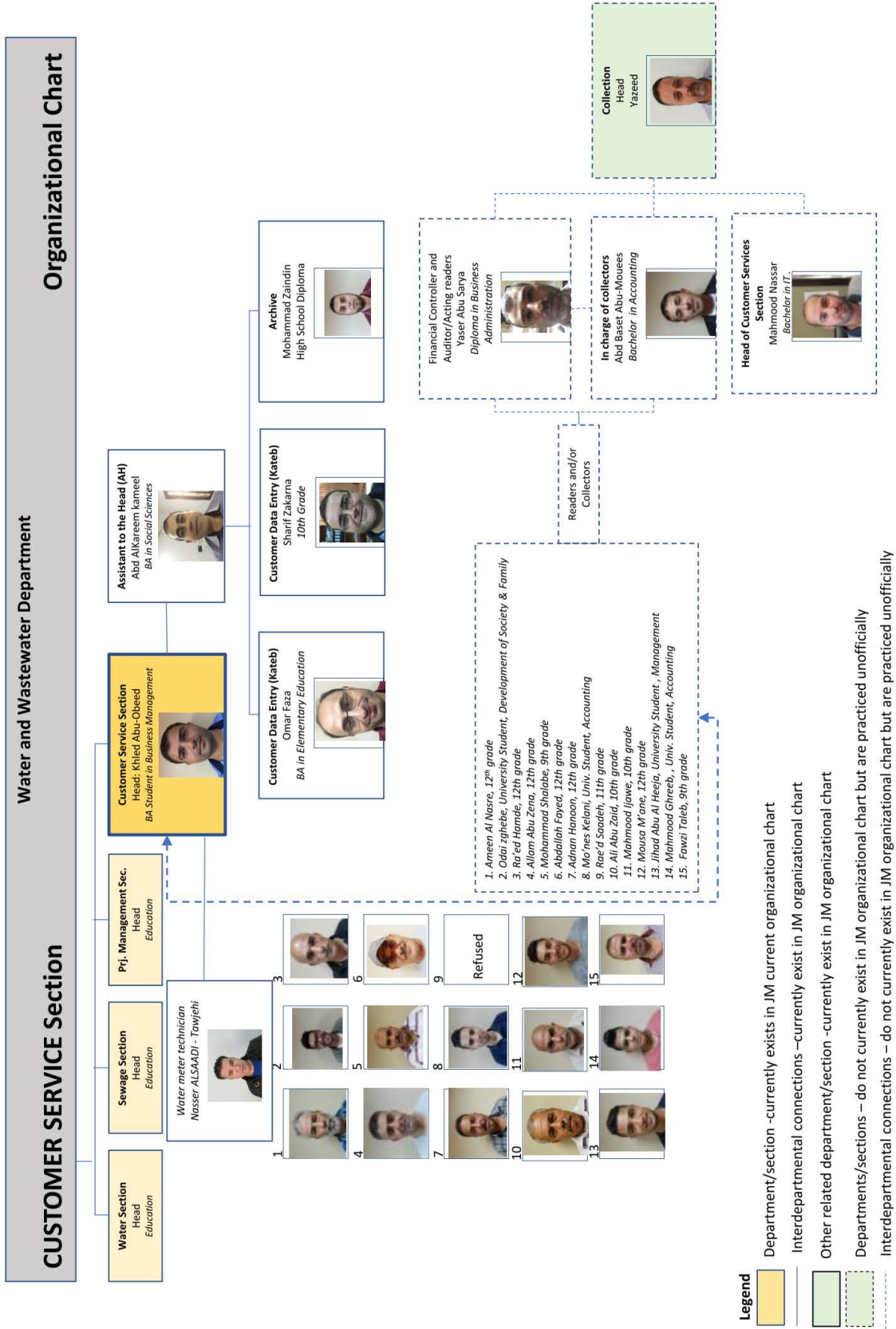
4.1.1 Personnel and Current Organogram (Customer Service Section)

The Customer Service Section is one of the four sections in the Water and Wastewater Department. The staff of this section is located in two separate buildings. The head of the section is recently placed at the WWD building. The reason was to provide better services to those customers when referred to the WWD for their technical needs of water issues. The rest of the staff is placed at the main JM building to provide non-technical services to the customers.

The section has three staff whom two oversee customer registration and data entry, and one for archiving. The former ones are called 'Kateb' and the later position is called 'Archive'. In addition to the Kateb and Archive, there are 15 members that do meter readings and bill collection during the months. They read meters the first 10 days of the month, and deliver the bills and collect billed fees the rest of the month.

Recently, the organizational chart of JM has changed in practice though not approved by PWA yet. In practice, there is a new unit called Collection Unit which supervises the 15 staff members from the 11th of each month when they work as the collectors. This means that these 15 staff are divided among two separate sections. Such divisions cause issues for the Head of the CS section when managing the staff.

The current organizational chart of the CS section is shown in Figure 4.1.



Source: JICA Expert Team
Figure 4.1 Current Organizational Chart of the WWD's Customer Service Section

4.1.2 Activities and Workflow of the Customer Service Section

Workflows of the following activities were collected through interviews with the related staff. The workflow was confirmed with the section head officer and the head of the WW department.

The workflows were also used to prepare job descriptions for the Head of Customer Service section and also job description for the Data Entry (Kateb) positions.

(1) New connections

CS- Asst. Officer (Kateb):

1. Applicant fills in a Site Check form (application paper form) for his new connection request and then is asked to be back in three days.

Water Section:

2. The head of Water Section through 2 technical persons checks the water network availability for the applicant's property within three days, maximum.

CS- Asst. Officer (Kateb):

3. Receives the field work report from the site check. If water network is available for the property, the new connection request process starts.

4. Kateb enters the customer data in the application form.

JM Bank of Jordan/Clearance office:

5. Applicant goes with the application to make a clearance and pay 682 NIS (496 NIS: connection fee, 31 NIS: location fee, 31 NIS: water meter fee, 124 NIS: worker wage fee).

CS- Asst. Officer (Kateb):

6. Applicant shows his already-purchased water meter Baylon brand to officer for initial checks and the fee receipts.

7. Kateb enters the applicant's information on AlShamel as a new customer and the meter number, type, etc.

8- Kateb transfers application to the head of C.S.

9- C.S transfers the application to the Water Section.

10- The Water Section informs customer to connect.

11- After customer connects his meter, he informs (by call) the Water Section to check.

Head of Customer Service:

12. The head of the Customer Section checks the application before it transfers the application to the Water Section. It needs 3 days because the Head collects the applications every 3 days.

13. The head of the Customer Service sends the applications on the same day to the Water Section as a routine procedure to sign the application in lieu of the head of the WWD. The head of WWD has given the signature right to the Water Section to further the application procedure. Head of C.S re-checks the application as Administrative procedure.

Water Section:

13. Customer calls when he installs the water meter. Head of Water Section sends the technician to the applicant's address to approve his water meter installation, within 2-3 days.

Collection unit:

14. Meter reading starts.

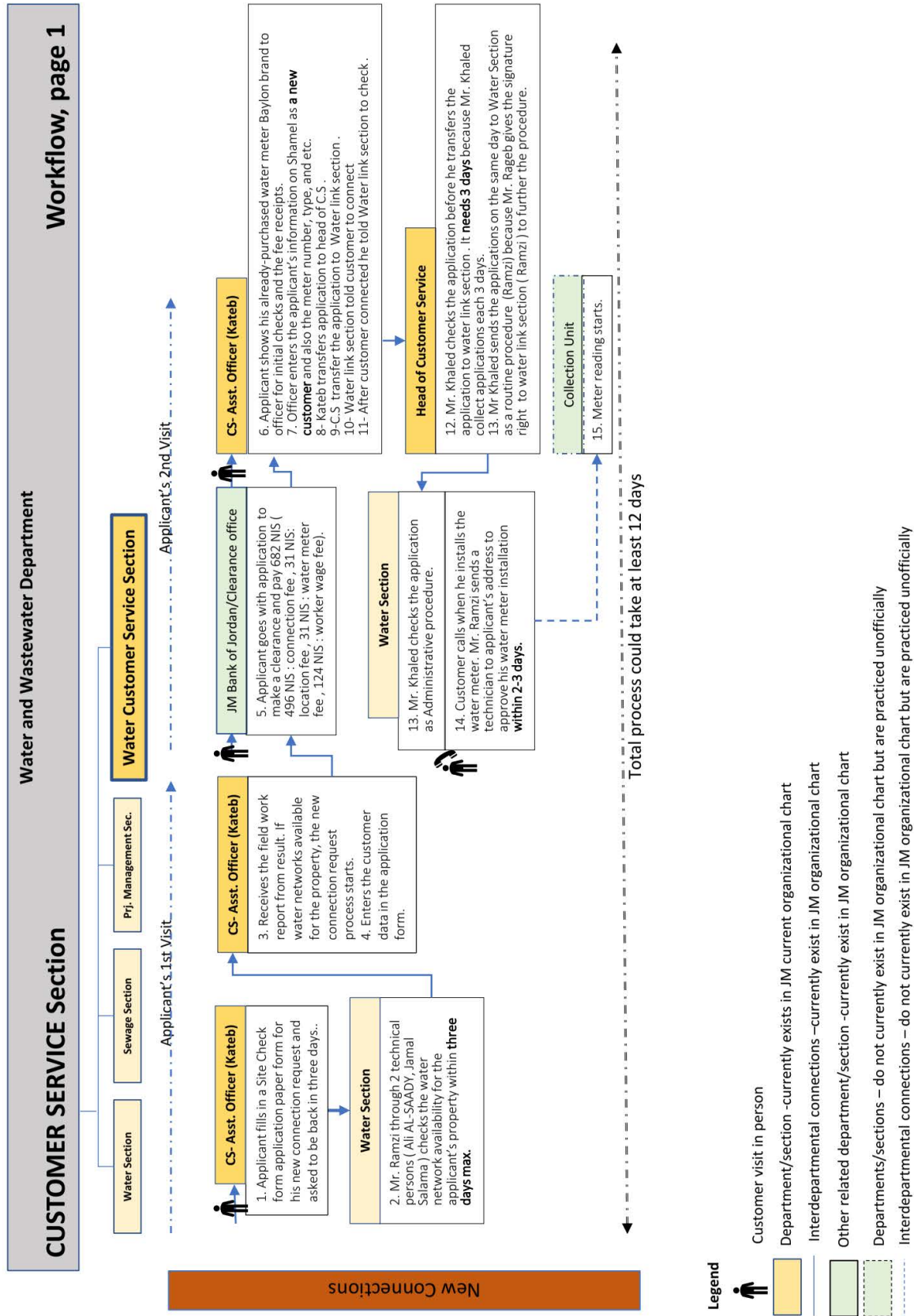


Figure 4.2 Workflow at the WWD's Customer Service Section (1/3)

(2) Meter reading and issuance of billing

Head of Customer Service:

1. Total customers connected to city water network are 8,053.
2. The Head provides the customers list to the readers for distributing the printed bills. This list contains everyone who connected to the network and he adds new customer, if any.
3. Each reader takes more or less than 500 customers, depends on the topography of the area and area size.

Meter reader:

4. They go to the field and read water meters from 8:30 AM until 12 PM, and back to the Municipality to hand in the read list to the Collection Unit.
5. The Collection Unit, who oversees the collectors, hands the list per day to the Kateb at C.S. to register.
6. Readers need 10 days to complete reading meters from the 1st of month until 10th of the month.
7. They back to the field after 25th if any problem in reads to reread and complete by the 30th.
8. After the 10th they become collectors.

CS. Asst. Officer (Kateb):

9. Starts data entry of the read meters until 20th and then they do other work.
10. From 20.25th, Kateb completes applications of new applicants and other work related.
11. 25.30th, Kateb reviews and checks the data entry for any errors of doubts of any high reads or anything they thought has problem.
12. Any problem, Kateb tells the readers to re.read the water meter.
13. After 30th they do invoice calculation.
14. Then send the final data to head of the Customers Service to check.

(3) Billing delivery

Head of Customer Service:

1. Bills cycle started from the 10th till the 10th of next month.
2. After the Head checks the list, he starts printing bills for all customers (8,053 bills).
3. Print bills after 30th of each month.
4. Hands in the bills to the Collection Unit.

Collection Unit:

5. Receives the bills from the Customer Service in beginning of the month.
6. Distributes the bills to the Collectors .
7. Each collector distributes more or less 500 bills on his area.
8. Collectors start distributing the bills from 8:30am till 1:30pm
9. Back to the Municipality, collectors deposit the collected cash in the water incomes account of the Bank of Jordan branch at Jenin Municipality.
10. Collecting bills starts from the 10th till the 30th of the month.
11. The acting officer in charge of the collectors audits the bank receipts and compares with the amount which the collector collected for the day and transfers the receipts to C.S to deduct from customer credit.

Note:

- Some customers pay direct to the Customer Service not through the bank.
- Some customers pay when they make a Clearance (means when pay off all the debts to the Municipality)
- Some customers pay through court after the Municipality goes to the court.
- Official institutions: municipality send financial request to official institutions and The Finance Ministry makes clearing with the Municipality.

(4) Meter ownership change

Head of Customer Service/Asst. Officer (Kateb):

1. Required document for the application: a. ID copy b. water clearance (has to be paid only all water debt if any, not other debts) c. contract between the old owner and new owner. d. a payment of 50 NIS as the ownership transfer fee.
2. If the customer is old and didn't have insurance he has to pay 50 Jordanian Dinar (250 NIS).
3. They send a technical staff to the field to check if there is a water network. If everything is ready they agree and continue the procedure.
4. It takes two or three days to transfer.
5. Adds the new customer to AShamel system and informs the reader who is responsible for the customer's area of reading.

(5) Temporary stop of meters

Head of Customer Service/Asst. Officer (Kateb):

1. Applicant needs a copy of ID and the Clearance.
2. Must pay 62NIS as a fee.
3. It takes two days.
4. Customer takes this decision because he wants to leave the Jenin city temporary & will come back, or for other reason.
5. After they finish Meter Temporary Stop paperwork, they send the form to the head of Water Section to send a technical staff to the customer's building to stop the meter.
6. Read water meter before stopping to calculate the final bill.

(6) Meter disconnections

Head of Customer Service/Asst. Officer (Kateb):

1. Application requirements: a. ID copy b. Clearance.
2. Must pay 62NIS as a fee.
3. It takes two days.
4. Customer takes this decision because he wants to leave the City forever or other reason.

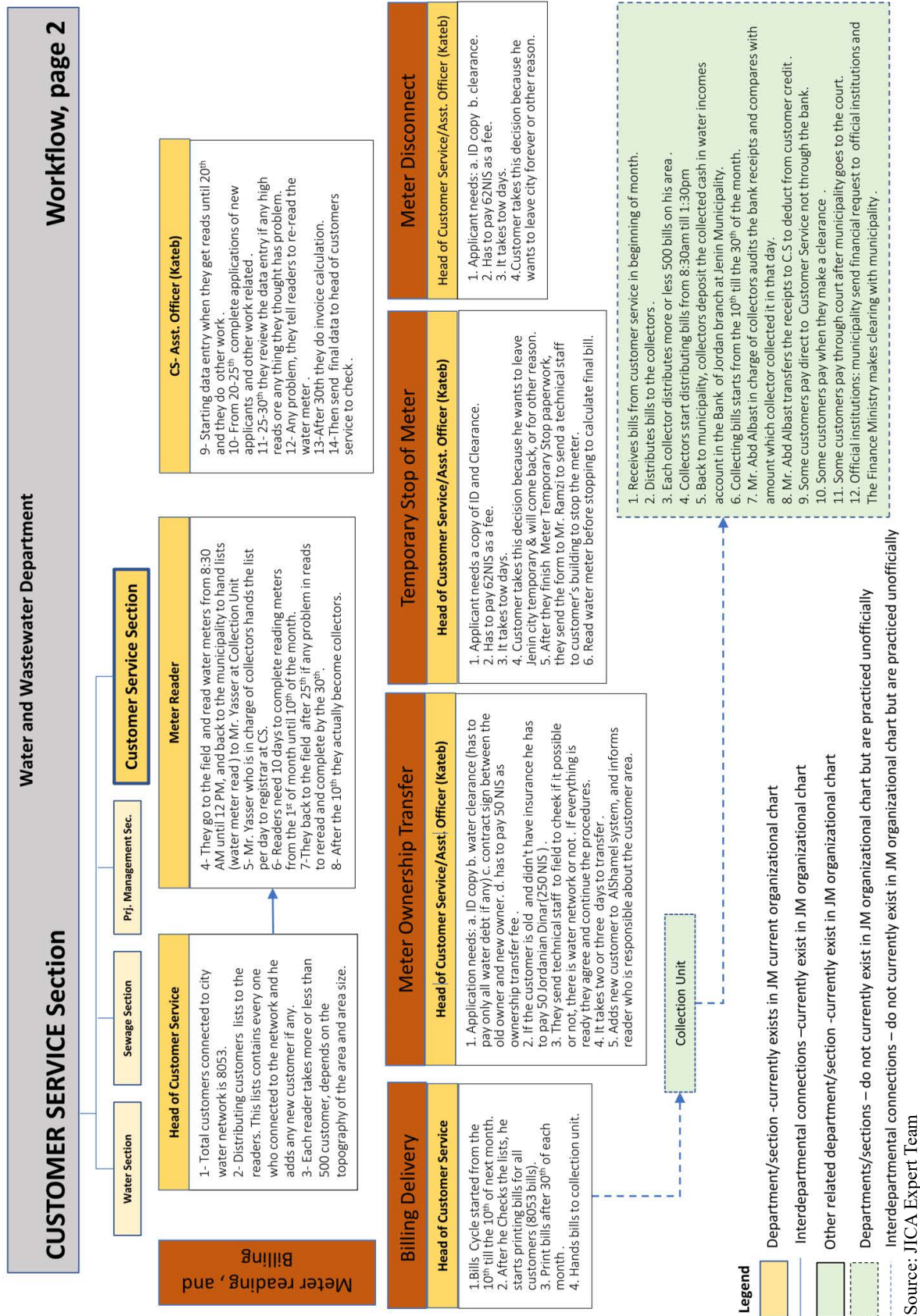


Figure 4.3 Workflow at the WWD's Customer Service Section (2/3)

(7) Re-connection

Head of Customer Service/CS- Asst. Officer (Kateb):

1. If the water meter disconnected forever and re-applied, it is considered as new customer application. Customer should do the same procedures as a new customer.
3. When applicant completes the application form and provides all required documents, he is added as a new customer to AlShamel system within 3 days.
4. In case of a temporary stop, he has to pay 62 NIS and clearance.
6. After Re-connection through customer, the technical staff checks the water meter and location and activate the customer an account on system and tells the related meter reader about the new customer.

(8) Illegal connection

Head of Customer Service/CS- Asst. Officer (Kateb):

1. If any reading is low or high or same read each month it indicates a problem.
2. Same read per month and low read per month lead to mark on this meter.
3. They send technical staff to check on water meter.
4. If they discover any illegal connection they stop water meter and stamp it.
5. Make report through the technical staff.
6. They put financial penalty 1,000 Jordanian Dinar (5,000 NIS).
7. Informs the Legal Unit about the customer.

(9) Financial issues

Head of Customer Service:

1. Calculates number of water tanks which supplied customers and official institutions and the costs.
2. Calculates water income of the department.
3. Calculates number of different types of applications per month.
4. Calculates water incomes from water meters insurance.
5. Calculates water consumption for the whole city.

(10) Absent customers

Head of Customer Service/CS- Asst. Officer (Kateb)/Reader:

1. Reader reads water meter every month if customer didn't tell the Municipality to stop or disconnect.
2. Records the minimum amount for consumption per month.
3. Do the same each month if no news from the absent customer.

(11) Customer complains

Head of Customer Service/CS- Asst. Officer (Kateb):

1. Kateb fills the complaint form.

Note: Sometimes complains filled at the public customer services section.

2. Sends it to the director/head of WWD after Mr. Mayor's review.
3. The forms is transferred to the head of C.S. after the head of WWD explains and leaves a note on the complaint form.
4. Head of C.S. sends a reader or the technical staff to re-read the water meter, and check the complaint issue, if is about water meter and reading complain.
5. They make a test through installing another water meter behind main water meter and compare.
6. If the problem is in water meter (technical) they then request the customer to fix it or buy a new one.
7. If the problem is related to the wrong reading the C.S corrects the reading.
8. There is no maintenance for water meter in JM.
9. Complains also sometimes are received by 'emergency direct call' to the head of WWD.

(12) Meter place/location transfer

Head of Customer Service/CS- Asst. Officer (Kateb):

1. Application requirements: a. ID copy b. Clearance, d. pay 217 NIS or 50 JD (250NIS) for old customer.

2. C.S. sends the technical staff to the field to check if it possible to transfer or not, there is a water network or not, as example. If everything is ready they agree and continue the procedure.
3. It takes two or three days to transfer.
4. Adds new customer location to the AlShamel system, and informs the reader.
5. Water meter must be installed by the customer himself.

(13) Repair water meters

Water meter technician:

1. Reader reports to the Clerk's division that there is problem with a water meter.
2. Clerks division sends a form to the Collection Unit.

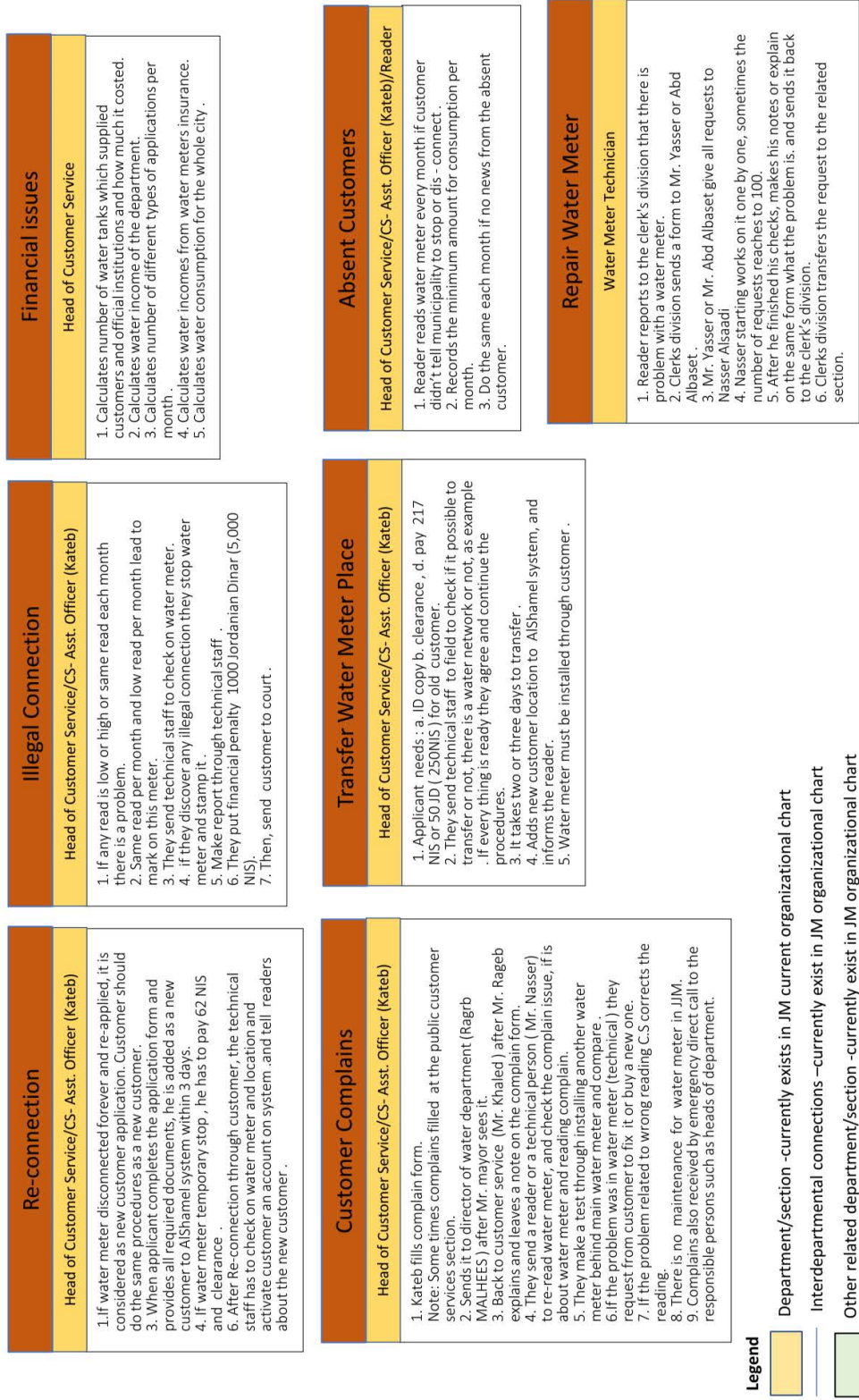
Collection Unit:

3. The Collection Unit gives all requests to the technician.
4. The Technician starts the work on it in the order as he receives, sometimes the number of requests reaches to 100.
5. After the technician finished his checks, makes his notes or explains on the same form what the problem is, and sends it back to the Clerk's division.
6. Clerks division transfers the request to the related section.

Water and Wastewater Department

CUSTOMER SERVICE SECTION

Workflow, page 3



Source: JICA Expert Team

Figure 4.4 Workflow at the WWD's Customer Service Section (3/3)

4.1.3 Issues and Challenges

Followings are issues and challenges at the customer service section of the WD department. The issues need to be categorized into major points related to NRW and bill collection rate and will be re-viewed for capacity building purposes.

- The issues related to the Customer Service section's workflow, staffing, and the software are shown in Table 4.1.
- Issues related to the PR department and its activities are presents in

● Table 4.2.

Table 4.1 Issues Related to Workflow, Staffing, and Software of the Customer Service Section

* Issues marked with in grey can be solved (all or partially) with PPWM

Issues *	Challenges	Results if Improved	Countermeasures
Lack of enough technical persons in C.S section	To maintain, repair, discover illegal connections and water meter technical problems, etc.	C.S will have a technical staff for solving the issues and this will decrease NRW commercial loss, leakage repair, and customer satisfaction	Assign more technical staff to C.S.
Inefficient allocation of readers and collectors among two sections; C.S and the Collection unit	The relation between the C.S and Collection unit is unclear regarding managing assignment of the 12 readers and collectors.	The 6 readers could be firmly assigned to C.S for the full months and thus C.S can assign other activities to them when they are free of reading duties.	To officially allocate the 6 readers to C.S and the 6 collectors to the Collection unit.
The AlShamel customer database system does not allow to register customers by the name of neighborhood. and the need to classify commercial, domestic etc,	To find customers by the neighborhood name. not easy to find any neighborhood name in current situation. and not quickly can find it.	To manage better customer services and customer inquiry in the system for C.S daily activities.	Add such options to AlShamel
Other departments sometimes enforce personal interests to C.S; for example, recommend accelerated procedure for a friend customer	Such personal interests slow down or interfere the daily activity schedule of C.S.	C.S will have more management of daily activities without receiving such (sometimes enforced) requests.	C.S just simply needs to be firmer about its schedule and reject such personal interest request.
Unclear and firmed procedure for implementing the already existed regulation about illegal connections.	Illegal connections and what exactly is the procedure, who are in charge, and who manages the whole procedure. Continue to steal water through illegal connections	NRW commercial loss would decrease and bill collection will increase due to registering the connection as a new customer and receiving penalties.	The illegal connection procedure needs to be clarified.
Late submission of list of the read water meter by readers	To delay updating the customer database with the month's read water meter and this could delay the billing printing and delivery.	The C.S management of the reading schedule and submission will improve.	C.S clarify the work schedule of the readers and workflow and implement firmly.
Lack of basic knowledge of using GIS software and customer data in the GIS system	With no GIS database for customer information and lack of the skills, any inquiry takes time using paper work or being delayed or ignored due to the lack of location base data and information	The C.S section would be able to make faster inquiries, investigation, mapping, location analysis, etc.	Training of GIS for the related staff and collecting more customer database through survey
Lack of enough employees	To help current staff in data entry and answers to customers complaints, the	Accelerates work procedures and allows current staff to do their	Assign more employees to the KATABA division.

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	current staff is not enough to response the different needs of customers, this sloWWDDown the workflow.	job correct way and on time.	
There are no technical teams specialized in illegal connections	More illegal connections but no discovery of current illegal connections	Reduce illegal connections, raising collections rate through stopping illegal connections	Assign more specialized team and train them on discovering illegal connections
No vehicle	Need more time to reach to the field.	Accelerates solving meters problems, and more achievement cases daily.	Car availability
Water meters inside home	Difficult to read it sometimes, easy to steal water and difficult to technical person to check	Easy to read, to check, difficult to steal water.	Transfer meters from inside to outside, any new customer should be the meters outside of home
Late submission of list of the read water meter by readers	To delay updating the customer database with the month's read water meter and this could delay the billing printing and delivery	The C.S management of the reading schedule and submission will improve.	C.S clarifies the work schedule of the readers and workflow and implement firmly.
No supervision or check on readers in the field	Estimation current reading by reader without going to water meters locations. They copy past readings and write new reads in estimation, they read water meters sometimes with error	Each meter will be read, they get real readings	Assign Field Supervisor
Need for reporter	Transfer documents and applications to DIWAN section or other department, it takes time now	Reporter task is to transfer any documents to related department, in this case KATABA are doing other work in the office.	Assign reporter
Need for print machine	They have to go to other place in the municipality to copy any paper, it takes too much time	Save time and efforts	Buy print machine
Objection to invoice value from customers when collector deliver to customers	Non-continuity in distributing the invoice to the person who objected	Raising collection rate	Water availability, make sure the water meters works. and customer has water
J.M not respond when readers or collectors inform about any cases	Continuous steal water and water losses	Stop illegal connections, reduce non-revenue	Quick response from J.M, raising number of technical employees
Collectors under pressure from J.M to collect more money	There is no motivations to collectors to collect more money, collection rate still the same each month	Raising collection rate	Give them percentage on collection or bonus
High balanced customers pay a little amount by from of the total debts.	When they go to the court and judge against customer, the decision will be pay as customer want. (Convenient installment)	Push and motivate customers for pay each month, raising collection rate	Reconsidering in court decisions, and take deterrent decisions

Not receiving and expelling collector sometimes	Can't deliver the bills	Delivery all bills to customers	Providing enough water to customers, because if the water available and customer use it, it's normal to get a bill and pay.
Sometimes the amount which paid from customer is not deducted from his accumulated credit balance	Expanding the gap between citizens and municipality and distrust of the municipality	Enhancing trust in the municipality, and commitment to payment	More control over the accounting section. and keep all receipts which customers received it from the municipality.
Water meter removed by customers	Readers cannot read meter, and increasing NRW rate, and this issue is illegal.	It's not allowed to any customer to remove the meter, when the meter exists. Reader can read all meters and reflect on collection.	Conduct field tours on water meters location and respond quickly to readers feedback and notes
Careless customers: water meter is dirty, hidden between grass	There are some risks like insects and snakes especially in the summer, it's not easy to read	Easy to read and easy to check if any problem in the meter.	Send an alert to the customer to change the location of meter, if he does not responding send to him a penalty.
Use pump on water meter to pull water to the tank	Water pressure to other customers is less than who use pump, in this case water does not reach for all customers	Water reach all customers in the same pressure approximate.	Tours especially at night to discover this issue, to discover who use pump or not. And prevent them by penalty.
Distributions not fair	Some customers access water and do not. This makes problem for readers and collectors when they read water meter or delivery bills for complains.	All customers access water fairly.	Reconsidering in water program distribution, and find where is the problem and solve it.
Ownership of water meter in wife's name.	Often wife no need to do Clearance, husband needs it often	The ownership of water meter should be by husband not wife, husband has to pay any debts to end his needs from municipality.	Reject any applicant with wife name.
Ownership of water meter in young people name, less 20 years.	In this age no need to pay anything to municipality, it easy to don't pay water tariff.	More collection if they don't accept any request for any young people.	Select specific age to accept the applicant.
No maintenance for water network and network is old. Complaints on network.	Continuation of losing water and illegal connection.	Keep water. access water in a fair way.	Maintenance, solve and follow up complaints.
Depend on private wells.	No commitment to pay for municipality because they have not access to municipality water.	Access more water and more payment.	Availability more water from municipality.
No quick response from the related section in the municipality.	Lack of trust between citizen and municipality.	More trust between municipality and customers.	Solve problems and quick response and use punishment.

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Lack of protection for collectors and fear of reporting illegal connections.	They don't report to municipality for any illegal connections.	More controlling on illegal connections.	Use penalties and punishment for those who attack the collectors or readers.
Location of water meter is in a high level.	Difficult to read and some risks.	Easy to read and read correct.	Modifying the procedures and request from customer to install the water meter at a suitable location.
Put a dog around water meter to prevent reader of read.	Can't read water meter, and in this case customer can steal water by illegal connection	Easy to read water meter and discovery the illegal connections.	Put a penalty and punishment for those whom use this way.
Without car especially when they back to the municipality.	More time and efforts, and paying transportation cost from their pocket when they back.	Facilitate and acceleration their tasks.	Availability car or more by municipality.
Non-payment culture	Accumulation of debts and lack of collection	Increase collection rate	Through public awareness campaigns and use penalty for whom not pay.
Collectors don't have enough will to collect water tariff, there is no punish policy in the municipality and no efficiency	Lack of collection	Increase collection rate	Give rewards and motivations to collectors and at the same time use punishment.
There are not enough readers and collectors	They cannot complete tasks on time, and more mistakes	Correct and accurate meter reading for accurate bill production and correct and timely bill distribution.	Increase number of staff through transfer some of employees who qualified to public services and collection unit.
No protection for readers and collectors from municipality	They do not care about getting the results or not. They protected themselves through non-collide with customers	If the protection available they can go to anywhere to read or any meter, and ask customers to pay.	Take a design for that and using punishment and penalty to whom harm municipality employees.
Intervention by the municipal council in work, in particular with the judiciary	Weakens readers' and collector's role and becomes weak, not report any illegal issues.	Independence of readers and collectors facilitates their work, and makes them able to achieve goals.	Not interfere with their work and give them financial motives.
No clear policy for collection from municipality.	Confusion in work and random work.	If the policy is clear, that makes readers follow this policy and thus do their job properly.	Clear policy from municipality and should be applicable.
Not Separate debt to be paid by customer through court for the amount owed monthly.	When amount is large, it doesn't help to pay, but when the current bill value is low it's easy to pay (Psychologically).	Increase collection rate.	Separate previous debts for the amount owed monthly
Direct handling by the municipal council with customers.	Reduce role of the collection unit	Apply law to everyone and everyone becomes committed and all of them are similar.	Non-interference by municipal Council in customers issues

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Installment boring for debts.	Encouraging customers to non-pay, and rate of collection is too low	Increase collection rate and more commitment.	Agreement between municipality and court to Installment amount in 3 years max.
Water meter in the name of died person.	heirs don't care to pay, and no direct responsibility for water meter and tariff.	Increase collection rate	Stop service after owner died and transfer water meter in the name of any son if they need.
Some water meters in the name of first and second name or third name.	Can't go to the court in this case, court needs full name,	When the names are clear, it easy to prosecute in the court	Rename all meters which has first and second name, through site visit and AlShamel system.
Location of meters and some meters closed.	Readers can't read meter.	Readers can read meter in clear way	Using the penalty for any customer hides water meter, and install meter in clear location from the beginning
Imaginary debts for some customers especially when customers are out of the city.	Accumulation of debts, because collector put minimum tariff per month.	No debts	Public awareness campaign to tell customers whom want to leave the city to fill Meter Temporary Stop form.
Buildings under construction which has water meter, in this case the owner should be stop the Subscription after he finish from construction.	Accumulation of debts, because collector put minimum tariff per month.	No debts	Tours on new buildings, to remind the owner to stop his subscription.
Abandoned houses especially in the old city.	Water meters are damaged and there is no one to review.	These houses should be surveyed and identified on database.	Affects the bill collection rate.
Collection rate in Jenin camp is too low, its 1% and debts is 7 million, and there are 1362 customers in the camp.	Does not contribute to development of city's water sector. not help to maintain the water network and effected on water sector in general	Collection rate is increase and contribute to protect water sector	Install one meter for Jenin camp, and Popular Committee in the camp is paid.
Problem in old accounting system, when customers get exemption, it is not migrated from customer account.	Accumulation of debt.	Encouraging customers to pay.	Re-analysis of the debt file for each customer who received an exemption.

Source: JICA Expert Team

Table 4.2 Issues Relate to the PR Department and Its Activities

Issues
The department has no strategy or plan for public relations and awareness activities and thus prepares no report on such activities.
There are no manuals for any public relations and awareness activities.
There is no written or official workflow or manual for responding to public complains and nor interdepartmental workflow on this matter.
When receive a complain, there is no record of the contents of the complaint.
The department does not implement any water related awareness activities.
The department sometimes announces the public about water cut schedule of some areas, on the JM's Facebook, upon the request from the Water and Waste Water Department. However, PR has no positive experience with such public announces because the water department fails to follow the announced schedule. This has caused the public to be reluctant towards such notices.
The department has no PR materials for raising awareness on water related matters. The department has no activities on decreasing NRW and increasing bill collection rate.

Source: JICA Expert Team

4.2 Information Management

4.2.1 Status of ICT System in JM Including AlShamel and ArcGIS

Currently there are major software which are being utilized by JM staff. It includes AlShamel database, Alshamel for HR (Etlak), AlShamel for payroll (Rawateb), Archiving system, ArcGIS for mapping customer data, Arts and Crafts program, Engineering program for buildings, and DMAS.

The software mentioned above are being used by different department according to their needs. According to an interview Head of the related departments, most of the staff is highly qualified and skilled with the functions that they use on daily bases.

(1) AlShamel the database software developed by Al- Israa company. This program contains solid waste and water customer accountants, mainly, with variety of functions that are not licensed yet. There is an annual support contract signed by the municipality. It is used since 2010. Every tool in which needs to be added costs more, so it is difficult for JM to take a decision to add tools.

(2) HR (Etlak) software was developed by Al-Israa company in Palestine. This is a software related to employees inside the municipality since 2014. The software is mostly used for employee vacations, basic information, rates, years of services, and all issues relates to employees. Also, it has an annual support contract signed by municipality.

(3) Alshamel for payroll (Rawateb) software was developed by Al-Israa company. This financial software is connected to AlShamel database directly because they are from the same vendor and is used to calculate salary and all issues relates to it like premiums, rates, not paid vacations, all other issues. This program is being used by JM since 2014.

(4) ArcGIS a fully licensed software has been utilized for digitizing layers of data including roads, buildings, zonings, water meters and water networks, different attributes, and also for making maps when is needed.

(5) The Archiving software also designed by spark, which is partner with Al-Israa company. JM has been using it from 2014 and used to archive all papers in municipality, Decisions of the Council, licenses, finance papers, all other municipality papers are scanned and saved to that software.

(6) The Engineering software is actually a small MS Access based program developed by JM for building licenses. It is not a powerful program and needs many corrections, or improvements. Perhaps,

if such functions can be added to AlShamel, It would be more useful for the JM to carry out the above activities.

(7) DMAS developed by Ilaq company, since 2015, it is used to facilitate citizen works, introducing applications from applicants is easier, also saving time, and have softcopy as archive for all papers.

Table 4.3 through Table 4.5 present more details about the status of the ArcGIS at the Jenin Municipality:

Table 4.3 ArcGIS Status at JM in Terms of Organizational and Individual Capacities

GIS Section: Organization	GIS skills: Individual
<ol style="list-style-type: none"> 1. The GIS section needs improvement. 2. Duties regulations of GIS section is in the planning phase. 3. Human resources and equipment is in the preparation phase. 3. Basic GIS database has been prepared but more data needs to be collected for advance database. 4. Operating plan of GIS is in planning phase. 5. The existing GIS database is not updated. 6. GIS section provides some drawings to other departments for management of pipeline and facility but very basic when requested. 7. Use of GIS to improve service of water supply is just being notices. 8. GIS has not been used for NRW physical or commercial loss. 9. Only basic mapping has been used for water network but not geographical analysis. 10. Currently GIS has no role in short or long-term planning of water work. 	<ol style="list-style-type: none"> 1. Some staff know basic knowledge of GIS. 2. Have hear about advantages of GIS. 3. Some staff at WWD have tried basic mapping with GIS but have already forgotten so they need refreshing course for basic ArcGIS. 4. No knowledge of making GeoDatabase in ArcGIS for house connections or customer meters. 5. No knowledge on building DB on pipe-network based on offset-survey drawings. 6. No knowledge of customizing the pipelines in ArcGIS. 7. Nonknowledge of geographic analysis using ArcGIS. 8. No knowledge of making long-term construction/replacement plan based on future forecast of water assets using ArcGIS. 9. Only the head of the GIS section of JM had basic and advance ArcGIS knowledge in mapping and basic analysis. 10. Advance analysis using ArcGIS is not possible without more GIS data.

Source: JICA Expert Team

Table 4.4 Software Status at JM in a Scored Level

Criteria	Items	Yes (1) / No(0)								
		Shamel	Etlak (HR)	Rawateb (Payroll)	Archiving System	ArcGIS	Arts and Crafts	Engineering	DMAS (Masarat)	
Use-ability	Understandability	1. It is straightforward to understand what software does & its purpose.	1	1	1	1	1		1	1
		2. It is straightforward to understand the use of the software.	1	1	1	1	1		1	1
		3. It is straightforward to understand software's basic functions.	0	0	0	0	0		0	0
		4. It is straightforward to understand software advanced function.	0	0	0	0	0		0	0
		5. Software help is available.	0	0	0	0	0		0	0
	User Documentation	6. Consists of clear, step-by-step instructions.	0	0	0	0	0		0	1
		7. Provides a high-level overview of the software.	0	0	0	0	0		0	1
		8. Gives examples of what the user can see at each step.	0	0	0	0	0		0	1
		9. For error messages, symptoms/step-by-step solutions are provided.	0	0	0	0	0		0	1
		10. States command names, says what menus to use, lists errors.	0	0	0	0	0		0	1
		11. What version of software the documentation applies to.	0	0	0	0	0		0	1
		12. It is available to the users.	0	0	0	0	0		0	1
	Installability	13. It is straightforward to meet the pre-requisites of software.	1	1	1	1	1		1	1
		14. It is straightforward to install the software in target platform.	1	1	1	1	1		1	1
		15. It is straightforward to configure the software installation.	1	1	1	1	1		1	1
		16. It is straightforward to verify the installation for use.	1	1	1	1	1		1	1
		17. All mandatory third-party docs are currently available.	1	1	1	1	1		1	1
		18. Tests are provided to verify the install has succeeded.	1	1	1	1	1		1	1
		19. When software is installed, contents organized in sub-directories.	1	1	1	1	1		1	1
	Learnability	20. Uninstallers uninstall every file or warns user of unremoved files.	1	1	1	1	1		1	1
		21. A getting started printed guide is provided by JM.	0	0	0	0	1		1	1
		22. Verbal instructions are provided by JM for many basic use.	1	1	1	1	1		1	1
		23. Printed instructions are provided by JM for many basic use.	0	0	0	0	1		1	1
Sum		11	11	11	11	13		13	20	
Maintain-ability	Licensing	24. Has an appropriate license	1	1	1	1	1		0	1
	Portability	25. Application can be built on and run under earlier Windows.	1	1	1	1	1		1	1
		26. Application can be built on and run under Windows 7.	1	1	1	1	1		1	1
		27. Application can be built on and run under Windows XP.	1	1	1	1	1		1	1
		28. Application can be built on and run under Windows Vista.	1	1	1	1	1		1	1
	Supportability	29. Software website has page describing how to get support.	0	0	0	0	1		0	0
		30. Software web site has search facility.	0	0	0	0	1		0	0
		31. Customer service is available locally.	1	1	1	1	1		1	1
	32. Customer service responds properly.	1	1	1	1	1		1	1	
	Change	33. It is straightforward to modify software based on new needs.	0	0	0	0	1		0	0
Sum		7	7	7	7	10		6	7	
Total Score			18	18	18	18	23		19	27

Source: JICA Expert Team

Table 4.5 Current Use of Software at JM and the Needs

Software brief evaluation	Scoring out of 33								
	Understandability	User documentation	Installability	Learnability	Licensing	Portability	Supportability	Changeability	Total
Shamel	2	0	8	1	1	4	2	0	18
HR	2	0	8	1	1	4	2	0	18
Rawat	2	0	8	1	1	4	2	0	18
Archiving System	2	0	8	1	1	4	2	0	18
ArcGIS	2	0	8	3	1	4	4	1	23
Engineering	2	0	8	3	0	4	2	0	19
Arts and Crafts program	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
DMAS	2	7	8	3	1	4	2	0	27
Software	General Status								
AlShamel databse software (ver. 3.0.0.5)	AlShamel the database software developed by Al- Israa company. This program contains solid waste and water customer accountants, mainly, with variety of functions that are not licensed yet. There is an annual support contract signed by the municipality. It is used since 2010. Every tool in which needs to be added costs more, so it is difficult for JM to take a decision to add tools.								
Etlak (HR) (ver. 2)	Alshamel for HR (Etlak) software was developed by Al-Israa company in Palestine. This is a software related to employees inside the municipality since 2014. The software is mostly used for employee vacations, basic information, rates, years of services, and all issues relates to employees. Also, it has an annual support contract signed by municipality.								
AlShamel Payroll (ver. 1)	Alshamel for payroll (Rawateb) software was developed by Al-Israa company. This financial software is connected to AlShamel database directly because they are from the same vendor and is used to calculate salary and all issues relates to it like premiums, rates, not paid vacations, all other issues. This program is being used by JM since 2014.								
ArcGIS 10.4.1	The software is licensed, the versions that we have are: 1- ArcGIS 10.4.1 Advanced for the server 2- One version 10.2 Advanced Desktop and 3- Three versions (Basic) for viewing. We also have the web application, this application eases the process of multi users on arcgis to create users on this web and give access for the staff to edit and enter the data that they are required to enter, also displays all the maps that we create and add to the service i.e. the master plan or cadastral plan.								
Archiving (ver. 1.1.0.0)	It is designed by spark, which is partner with Al-Iraa company. JM has been using it from 2014 and used to archive all papers in municipality, Decisions of the Council, licenses, finance papers, all other municipality papers are scanned and saved to that software.								
Engineering	It is a small MS Access based program developed by JM for building licenses. It is not a powerful program and needs many corrections, or improvements. Perhaps, if such functions can be added to AlShamel, It would be more useful for JM to carry out the above activities.								
DMAS	Developed by Itlaq company, since 2015, it is used for facilitating citizen works, introducing applications from applicants is easier, also saving time, and have softcopy as archive for all papers.								
Software	Current Use			Expansion needs					
HR ver. 2	1- Vacations. 2- Extra allowance. 3- Employee information			Not complete yet.					
Rawateb ver. 1	1. Payroll			Not complete yet.					

Shamel ver. (3.0.0.5)	<ol style="list-style-type: none"> 1- Water department. 2- Solid waste department. 3- Accounting department. 4- Inquire about invoices. 5- Expense and revenue accounting. 6- Calculation of bank balances. 	<p>The staff working on the Al-Shamil program reported that they want some training in the area of receivables (creditor and debtor) and how to include such information on the Shamil program and also need training in preparing budgets in the Shamil program. Also error messages appears sometimes i.e. user not found. The software is sometimes very slow in loading data. Customers of water department cannot be found by their neighborhood areas.</p> <p>With regard to the proposed amendments,</p> <ol style="list-style-type: none"> 1. Extending the number of characters in the box (general note of pledge) 2. Add an icon (print) when information about the bonds of a certain person.
ArcGIS 10.4.1	<ol style="list-style-type: none"> 1- Establishing Maps for Engineering Department. 2- Spatial Analyst for Service coverage of some facilities. 3- Network Analyst for Road Network. 4. Establishing the water, waste water and drainage systems. 5. Establishing new cadastral plan. 6. Installing all the building licenses as attachment for parcels. 	<p>Add In Extensions, creating a system within ArcGIS for connecting the water system with the financial and billing sections in order to create a complete system for WWD. This system shall be used by the head of WWD, the head of water section, and the head of waste water section for entering data while the editing shall be limited to one person in order to avoid misleading data. The maintenance fee is not paid so it is needed for any updates and utilizing some other services. The ArcGIS server is not fully uses. Staff need basic and advance training in using GIS and be committed to utilize it in daily work such as water work. More GIS data needs to be collected and prepared. GIS should play important rule in decision makings by JM higher staff.</p>
Archiving System issued 1.1.0.0	<ol style="list-style-type: none"> 1. Archive all papers in the municipality. 2. Scan all papers and print it. 3. Inquire about a book issued or contained in the municipality 4. Data entry and documentation. 	<ol style="list-style-type: none"> 1. Extending the number of fields when the query by words. 2. The monthly fees paid by the Municipality for maintenance services are not tangible. 3. Upon request for an update or modification of the purposes and requirements of the work, the answer shall be found by the Company as a unified program for all municipalities 4. Supervision and follow-up of the currency is required to merge the data of the Central Archive Program and the outgoing and incoming program
Engineering Dept. program	Archive all license in Jenin also Notifications	This program is made by a programmer called Tariq in the past, and it's kind of Microsoft Access Program working on it Director of the Engineering Department, the Department of Planning and Building, the Secretary of the Organization and the Department of Studies in the Engineering Department, which was by a former employee and not a supplying company.
Assets Program made by Al Israa	A special program for the Covenant and assets belonging to Al Israa Company, has been recently downloaded and needs development	<ol style="list-style-type: none"> 1. Need to add more characters when inquiring about ordering supplies and need training on some components such as transferring assets from one employee's custody to the custody of another employee. 2. Describes procedures for transferring assets from one employee to another complex and need to be simplified. 3. Needs training on the definition and settings related to the barcode printer for the program as it is difficult process and when the fragmentation of any computer starts again. 4. The water department should be using this software as well.
Arts and Crafts program	Not complete yet.	Not complete yet.
DMAS	Introducing applications for citizen. And following up from all departments related to the application.	<ol style="list-style-type: none"> 1. A Proposal to integrate the DMAS program with the comprehensive as an electronic service to contribute to facilitate the clearing mechanism. 2. Extend the working hours approved by the Etlaq company and estimated at 25 credit hours to a larger amount of the same cost to complete the rest of the tracks that have to do with.

Source: JICA Expert Team

4.2.2 Issues and Challenges

The IT staff is very limited with mostly only one staff who is the most familiar with the software in JM and its status. The other few staff basically are desk staff and need to be more efficient when the main key IT person is away from the office.

Some staff at other departments have no access to any software i.e. the store at the water department which has no access to the software to record its inventory.

Table 4.6 shows issues noticed after observing the ICT status in JM.

Table 4.6 Issues Relate to the Software Status at the Municipality

Issues
There is no maintenance management system or protocol.
Except the basic software for payroll, HR, and customer database, the other software are mostly like a small programs that ex-IT staff developed for JM's use, and are very limited.
Not all functions of the existing licensed software are utilized by JM staff.
There are some functional issues with the utilized modules of the software that need to be addressed i.e. issues with the print option, character typing, slow run, slow log in, error messages.
Training for the extended functions are needed for the main software.
Database needs to be extended for more effectively utilize the software. ArcGIS database needs to be updated and expanded in order to use its analysis tools for making more informed decisions
More staff needs to be trained of ArcGIS and advance training is needed with those who are familiar with the basic tools.
A system needs to be created within ArcGIS for connecting the water system with the financial and billing sections in order to create a complete system for WWD. This system shall be used by the head of WWD, the head of water section, and the head of waste water section for entering data while the editing shall be limited to one person in order to avoid misleading data.
The maintenance fee is not paid for ArcGIS so it is needed for any updates and utilizing some other services.
The ArcGIS server is not fully used.
User documentation; Training manuals i.e. step-by-step instructions and examples of issues are not prepared for the JM's software and every inquiry or questions needs to be addressed to the Al-Esra company for solutions which takes some few days. Except the ArcGIS, other locally built software has no online help or website helps. Only verbal instructions are provided by the JM's IT staff for some basic troubleshooting.
Understandability: Most of the software are not straightforward to understand the basic functions and thus not so to understand the software's advanced functions.
The software help is not available for most of them.

Source: JICA Expert Team

4.3 Customer Database Survey (CDS)

4.3.1 CDS Purpose and Objectives

A customer database survey was also planned for the PA1 area and started in December to enhance the existing customer database on the GIS system and also discover any missing data. The survey will be also conducted for the PA2 and PA3 areas to make sure that the customer database and the related GIS database are complete and updated.

The main purpose of the survey is:

To establish accurate customer database which can help WD in sufficient management of customer services including bill collections and NRW activities.

The objectives include:

- 1) To update, revise, and correct the existing customer database in GIS and add missing data.
- 2) To introduce building coding system* (customer and non-customer buildings) and add to the database.
- 3) To link the building coding with the meter numbering system to be useful for updating the GIS database.

4.3.2 Survey Plan, Phase, Schedule, Team, and Progress

The survey includes two phases:

Phase 1: Updating building shapefile on the GIS customer database.

Phase 2: Updating building shapefile on the GIS customer database through door-to-door visits.

Table 4.7 provides the details, survey team, the schedule, the workflow of each phase, and also the survey weekly progress as of the time of writing this report.

Figure 4.5 also shows the outcomes of the CDS and the related action teams. As of the writing this report only one team (GIS team) is organized and has been updating the GIS database as the CDS progresses. Other teams must be organized as soon as possible and start working in parallel of the CDS findings and take the actions.

It is a weekly survey activity. JET assists C/P in conducting the survey. As of the preparation of this report, the survey is going slower than it was expected due to lack of enough C/P staff and their availability. There is only one C/P staff (the meter reader of the PA1 area) that works on the field work and one from the GIS section that in charge of updating the survey data on the GIS.

Table 4.7 CDS Plan, Schedule, and weekly Progress

Customer Database Survey Plan, Phases, Schedule, Team Members, and Progress	
Purpose	The accurate customer database can help WD in sufficient management of customer services including bill collections and NRW activities.
Objectives	(1) To update, revise, and correct the existing customer database in GIS and add missing data. (2) To introduce building coding system* (customer and non-customer buildings) and add to the database. (3) To link the building coding with the meter numbering system to be useful for updating the GIS database. * The (draft) coding system consists of the following: (Building #/St.#/Customer #). (Still to be decided by Head of the WD)
Target data	Customer name, household status, building info, potential customers, connection status and illegal connections, non-customers, use of private networks, etc.
Phase 1 (preliminary)	Updating building shapefile on the GIS customer database
	Workflow
	1. Building owner's name, building code number, building photo, and date of survey will be recorder on the Record of Customer Database Survey form. See the sample in end of this document. 2. Missing buildings will be observed and confirmed on the GIS shapefile. Their GPS points will be collected at the site. The building sketch & its coordinates will be also indicated on the form for GIS shapefile updates. 3. Collected data will be sent to the JM's GIS section, weekly, for updating the shapefile. 4. The forms will be attached to each building polygon on the GIS shapefile.
	Survey team members
	1. Rashad Algorbyia, Senior Civil Engineer, Customer Service, JICA team (Assists C/P in GIS updating

	& field work) 2. Mohammad Azmoty, Customer Service, JICA team (Assists C/P in field work) 3. Mahmood Ajjawe, Meter reader of the PA1 area, C/P (field work) 4. Khayriya Al Souki, Head of GIS section, C/P (GIS desk work) 5. Naoto Koike, Customer Service, JICA team (Assists C/P in field work) 6. Fatemeh Masouleh, Customer Service, JICA Expert (Assists C/P in desk work)						
	Schedule: End of November to End of January (2 months)						
	Total surveyed buildings by end of Phase 1	New/updated buildings on the database	Building shapefile updates	Attachment of survey form to GIS			
	835	31/804	Completed	Completed			
Phase (main)	2 Updates building and water meter shapefiles on the GIS customer database through door-to-door visits. Updates the customer database on the AlShamel system. Finds illegal connections, potential new customers, malfunctioned water meters, and leakages.						
	Workflow						
	1. Building owner's name, building code number, number of households and family, registration status in customer database, water meter number, route of house connection, utilized pipe material and diameter, XY coordinates of the water meter location and branched points XY, usage of private network, number and volume of water tanks, building photo, and date of survey will be recorder of the Record of Customer Database Survey form.						
	2. Collected data will be sent to the GIS section, weekly, for updating the building and water meter shapefiles.						
	3. The forms will be attached to each building polygon/point (customer data) on the GIS shapefile.						
	Survey team members		10:00am- 1:00pm (daily excl. Thu.)	Supervisor			
	1- MR. Azmoty (Leader)		1- Mr. Rashad (Leader)	Mr. Koike			
	2- Mr. Jehad Al-Nazmi (water technician, WWD)		2- Mr. Amjad Sadih (water technician, WWD)	Mr. Abdl Hadi (WWD)			
	3- Mr. Naser Gazal (PR)		3- Mohammad ALzoubi (PR)	Mr. Koike			
	4- Ms. Fayha (PR)		4- Ms. Fida Ryal (PR)	Mr. Koike			
	5- Ms. Kheria (GIS)		5- Ms. Kheria (GIS)	Ms. Maosuleh			
	6- Mr. Omar Faza (AlShamel update, WWD)		6. Mr. Omar Faza (AlShamel update, WWD)	Ms. Maosuleh			
	Schedule: From mid-January 2018. Progress report by week:						
	Collected data		January (up to the 29th)	February Week 1 30-Jan up to 5 feb	Week 2	Week 3	Week 4
	Total surveyed (shops)						
	Registered (Customer)	Total Visible problems in WM	Illegal connection	Not collected			
			Not horizontal	Not collected			
			Unreadable	Not collected			
			Unfirmed position	Not collected			
			Other	Not collected			
	Not-registered (Not	Total					
	Illegal connection						

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	customer)	Gets water from neighbor	WM					
			Private well					
			Other	Not collected				
		Own private well						
		Buys from vendor						
		Other						
	GIS	Data entry: completed (a)/on-going (b), not started (c)		a	b			
		Attachment of Survey Forms/WM photos: completed (a), ongoing (b), not started (c)		c	c			
	Updates on AlShamel: completed (a), on-going (b), not started (c)			c	c			

Source: JICA Expert Team

* The mismatch between the total number of non-registered and the related categories is because some of the items were added to the survey form later in the month.

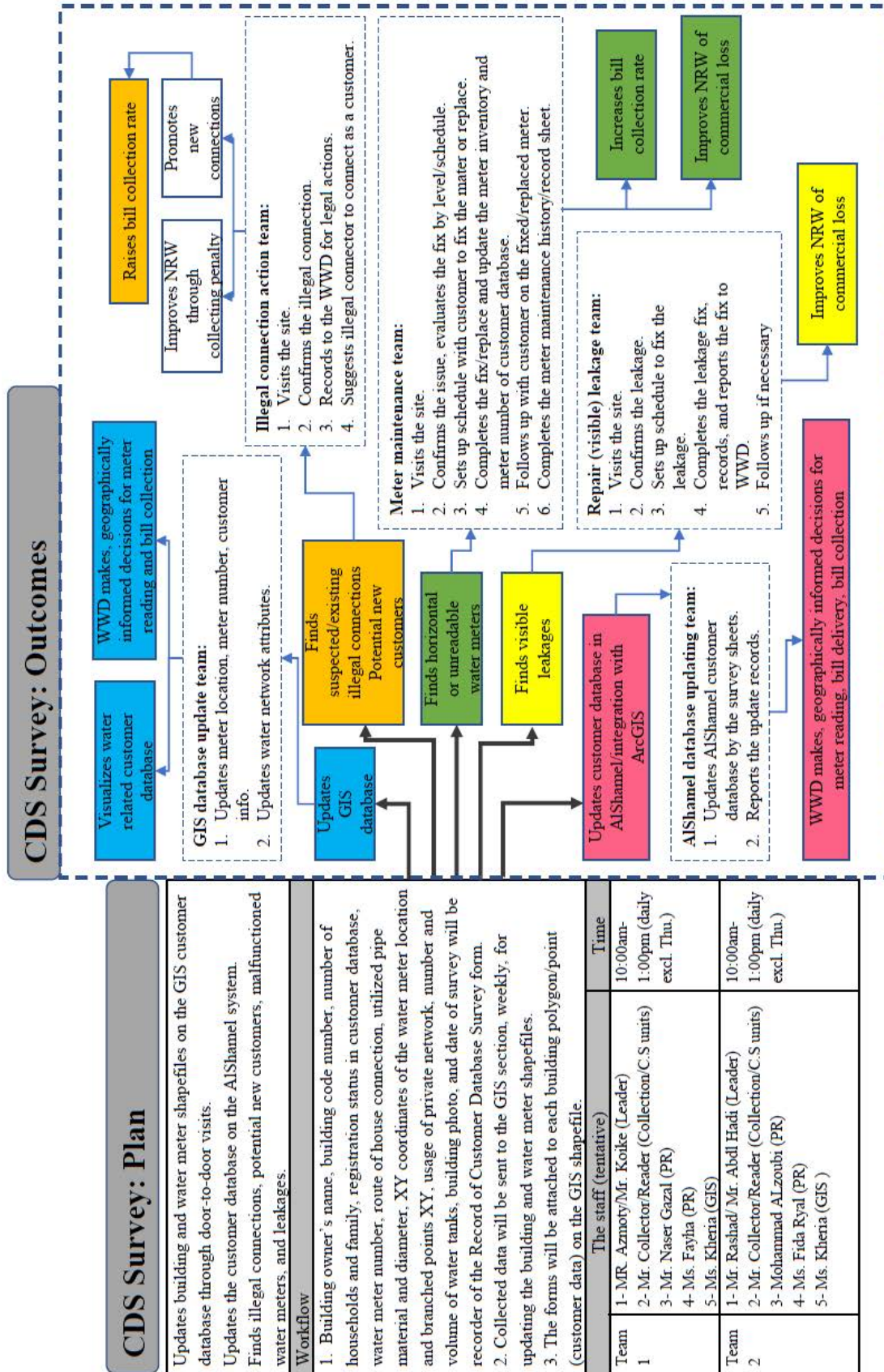


Figure 4.5 CDS Outcomes and Action Teams

Source: JICA Expert Team

4.4 GIS Training Program

(1) Background and purpose

Jenin Municipality has its water and wastewater infrastructures mapped in GIS. The Municipality has a GIS section headed by an Engineer, but GIS is not used intensively in the Water & Wastewater Department. This is due mainly to lack of well trained staff and also access to GIS data on the server. Newly and the existing water and wastewater assets need to be mapped and continuedly updated to improve accuracy. For this, staff from the Department need to be trained and a working GIS system needs to be established.

Some of the current staff of the department are familiar with basic GIS functions, however they need refreshing training programs. Such refreshing course will be conducted by the head of the GIS section in December and January to those staff who are interested and are recommended for such training. After the refreshing training by Jenin Municipality, the JICA project will provide this advance course.

The purpose of this advance training course is:

- 1) To gain advance GIS skills and learn use of advance GIS functions
- 2) To explore a range of spatial and analytical techniques and their implementation in GIS software. 3. To apply different spatial techniques with the software and become familiar with the essential methodological and practical issues involved in spatial analysis and to find spatial solutions for the problems,
- 3) Think spatially -as GIS is a spatial analysis software- and apply the learnings to the Department's water work decisions and mapping,
- 4) To learn importance of other set of data that could help the department make profound water related decisions,
- 5) To be qualified for more advance level of GIS training when provided.

The advance course will be using GIS software, the course-book's sample data, also the Department's water data.

(2) Candidate trainees

The advance GIS training is proposed to be for the group that has already passed the refreshing course provided by Jenin Municipality and knows basic GIS, and also to be able to commit to the program for 11 weeks.

The names of candidate trainees are shown in Table 4.8.

Table 4.8 Candidate Trainees for Advance ArcGIS

Candidate Trainees		Position	
1	Raghib Malhis	Director, Water & Wastewater Dept.	Observer trainee
2	Abd Al-Hadi Hamran	Engineer / GIS – surveying section / Engineering Dept.	Trainee
3	Ramzi Ja'far	Engineer, Water Section	Trainee
4	Khalid Abu A'beid	Customer service section	Trainee
5	Other candidate(s) who successfully pass the refreshing course and approved by head of GIS section		

Source: JICA Expert Team

(3) Training schedule

The training duration will be 11 weeks, starting on February 1st, 2018. The training is planned to be organized as a self-paced based training to avoid any interfere with the trainees' daily work duties. No training time or place would be set up. The trainees will use their own computers, or the computers

provided by the Project and the GIS software and will submit their training assignments by the weekly deadline via email to the Expert. The GIS Expert will provide all the instructions and will be available for any troubleshooting or questions. It will be a distance education program.

(4) Facilities

The Project (JICA Project) will provide a workstation. Also, GIS software with a 6 months license will be installed and used. The Project will also provide the trainees with GIS workbooks for exercises and weekly assignments.

(5) Trainer

The following expert from JICA sides will be the trainer. The C/P's GIS specialist will also assist the trainees in technical troubleshooting when needed.

- 1) Fatemeh Masouleh, Customer database and GIS expert, JICA side
- 2) Kairia Souqia, Engineer GIS Dept., Jenin Municipality, Project C/P, Assistant trainer

(6) Training's workbook and GIS software

Title of the workbook:

GIS Tutorial 2: Spatial Analysis Workbook, Updated for ArcGIS 10.3.x

The book will be purchased for each student by the Project and comes with a 6 months GIS 10.3.1 software.

(7) Other required software

- 1) Operating System: Windows 2003/2008/7/8/8.1/10/Vista/XP
- 2) Access to a computer that meets the ESRI Suggested Hardware Configuration for ArcGIS 10.3.1 Desktop.
- 3) Word processing package (MS Word) - needed for answers to assignments
- 4) Spreadsheet package (MS Excel) – for reviewing dbf files
- 5) Adobe Reader PDF Viewer to read assignments and course lectures - download for free at <http://www.adobe.com/products/acrobat/readstep2.html>
- 6) Web browser- for access to course Web site and supplemental files
- 7) 7ZIP – to compress multiple files and folders into a single file for uploading assignment solutions – download for free at <http://www.7-zip.org/download.html>. There are plenty of other free zipping utilities as well.

(8) Training method

The course consists of 9 units of instruction and exercises, also a discussion board topic. Trainees must turn in the assignments as noted in the assignment area for each unit. There are two final projects as well to help trainees bring all of the components of what have learned in the course together. The Expert and trainees will be mostly in contact via email or in person if Expert is available in the department. The GIS assistant trainer will be also available in case of technical troubleshooting.

There will be an assessment (measurement) of trainees' achievement of outcomes. There will be scoring system in end of each learning unit, and also for the final projects. This will help to evaluate what trainees have learned in the GIS course. There will be no late submission of weekly assignments and trainees will lose the total score.

(9) Awards for successful trainees

- 1) Successful trainees who pass scores of 90-100% of the total course score will be awarded a prize (TBD).
- 2) Successful trainees who pass scores of 70 to 100% of the total course score will be awarded a certificate of completion of the course by the Project/JICA.
- 3) Trainees who pass scores of 69% or below will be provided with the option of re-taking the course.

(10) Scoring system

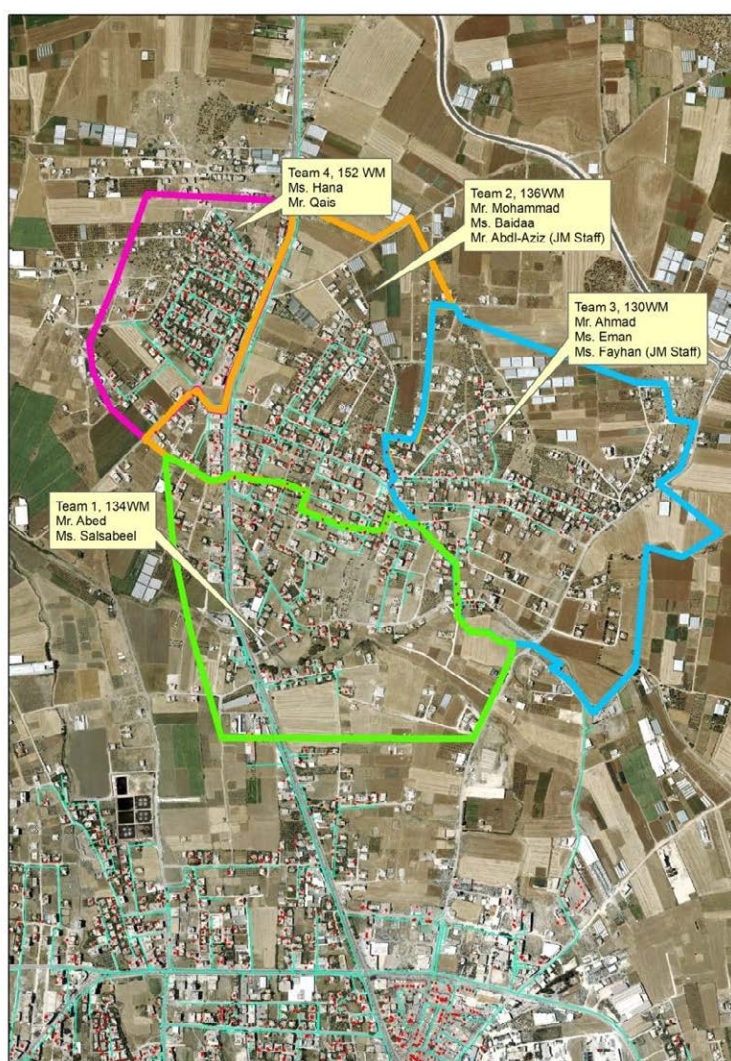
- 1) 90-100% of the total course score = A
- 2) 80-89% of the total course score = B
- 3) 70-79% of the total course score = C
- 4) 60-69% of the total course score = D
- 5) 60% and below of the total course score = E

4.5 Social Surveys

4.5.1 Social Survey: PA1 Area

(1) Survey plan

This section of the report is prepared based on the findings from the social survey conducted for the Pilot Area 1. Figure 4.4 shows the PA1 survey area which was divided among 4 survey teams.



Source: JICA Expert Team

Figure 4.6 The PA1 Social Survey Area

In addition to the basic information, the social survey collected information on:















- 1) Customer satisfaction of JM's water service,
- 2) Willingness to pay in case of any increase of water tariff and,

3) Public's opinion on PPWM if the Project decides to install PPWM.

As seen in Table 4.9, the survey team consisted of 8 surveyors including two from the C/P.

A total of 124 questionnaires were filled out in the PA 1 area, randomly, including 101 households and 23 business establishments. Since the PA1 area is mostly residential and the number of businesses is small and mostly small shops, the survey results were tabulated as all respondents and not separated as households and businesses. However, the data was tabulated as connected customers and not connected customers because the connection status had an impact on the responses. Attachment 3 includes the questionnaire form of this survey.

Table 4.9 Team of the PA1 Social Survey

Survey	Purpose	1 st Survey Area	Number of Survey	
Social Survey	To gather basic information and mainly to collect data on customer's: 1) Satisfaction with water services 2) Willingness to pay 3) Opinion on PPWM	PA 1 area: approximately 550 connected and about 70 unconnected (counted buildings without water meter on satellite imagery)	124 surveys (20% of total buildings of 620)	
		Samples, Survey Team, Schedule: 124 surveys = 4 teams × 6-7 surveys per day × 5 days		
		Names	Phone Number	Survey Area
Team 1		Mr. Abed Alrhman Fayeze Moghrabi	0597052986	
		Ms. Salsabeel Hamdi	0595085154	
Team 2		Mr. Mohannad Mahmud Saadieh	0595557964	
		Ms. Baidaa Mohammad Stitia	0598012652	
		Mr. Mohammad Abdl-Aziz (JM Staff)	0599754460	
Team 3		Mr. Ahmad Al-Nakhala	0568704241	
		Ms. Eman Fathe Alqassarwe	0598307980	
		Ms. Fayha Abdl-Khalegh (JM Staff)	0599970985	
Team 4		Ms. Hanaa Nathme Saabna	0599588216	
		Mr. Qais Zahalka	0598222461	
Start/End		Target of the day		
Sun. 22 nd , October		Full day: Preliminary training		
Mon. 23 rd to Sat. 28 th , October:		Field survey:		
9:00AM		Orientation of the day-Transport to the field		
9:30AM-15:30PM		Survey 6-7 properties		
15:30AM-16:00pm		Back to the office to submit the filled-out forms and discuss the day issues if any and plan for next day		

Source: JICA Expert Team

(2) Basic Characteristics of Water Status

1) Respondents' characteristics

- Number of households per surveyed connected houses: mostly one HH per residential building.
- Ownership: All connected or unconnected houses were owned.

- Connection status to water supply network: 86% of the respondents are connected (households and businesses). (Table 4.10)

Table 4.10 Basic Information of the Surveyed Residents and Connection Status (PA1)

Connected Residential Properties				(88 out of 124) 70%	
Ownership	Own: 88		Rented: 0		
Gender	Male: 38		Female: 50		
Number of HH	1HH: 49	2HH: 17	3HH: 19	4HH: 3	
Education	Illiterate: 8	Elementary:24	Secondary:39	Post-Secondary:26	
Un-Connected Residential properties				(13 out of 124) 10%	
Ownership	Own: 13		Rented: 0		
Gender	Male:4		Female:9		
Number of HH	1HH: 11	2HH:1	3HH: 1	4HH:0	
Education	Illiterate: 2	Elementary:1	Secondary:1	Post-Secondary:9	
Connected Business Properties				(20 out of 124) 16%	
Ownership	Own:13		Rented:7		
Gender	Male: 13		Female :7		
Type of property	Wedding hall (1), Hotel (1), Car company (1), Gas station (1), Kindergartens (2), Shops (3), Furniture shop (2), Factory (1), Wholesale market (1)		Schools (3), Hair salon (2), Restaurants (2)		
Un-Connected Business Properties				(3 out of 124) 2.4%	
Ownership	Own:1		Rented: 2		
Gender	Male: 1		Female: 0		
Type of property	Gift shop (1), and baby shop (1)		Wholesale market (1)		

Source: JICA Expert Team

2) Status of Water Access

- Out of the 124 surveys, 108 (87%) are connected to the water network.
- Water availability has no pattern and doesn't show a concrete weekly or monthly schedule.
- In the summer, water is available to most of the respondents only one day a week and mostly only for 4 to 12 hours.
- The respondents have to purchase water to fulfill their needs. The water availability is unclear, and lack of schedule has cause some respondents not to be aware about the days/hours they have access to city water. The city water and purchased water is stored in the same tank and this is other reasons they don't truly know when they JM water is available at their places.
- The seasonal access is also another issue. In the summer more responded to have access to only a day per week while in winter more have access to 3-4 days a week. (Table 4.11)

3) Amount and cost of purchasing water from private vendors

- Half of the connected customers (108) still need to buy water for about 20m³ per month to meet their needs which costs them on average about 207NIS per month. When asked for other reasons they mentioned that the JM water is not clean and suitable to drink, it disconnects sometimes and not available continuously.
- The unconnected residents (16 of the total 124) so buy water; about 20m³ per month to meet their needs which costs them on average about 190NIS per month. They have their own reasons not to be connected. Beside of lack of water network for their properties, other reasons for un-connection is that they get free water from the neighbors, they don't want to deal with the Municipality, and that water tariff and connection are too expensive.
- Interestingly, those who are connected to city water network buy same amount of water as the un-connected buy, on average. This could indicate that the water supplied to the area in general is not enough and both group have to turn to the vendors for their need of water. Further look at the total water supply at user level needs to be studied. (Table 4.12)

Table 4.11 Status of Access to the Municipality's Water in the Surveyed Area (PA1)

Connected to JM water network				(107)* 87%		
Do you have access to JM water every day? * Note: One respondent is excluded for this question as he refused to answer.	Winter	Yes (6) 5.6%	No (87) 81.3%			IDN (14) 13.1%
			1 day (27) 31% ~3h | 4-6h | 7-12h | 12-24h | IDN (3) | (9) | (6) | (9) | (0) 2 days (25) 28.7% ~3h | 4-6h | 7-12h | 12-24h | IDN (3) | (6) | (5) | (6) | (5) 3-4 days (30) 34.5% ~3h | 4-6h | 7-12h | 12-24h | IDN (1) | (2) | (6) | (19) | (2) 1 time/month (2) 2.6% ~3h | 4-6h | 7-12h | 12-24h | IDN (1) | (0) | (1) | (0) | (0) 2 times/month (3) 3.4% ~3h | 4-6h | 7-12h | 12-24h | IDN (0) | (1) | (2) | (0) | (0)			
	Summer	Yes (5) 4.6%	No (99) 92.5%			IDN (3) 2.8%
			1 day (47) 47.5% ~3h | 4-6h | 7-12h | 12-24h | IDN (4) | (11) | (25) | (7) | (0) 2 days (28) 28.3% ~3h | 4-6h | 7-12h | 12-24h | IDN (4) | (7) | (8) | (4) | (5) 3-4 days (9) 9.1% ~3h | 4-6h | 7-12h | 12-24h | IDN (2) | (1) | (1) | (5) | (0) 1 time/month (8) 8.1% ~3h | 4-6h | 7-12h | 12-24h | IDN (3) | (0) | (3) | (2) | (0) 2 times/month (5) 5% ~3h | 4-6h | 7-12h | 12-24h | IDN (2) | (2) | (0) | (0) | (0) Some months (2) 2% ~3h | 4-6h | 7-12h | 12-24h | IDN (0) | (1) | (0) | (1) | (0)			

Source: JICA Expert Team

(3) Customer Satisfaction

The 108 connected respondents were asked about their satisfaction of JM water service in past year if they used any of the service: New-application process, Meter reading by meter readers, Bill distribution every month, Payment method, Type of water meter, Meter installation, Meter re-connection/owner name change, Water availability in the pipes for your use, and Water quality.

The survey found that the satisfaction order of the services from high to low is as follows. It should be mentioned that meter reconnection, owner name change, and new applications were not used by most of the respondents in past year.

- 1) Bill distribution every month 92.6%
- 2) Payment method 92.6%
- 3) Meter reading by meter readers 86.1%

- 4) Meter installation 65%
- 5) Type of water meter 72%
- 6) Water quality 39%
- 7) Water availability in the pipes for use 19.4%

Table 4.12 Costs and Amount of Purchased Water from Private Vendors in the Surveyed Area (PA1)

Connected to JM water network				(108) 87.1%	
Do you still need to buy water from vendors? If yes, how much is the cost and the volume?	Yes (54) 50%			No (54) 50%	
	The reasons:				
	1. JM water is not clean				
	2. it disconnect sometimes				
	3. not enough water from JM and it's not supplied for a while				
	4. the water is not suitable to drink				
Cost of Purchased Water				Purchased Amount	
Purchase (a)	Times /month (b)	Cost per time NIS (c)	Total cost NIS/m ³ (b)×(c)	(a)× (b)	
5 m ³	2.8	60	167.9	14	
12 m ³	2.18	113.125	246.6	26.16	
Other m ³	0.0	0.0	0.0	0.0	
Avg.	2.13	86.6	207.25	20.08	
Un-Connected to JM water network				(16) 12.4%	
Why aren't you connected to JM water network and how much is the cost and volume of water you purchase?	Reasons for not being connected:				
	1. Water debt and free water from the neighbors				
	2. No water through the area, and we don't want to deal with the municipality				
	3. water is too expensive, and connectivity is too expensive				
	Cost of Purchased Water				Purchased Amount
	Purchase (a)	Times /month (b)	Cost per time NIS (c)	Total cost NIS/m ³ (b)×(c)	(a) × (b)
5 m ³	2.75	48	132	13.75	
12 m ³	3	97	291	36	
Other m ³	3	50	150	12	
Avg.	2.92	65	190	20.6	

Source: JICA Expert Team

- 80% of the respondents are not satisfied with the water supply amount at their house.
- They pointed that the water taste (30% of respondents), water smell (28% of respondents), water color (23% of respondents), and water particles of sand (45% of respondents) should be improved.
- In general, when asked to rank the water service of JM from 1 to 5 (5 being the highest), over 60% ranked only 1 and 2. (Table 4.13)
- All the surveyed population (124) was asked about their requests on improved water services from the Jenin Municipality. The responses show that they mostly are looking for improved water pressure, expansion of water network, installation of water meters and connection by the municipality, quick response and fixation of complains, request 3 days of water availability, and increased amount of water by 2 times. More details are shown in the chart below. (Table 4.14)

Table 4.13 Customer Satisfaction Level among the Surveyed Population (PA1)

Connected to JM water network					(108)	87.1%
a. Are you satisfied with the current water service by Jenin Municipality for any of the followings ----if used in past year.						
New-application process?		Yes (15) 14%		No (14) 13%		Didn't use (79) 73%
Meter reading by meter readers?		Yes (93) 86.1%		No (10) 9.3%		Didn't use (5) 4.6%
Bill distribution every month?		Yes (100) 92.6%		No (3) 2.8%		Didn't use (5) 4.6%
Payment method?		Yes (100) 92.6%		No (3) 2.8%		Didn't use (5) 4.6%
Type of water meter?		Baylan:		Yes		No
Baylan: (37) 34.3 %				(28) 75.6%		(7) 19%
Arad: (60) 55.6%		Arad:		Yes (50)		No (10) 16.7%
IDK (11) 11.1%				83.3%		
Meter installation?		Yes		No		Didn't use
		(70) 65%		(15) 13.9%		(23) 21.3%
Meter re-connection, owner name change?		Yes		No		Didn't use
		(20) 18.5%		(10) 9.3%		(78) 72.2%
Water availability in the pipes for your use?			Yes		No	
			(21) 19.4%		(86) 79.6%	
Water quality improve		No problem	Improve taste	Remove smell	Remove color	Remove particles of sand
		(42) 39%	(33) 30%	(30) 28%	(25) 23%	(49) 45%
What would do you rate performance of the current water supply service on a scale of 1 to 5 where 5 is the best and 1 is very poor?					1	2
					(38)	(23)
					35%	21.3%
					3	4
					(32)	(9)
					30%	8.2%
					5	5
					(6)	
					5.5%	

Source: JICA Expert Team

Table 4.14 Requests for Improvements by Surveyed Population (PA1)

All Respondents						(124) 100%
On water supply service		Yes (122) 98.4%				No (2) 1.6%
a. Improve pressure of supplied water						
b. Days/hours of water availability (#/average hours)		1 day (5) 4%				
		~3h	4-6h	7-12h	12h	24
		(1)	(0)	(0)	(3)	(1)
		2 days (23) 18.8%				
		~3h	4-6h	7-12h	12-24h	24
		(1)	(7)	(2)	(6)	(7)
		3 days (37) 30.1%				
		~3h	4-6h	7-12h	12-24h	24
		(1)	(4)	(7)	(15)	(10)
		4 days (16) 13%				
		~3h	4-6h	7-12h	12-24h	24
		(0)	(8)	(2)	(5)	(1)
		5 days (5) 4%				
		~3h	4-6h	7-12h	12-24h	24
		(0)	(4)	(0)	(0)	(1)
		6 days (2) 1.6%				
		~3h	4-6h	7-12h	12-24h	24
		(0)	(0)	(0)	(1)	(1)
		7 days (35) 28.5%				
		~3h	4-6h	7-12h	12-24h	24
		(3)	(3)	(0)	(2)	(27)
c. Increase amount of current water availability		1.5 times		2 times		3 times`
		(32) 25.8%		(36) 29%		(20) 16%
						More
						(32) 25.8%
						No Ans.
						(3) 2.4%
d. Expand pipeline network coverage		Yes (121) 97.6%			No (3) 2.4%	
					Don't matter (0) 0%	

e. Municipality should install meters and connections	Yes (116) 93.6%	No (5) 4%	Don't matter (3) 2.4%
f. Quick response/fixation to/of complaints	Yes (112) 90.3%	No (11) 8.9%	No Answer (1) 0.8%
All Respondents	(124) 100%		
On sewerage service	Yes (103) 83.1%	No (17) 13.7%	No Answer (4) 3.2%
• Fix blocked sewer/sewage			
• Quick response/fix/on complaints	Yes (101) 81.5%	No (17) 13.7%	No Answer (6) 4.8%
• Expand sewer coverage	Yes (103) 83.1%	No (17) 13.7%	No Answer (4) 3.2%
• Subsidize household connection	Yes (106) 85.5%	No (14) 11.3%	No Answer (4) 3.2%
• Improve quality of treated wastewater	Yes (107) 86.3%	No (13) 10.5%	No Answer (4) 3.2%

Source: JICA Expert Team

(4) Willingness to Pay

As seen in Table 4.15:

- 83.3% of the connected surveyed population said that they pay their bills and 9.3% don't pay and the rest pay sometimes.
- 70% of the 124 surveyed people did not know about the amount of current water tariff fee.
- When explained about the current tariff fee of Jenin Municipality and some other cities in Palestine, only half of them (50%) believed that it is a fair fee and mostly believed that it is still expensive.
- If water services improved, over half of the respondents are willing to pay a little more (4.87NIS/m³ instead of the current 4.3NIS/m³).

The 45.5% who are not willing to pay more have the following reasons for their opinion:

1. It's municipality responsibility.
2. They have no enough money.
3. It's already so expensive.
4. They don't trust municipality.
5. They are good by well water they purchase so no need to improve and pay more.

Table 4.15 Willingness to Pay among the Surveyed Population (PA1)

All Surveyed	(124) 100 %			
If connected, do you pay bill every month? Note: 108 are connected.	Yes (90) 83.3%	No (10) 9.3%	Sometimes (8) 7.4%	
If connected or not, do you know how much is the water tariff rate by Jenin Municipality?	Yes (36) 29.9%		I don't know (88) 70.1%	
If connected or not, what do you think about the water tariff in Jenin?	Expensive	Fair	Cheap	No opinion
	(55) 44.3%	(62) 50%	(2) 1.6%	(5) 4.1%
What do you think about the sewerage tariff in Jenin?	Expensive	Fair	Cheap	No opinion
	(12) 9.6%	(76) 61.3%	(31) 25%	(5) 4.1%
More/improved water service by JM, water network, STP and sewer network mean a healthier life and urban living environment. However, it also could mean an increase in the tariff rate due to the constructions, O&M expense recovery. Would you be willing to pay the rate for water/sewage tariff if increased?	Yes (80) 64.5%	No (44) 35.5% The reason: 1. It's municipality responsibility 2. Not enough money 3. So expensive 4. We don't trust municipality 5. No, we are good be well water		
• If Yes, how much would you be willing to pay more for water tariff or sewerage tariff?	Water tariff: 4.87/m ³		Sewerage tariff: 6.97/mo	
Which system of payment do you think is fair? (for water and/or sewage).	Payment based on a fixed amount (10) 8% Payment based on a flat rate. (98) 79% Payment based on an increasing block tariff (16) 13%			

Source: JICA Expert Team

(5) Opinion on PPWM

- From the total 124 respondents, 81 (65%) prefer PPWM and the rest don't.
- If JM takes a decision to install PPWM, slightly a higher number of residents accept PPWM (67%). This means an obligatory PPWM will not make a difference in the Public's acceptance of PPWM.
- The reasons for accepting PPWM were:
 1. Customer pays regularly
 2. To get water every day without cutting.
 3. This system is better.
 4. Easier for customers and municipal.
 5. More accurate and depends on how much people consume.
- Reasons for not accepting were:
 1. Not enough money to charge regularly.
 2. It cost more money.
 3. Don't trust municipality.
 4. We are paying cash so no need for this system.
 5. This WM read more than consuming.
 6. Not suitable for poor people. (Table 4.16)

Table 4.16 Respondents Opinions on PPWM among Surveyed Population (PA1)

Do you prefer PPWM?	Yes (81) 65.3. %		No (43.) 34.7%	
	Owner Yes (80)	Tenant Yes (1)	Owner Yes (42)	Tenant Yes (1)
If JM takes a decision to install PPWM, do you accept?	Yes (83) 66.9. %		No (41) 33.1%	
	Owner Yes (82)	Tenant Yes (1)	Owner Yes (40)	Tenant Yes (1)
Reasons:	Accepting		Rejecting	
	1. Customer pays regularly 2. Makes customer periodic 3. To get water every day without cutting. 4. This system is better. 5. Easier for customers and municipal. More accurate and depends on how much people consume.		1. Not enough money to charge regularly. 2. It cost more money. 3. Don't trust municipality. 4. We are paying cash so no need for this system. 5. This WM read more than consuming. 6. Not suitable for poor people.	

Source: JICA Expert Team

Perhaps the best way to reach out for PR activities are through Facebook/social media, phone, SMS, and also door-to-door visit as these were ranked 2 and 3 out of 5, respectively, when asked about ways to reach out for PR. (

Table 4.17)

Table 4.17 Best Way of Reaching Out for PR Activities in the Surveyed Area (PA1)

What are the best ways to communicate with you about the City's future projects for water/sewage system improvement? Rank the following list from 1 to 5, with 1 being most effective, and 5 being least effective.	(3) SMS	(4) Newspapers	(2) City Facebook /Website	(5) Radio
	(5) Email	(5) By mail	(4) Neighborhood meetings	(4) TV
	(3) Phone	(3) In person at door	(4) Public meetings at City hall	() Other

Source: JICA Expert Team

4.5.2 Social Survey: City-wide

(1) Survey plan

This section of the report is prepared based on the findings from the social survey conducted for the all city. In addition to the basic information, the social survey collected information on:

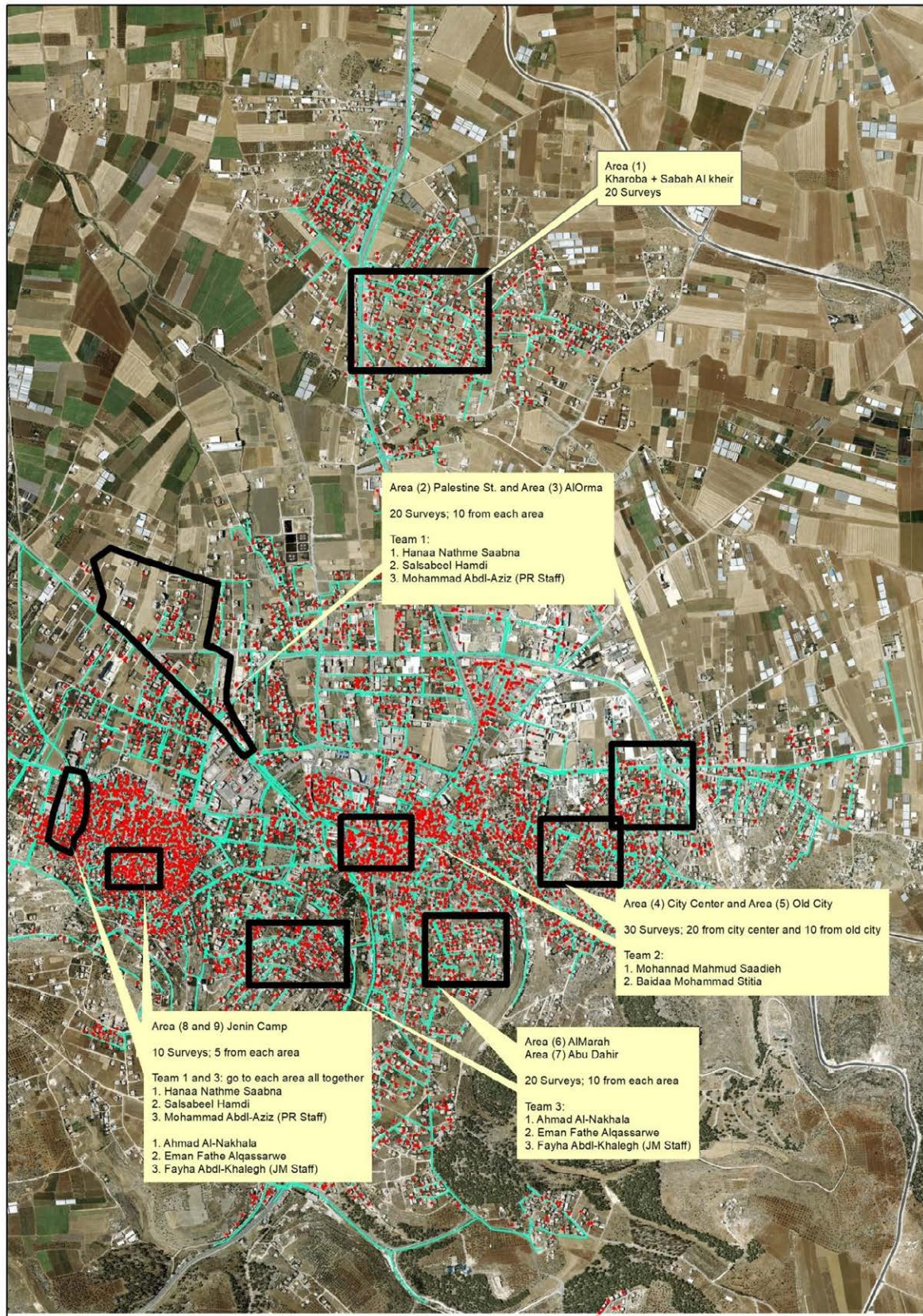
- 1) Customer satisfaction of JM's water service
- 2) Willingness to pay in case of any increase of water tariff and,
- 3) Public's opinion on PPWM if the Project decides to install PPWM.

A total of 100 questionnaire were filled out in the selected areas, randomly, including 82 households and 18 business establishments. Since the all city area is mostly residential and the number of businesses is small and mostly small shops, the survey results were tabulated as all respondents and not separated as households and businesses. However, the data was tabulated as connected customers and not connected customers because the connection status had an impact on the responses.

Figure 4.5 shows the survey area. As seen, it was divided to 9 areas which covered the city from different socio-economic and also topographic area including the refugee camp.

The survey areas also included the city center with mostly small-scale shops and businesses. The survey team consisted of 3 teams with a total of 9 members whom two were from the C/P. (Table 4.18).









The questionnaire form for this survey was the same as the form and questions of the PA1 social survey.



Source: JICA Expert Team

Figure 4.7 Study Area of the City-wide Social Survey

Table 4.18 Team of the City-wide Social Survey

Survey	Purpose		All-city Social Survey	Number of Survey		
All-city social Survey	To gather basic information and mainly to collect data on overall customer's: 1) Satisfaction with water services 2) Willingness to pay 3) Opinion on PPWM		Area: All city	80 surveys (total is 100 and 20 already done from PA1 area, so only 80 would be collected)		
			Samples, Survey Team, Schedule:			
			----- 80 surveys = 3 teams × 9 surveys per day × 3 days			
			Names	Phone Number	Survey Area	
	Team 1		Ms. Hanaa Nathme Saabna	0599588216	Area 2 (day 1) Area 3 (day 2)	
			Ms. Salsabeel Hamdi	0595085154	Area 8 and 9 (day 3)	
			Mr. Mohammad Abdl-Aziz (PR Staff)	0599754460		
	Team 2		Mr. Mohannad Mahmud Saadieh	0595557964	Area 4 (day 1)	
			Ms. Baidaa Mohammad Stitia	0598012652	Area 5 (day 2 and 3)	
	Team 3		Mr. Ahmad Al-Nakhala	0568704241	Area 6 (day 1)	
		Ms. Eman Fathe Alqassarwe	0598307980	Area 7 (day 2)		
		Ms. Fayha Abdl-Khalegh (JM Staff)	0599970985	Area 8 and 9 (day 3)		
Start/End		Target of the day				
The 7 th , 8 th , and 11 th of Nov.		Come to the office; Orientation of the day, survey area maps, transport to the field Survey 9 properties , then back to the office to submit the filled-out forms Discuss the day issues if any and plan for next day				
8:30AM						
9:30AM-15:00PM						
15:15AM-16:00pm						

Source: JICA Expert Team

(2) Basic Characteristics of Water Status

1) Respondents' characteristics

- Number of households per surveyed connected houses: mostly one HH per residential building.
- Ownership: 77% connected or unconnected houses were owned.
- Connection status to water supply network: 91% of the respondents are connected (households and businesses). (Table 4.19)

Table 4.19 Basic Information of the Surveyed Residents and Connection Status (City-wide)

Connected Residential Properties				(75 out of 100) 75%	
Ownership	Own: 71		Rented: 4		
Gender	Male: 32		Female: 43		
Number of HH	1HH: 36	2HH: 23	3HH: 14	4HH: 2	
Education	Illiterate: 8	Elementary: 24	Secondary: 39	Post-Secondary: 26	
Un-Connected Residential properties				(7 out of 100) 7%	
Ownership	Own: 6		Rented: 1		
Gender	Male: 0		Female: 7		

Number of HH	1HH: 7	2HH:0	3HH: 0	4HH:0
Education	Illiterate: 1	Elementary:1	Secondary:2	Post-Secondary:3
Connected Business Properties			(16 out of 100) 16%	
Ownership	Own:7		Rented:9	
Type of property	Electric Shop (1), Bucher (1), Grocery Shop (1)	Restaurant (3), Bucher (1), Bakery (1), Pharmacy (1), Fish Market (1), Grocery Shop (1), Electric Shop (1)		
Un-Connected Business Properties			(2 out of 100) 2%	
Ownership	Own:2		Rented: 0	
Type of property	Bakery Shop (1)	Hair Salon (1)		

Source: JICA Expert Team

2) Status of Water Access

- Out of the 100 surveys, 91 (91%) are connected to the water network.
- Water availability has no pattern and doesn't show a concrete weekly or monthly schedule.
- In the summer, water is available to most of the respondents only one day a week and mostly only for up to 12 hours.
- The respondents have to purchase water to fulfill their needs. The water availability is unclear, and lack of schedule has cause some respondents not to be aware about the days/hours they have access to city water. The city water and purchased water is stored in the same tank and this is other reasons they don't truly know when they JM water is available at their places.
- The seasonal access is also another issue. In the summer more responded to have access to only a day per week while in winter more have access to 2-3 days a week. (Table 4.20)

Table 4.20 Status of Access to the Municipality's Water in the Surveyed Area (City-wide)

Connected to JM water network				(91 out of 100) 91%		
Do you have access to JM water every day? * Note: One respondent is excluded for this question as he refused to answer.	Winter	Yes (4) 4.4%	No (82) 90.1%			IDN (5) 5.5 %
			1 day (26) 31.7% ~3h | 4-6h | 7-12h | 12-24h | IDN (6) | (3) | (5) | (6) | (6) 2 days (20) 24.4% ~3h | 4-6h | 7-12h | 12-24h | IDN (1) | (3) | (7) | (7) | (2) 3-4 days (16) 19.5% ~3h | 4-6h | 7-12h | 12-24h | IDN (2) | (1) | (5) | (7) | (1) 1 time/month (0) 0% ~3h | 4-6h | 7-12h | 12-24h | IDN (0) | (0) | (0) | (0) | (0) 2 times/month (5) 6% ~3h | 4-6h | 7-12h | 12-24h | IDN (0) | (1) | (3) | (0) | (1) IDK (15) 18.3%			
	Summer	Yes (3) 3.3%	No (86) 94.5%			IDN (2) 2.2%
			1 day (53) 61.4% ~3h | 4-6h | 7-12h | 12-24h | IDN (7) | (8) | (27) | (6) | (5) 2 days (11) 13.3% ~3h | 4-6h | 7-12h | 12-24h | IDN (0) | (3) | (5) | (2) | (1) 3-4 days (8) 9.2% ~3h | 4-6h | 7-12h | 12-24h | IDN			

			(1)	(0)	(3)	(4)	(0)	
			1 time/month (8) 9.2%					
			~3h	4-6h	7-12h	12-24h	IDN	
			(4)	(1)	(1)	(0)	(2)	
			2 times/month (6) 6.9%					
			~3h	4-6h	7-12h	12-24h	IDN	
			(1)	(0)	(4)	(0)	(1)	
			IDK (0)					

Source: JICA Expert Team

3) Amount and cost of purchasing water from private vendors

- 61.5% of the connected customers (91) still need to buy water for about average of 24.05m³ per month to meet their needs which costs them on average about 238.05NIS per month. When asked for other reasons they mentioned that the JM water is not always available, and disconnects sometimes, and they need water for daily.
- The unconnected residents (9 of the total 100) so buy water; about 7.7m³ per month to meet their needs which costs them on average about 70.4NIS per month. They have their own reasons not to be connected. They seem to be good with this situation and that area is not supplied by JM water enough. And also, the JM cuts water.
- Those who are not connected to the city water network buy even less water from the vendors. The reason could be because they are business establishments (a bakery shop), or have their own water well or get water from neighbors. (Table 4.21)

Table 4.21 Average Monthly Cost and Amount of Purchased Water from Private Vendors in the Surveyed Area (City-wide)

Connected to JM water network		(91) 91%			
Do you still need to buy water from vendors? If yes, how much is the cost and the volume?	Yes (56) 61.5%	No (35) 38.5%			
	The reasons:				
	1. No water available from the JM.				
	2. No water.				
	3. Sometimes disconnects for a while.				
	4. We need water daily.				
	Water Cost				Water Use
	Purchase (a)	Times /month (b)	Cost per time NIS (c)	Total cost NIS/m ³ (b) × (c)	(a) × (b)
	5 m ³	3.18	54.06	171.56	15.93
	12 m ³	4.46	105	451.15	53.53
	3 m ³	2.25	26.25	57.5	6.75
	4 m ³	5	54	272	20
	Avg.	3.72	59.82	238.05	24.05
Un-Connected to JM water network		(9) 9%			

Why aren't you connected to JM water network and how much is the cost and volume of water you purchase?	Reasons for not being connected:				
	1. We are good with this situation				
	2. This area is not supplied by JM water.				
	3. The Municipality cuts the water.				
	Water Cost				Water Use
	Purchase (a)	Times per month (b)	Cost each time NIS (c)	Total cost NIS/m ³ (b) × (c)	(a) × (b)
5 m ³	1	50 NIS	50 NIS	5 m ³	
12 m ³	1.66	100 NIS	166.66 NIS	20 m ³	
.... m ³	2	32.5 NIS	65 NIS	6 m ³	
Avg.	1.1	45.6 NIS	70.4 NIS	7.7 m ³	

Source: JICA Expert Team

(3) Customer Satisfaction

The 91 connected respondents were asked about their satisfaction of JM water service in past year if they used any of the service: New-application process, Meter reading by meter readers, Bill distribution every month, Payment method, Type of water meter, Meter installation, Meter re-connection/owner name change, Water availability in the pipes for your use, and Water quality.

The survey found that the satisfaction order of the services from high to low is as follows. It should be mentioned that meter reconnection, owner name change, and new applications were not used by most of the respondents in past year.

- 1) Payment method 97.8%
- 2) Bill distribution every month 95.6%
- 3) Meter reading by meter readers 94.5%
- 4) Meter installation 91.2%
- 5) Type of water meter 84.6%
- 6) Water quality 38.5%
- 7) Water availability in the pipes for use 35.2%

Over 60% of the respondents are not satisfied with the water supply amount at their house. (Table 4.22)

Table 4.22 Customer Satisfaction Level among the Surveyed Population (City-wide)

Connected to JM water network				(91) 91%		
a. Are you satisfied with the current water service by Jenin Municipality for any of the followings ----if used in past year.						
New-application process?		Yes (7) 7.7%		No (6) 6.6%		Didn't use (78) 85.7%
Meter reading by meter readers?		Yes (86) 94.5%		No (5) 5.5%		Didn't use (0) 0%
Bill distribution every month?		Yes (87) 95.6%		No (3) 3.3%		Didn't use (1) 1.1%
Payment method?		Yes (89) 97.8%		No (2) 2.2%		Didn't use (0) 0%
Type of water meter? Baylan: (27) 29.7% Arad: (59) 64.8% IDK (5) 5.5%		Baylan:	Yes (24) 88.8%			No (3) 11.2%
		Arad:	Yes (53) 89.83%			No (6) 11%
Meter installation?		Yes (83) 91.2%		No (6) 6.6%		Didn't use (2) 2.2%
Meter re-connection, owner name change?		Yes (14) 15.4%		No (3) 3.3%		Didn't use (74) 81.3%
Water availability in the pipes for your use?		Yes (32) 35.2%				No (59) 64.8%
Water quality	No problem	Improve taste	Remove smell	Remove color	Remove particles of sand	

improve	(35) 38.5%	(19) 21%	(14) 15.4%	(14) 15.4%	(42) 46.2%
What would do you rate performance of the current water supply service on a scale of 1 to 5 where 5 is the best and 1 is very poor?	1 (23) 25.5%	2 (26) 28.7%	3 (28) 30.7%	4 (11) 12%	5 (3) 3.3%

Source: JICA Expert Team

- They pointed that the water taste (21% of respondents), water smell (15.4% of respondents), water color (15.4% of respondents), and water particles of sand (46.2% of respondents) should be improved.
- In general, when asked to rank the water service of JM from 1 to 5 (5 being the highest), over 54.2% ranked only 1 and 2.
- All the surveyed population (100) was asked about their requests on improved water services from the Jenin Municipality. The responses show that they mostly are looking for improved water pressure, expansion of water network, installation of water meters and connection by the municipality, quick response and fixation of complains, request 3 days of water availability, and increased amount of water by 1.5 times. More details are shown in the chart below. (Table 4.23)

Table 4.23 Requests for Improvements by Surveyed Population (City-wide)

All Respondents		(100) 100%				
On water supply service		Yes (89) 95.6%			No (4) 4.4%	
a. Improve pressure of supplied water						
b. Days/hours of water availability (#/average hours)		1 day (2) 2.2% ~3h | 4-6h | 7-12h | 12h | 24 (2) | (0) | (0) | (0) | (0)				
		2 days (23) 25.8% ~3h | 4-6h | 7-12h | 12-24h | 24 (1) | (3) | (14) | (0) | (5)				
		3 days (24) 27% ~3h | 4-6h | 7-12h | 12-24h | 24 (1) | (1) | (15) | (0) | (7)				
		4 days (9) 10.1% ~3h | 4-6h | 7-12h | 12-24h | 24 (0) | (0) | (1) | (7) | (1)				
		5 days (3) 3.4% ~3h | 4-6h | 7-12h | 12-24h | 24 (0) | (0) | (0) | (2) | (1)				
		6 days (0) 0% ~3h | 4-6h | 7-12h | 12-24h | 24 (0) | (0) | (0) | (0) | (0)				
		7 days 28 31.5% ~3h | 4-6h | 7-12h | 12-24h | 24 (1) | (0) | (0) | (1) | (26)				
c. Increase amount of current water availability		1.5 times (42) 46.1%	2 times (20) 22%	3 times` (6) 6.6%	More (23) 25.3%	No Ans. (42) 46.1%
d. Expand pipeline network coverage		Yes (90) 98.9%		No (1) 1.1%	Yes (90) 98.9%	
e. Municipality should install meters and connections		Yes (89) 97.8%		No (2) 2.2%	Yes (89) 97.8%	
f. Quick response/fixation to/of complaints		Yes (89) 97.8%		No (2) 2.2%	Yes (89) 97.8%	
All Respondents		(100) 100%				
On sewerage service		Yes (95) 95%		No (3) 3%	No opinion (2) 2%	
• Fix blocked sewer/sewage		Yes (68) 68%		No (28) 28%	No opinion (4) 4%	
• Quick response/fix/on complaints		Yes (96) 96%		No (2) 2%	No opinion (2) 2%	

• Subsidize household connection	Yes (97) 97%	No (1) 1%	No opinion (2) 2%
• Improve quality of treated wastewater	Yes (94) 94%	No (1) 1%	No opinion (5) 5%

Source: JICA Expert Team

(4) Willingness to Pay

- 82% of the 100 surveyed people did not know about the amount of current water tariff fee.
- When explained about the current tariff fee of Jenin Municipality and some other cities in Palestine, only half of them (60%) believed that it is a fair fee and 34% believed that it is still expensive.
- If water services improved, half of the respondents are willing to pay a little more (4.98NIS/m³ instead of the current 4.3NIS/m³). (Table 4.24)
- The other half who are not willing to pay more have the following reasons for their opinion:
 1. Financial status is bad.
 2. Its Municipality responsibility.
 3. No need.
 4. To get better services.
 5. We already pay a lot for the JM.

Table 4.24 Willingness to Pay among the Surveyed Population (City-wide)

All Surveyed	(100) 100 %			
If connected or not, do you know how much the water tariff rate is by Jenin Municipality?	Yes (18) 18%		I don't know (82) 82%	
If connected or not, what do you think about the water tariff in Jenin?	Expensive	Fair	Cheap	No opinion
	(36) 36%	(52) 52%	(8) 8%	(4) 4%
What do you think about the sewerage tariff in Jenin?	Expensive	Fair	Cheap	No opinion
	(7) 7%	(59) 59%	(29) 29%	(5) 5%
More/improved water service by JM, water network, STP and sewer network mean a healthier life and urban living environment. However, it also could mean an increase in the tariff rate due to the constructions, O&M expense recovery. Would you be willing to pay the rate for water/sewage tariff if increased?	Yes (50) 50%	No (50) 50%		
		The reason: 1. Financial status is bad. 2. Its Municipality responsibility. 3. No need. 4. To get better services. 5. We already pay a lot for the JM.		
• If Yes, how much would you be willing to pay more for water tariff or sewerage tariff?	Water tariff 4.98NIS/m ³		Sewerage tariff 10.78NIS/mo	
Which system of payment do you think is fair? (for water and/or sewage).	Payment based on a fixed amount (7) 7%			
	Payment based on a flat rate. (82) 82%			
	Payment based on an increasing block tariff (11) 11%			

Source: JICA Expert Team

(5) Opinion on PPWM

- From the total 100 respondents, 56 prefer PPWM and the rest don't.
- If JM takes a decision to install PPWM, slightly a higher number of residents accept PPWM (61). This means an obligatory PPWM will not make a difference in the Publius's acceptance of PPWM.
- The reasons for accepting PPWM were:
 1. Customer pays regularly
 2. Makes customer periodic
 3. To get water every day without cutting.
 4. This system is better.
 5. Easier for customers and municipal.
 6. More accurate and depends on how much people consume.
 7. We don't pay attention for bills every month.

8. Water will be available always.
 9. More accurate and depends on how much people consume.
 10. Better control consumption
- Reasons for not accepting were:
 1. Not enough money to charge regularly.
 2. It cost more money.
 3. Don't trust municipality.
 4. We are paying cash so no need for this system.
 5. This WM read more than consuming.
 6. Not suitable for poor people.
 7. More difficult system.
 8. Lack of money.
 9. Paying every month is better, and the financial status is bad.
 10. Too much commitment.
 11. This WM read more than consuming.
 12. Not suitable for poor people.
 - Perhaps the best way to reach out for PR activities are through Facebook/social media, phone, SMS, and also door-to-door visit as these were ranked 3 or 2 out of 5 (Table 4.25 and Table 4.26)

Table 4.25 Respondents Opinions on PPWM (City-wide)

Do you prefer PPWM?	Yes (56) 56%	No (44.) 44%
If JM takes a decision to install PPWM, would you accept?	Yes (61) 61%	No (39) 4%
Reasons:	Accepting	Rejecting
	<ol style="list-style-type: none"> 1. Customer pays regularly 2. Makes customer periodic 3. To get water every day without cutting. 4. This system is better. 5. Easier for customers and municipal. 6. More accurate and depends on how much people consume. 7. We don't pay attention for bills every month. 8. Water will be available always. 9. More accurate and depends on how much people consume. 10. Better control consumption 	<ol style="list-style-type: none"> 1. Not enough money to charge regularly. 2. It cost more money. 3. Don't trust municipality. 4. We are paying cash so no need for this system. 5. This WM read more than consuming. 6. Not suitable for poor people. 7. More difficult system. 8. Lack of money. 9. Paying every month is better, and the financial status is bad. 10. Too much commitment. 11. This WM read more than consuming. 12. Not suitable for poor people.

Source: JICA Expert Team

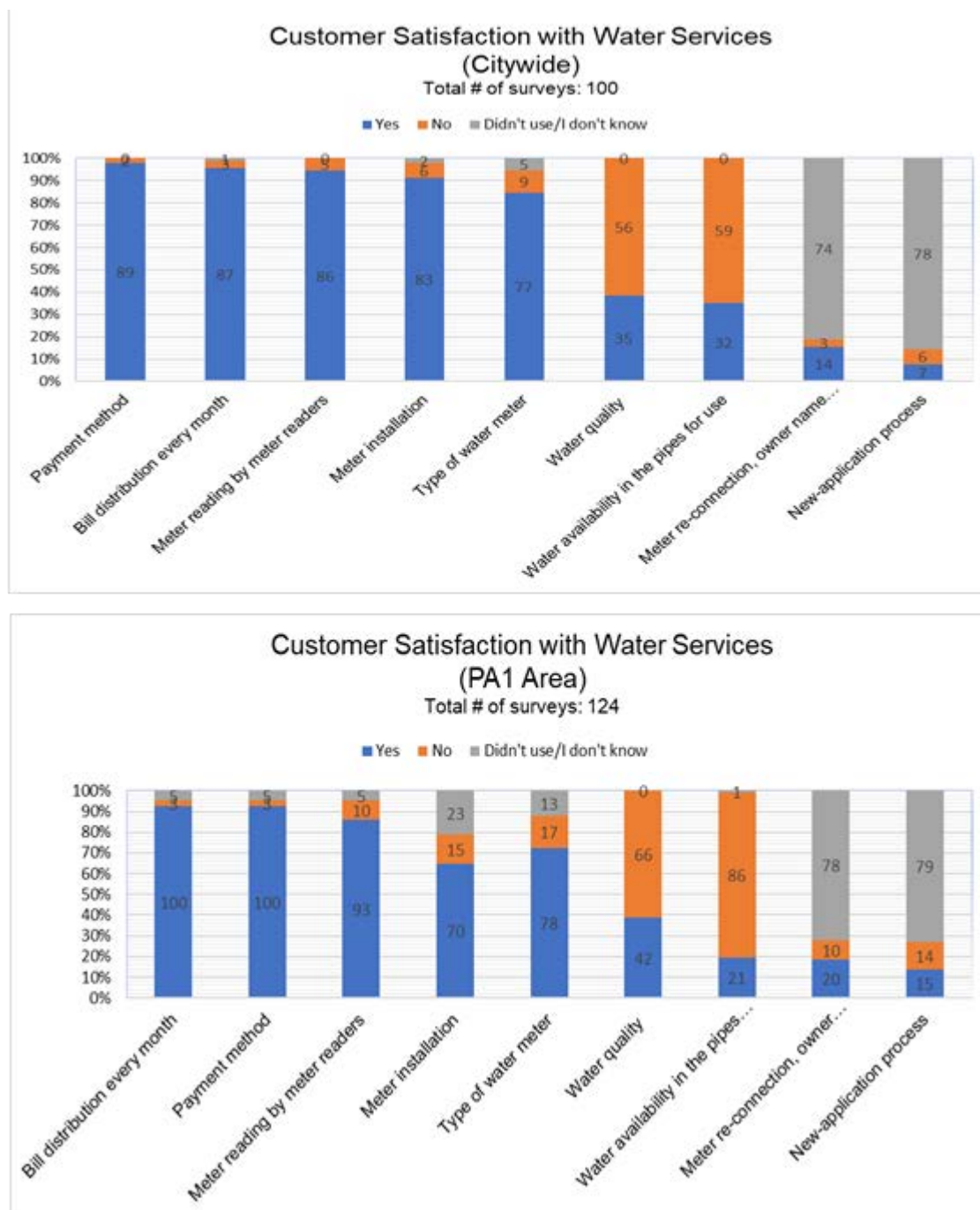
Table 4.26 Best Ways of Reaching Out for PR Activities According to the Surveyed Population (City-wide)

What are the best ways to communicate with you about the City's future projects for water/sewage system improvement? Rank the following list from 1 to 5, with 1 being most effective, and 5 being least effective.	(3) SMS	(5) Newspapers	(2.5) City Facebook /Website	(5) Radio
	(5) Email	(5) By mail	(4) Neighborhood meetings	(5) TV
	(3) Phone	(3.5) In person at door	(5) Public meetings at City hall	(5) Other

Source: JICA Expert Team

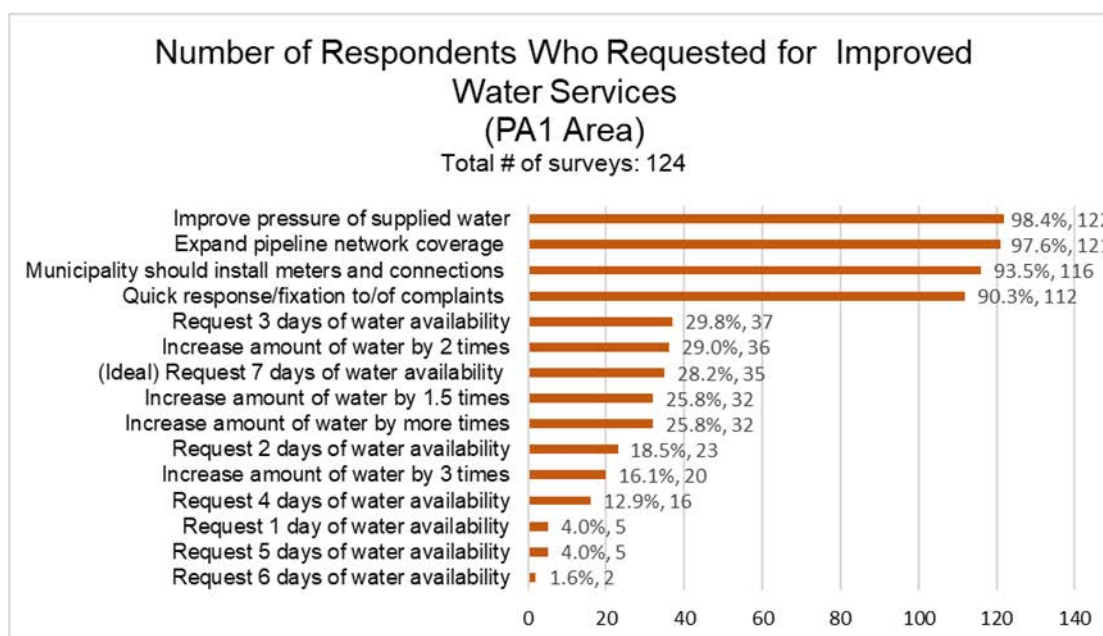
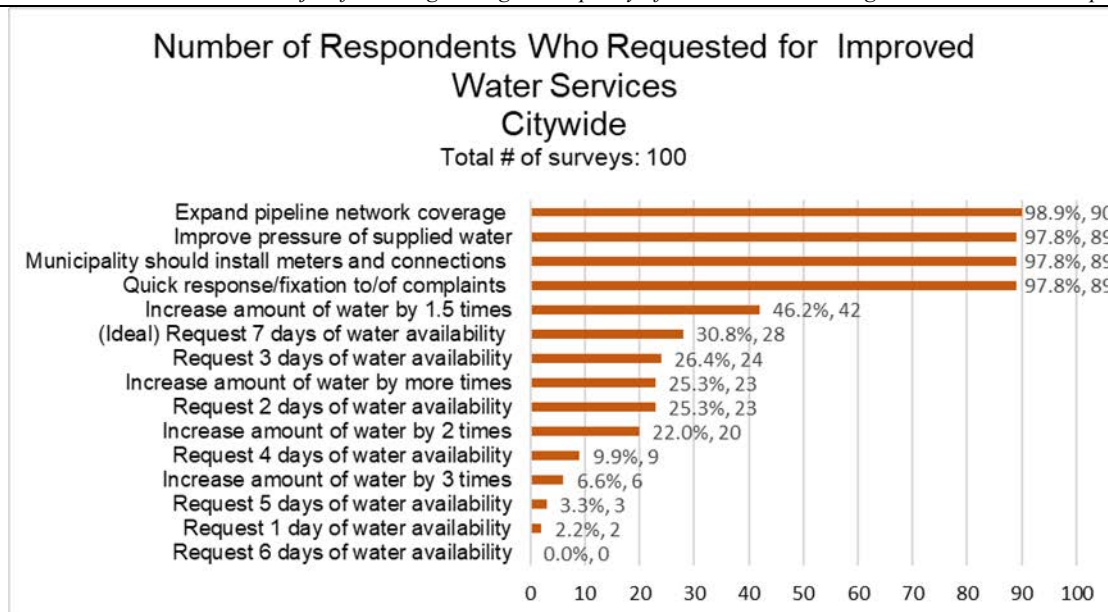
4.5.4 Comparison of PA1 and City-wide Surveys Results

Figures 4.6 through 4.10 show comparison of the major findings of the PA1 and the city-wide area social survey results. In general, there was no major difference among the two survey results.



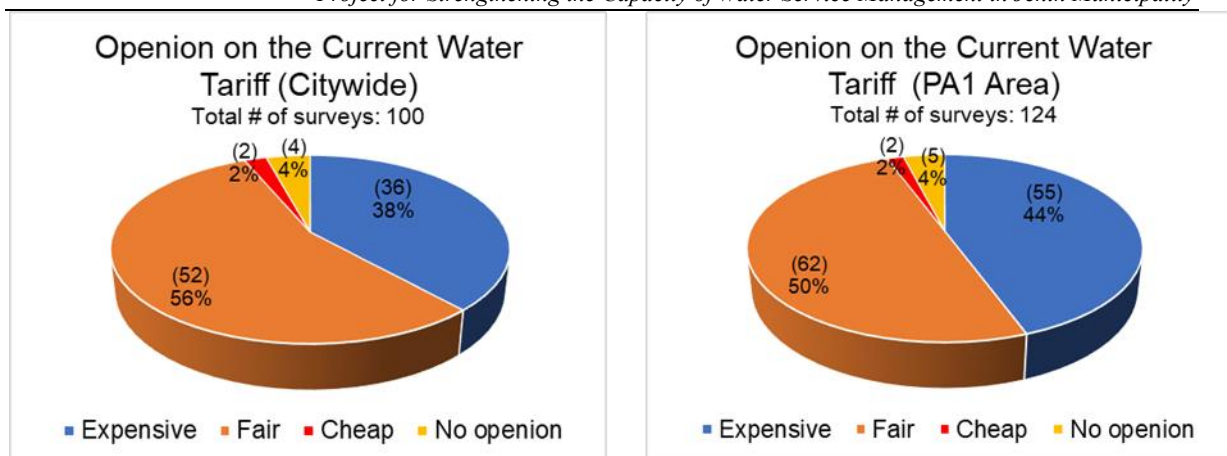
Source: JICA Expert Team

Figure 4.8 Customer Service Satisfaction in PA1 and City-wide Surveyed Areas



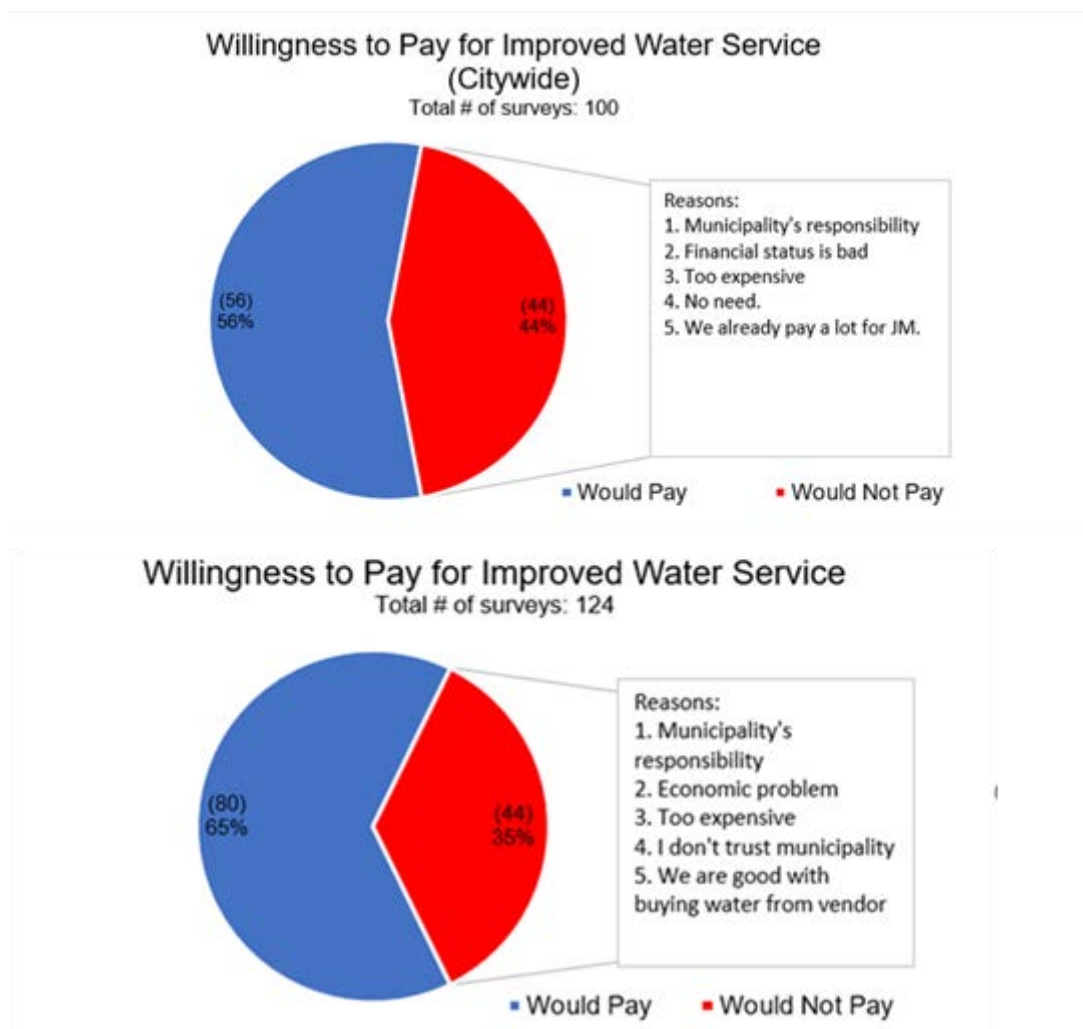
Source: JICA Expert Team

Figure 4.9 Requests for Improved Water Services in PA1 and City-wide Surveyed Areas



Source: JICA Expert Team

Figure 4.10 Opinion on Current Water Tariff in PA1 and City-wide Surveyed Areas



Source: JICA Expert Team

Figure 4.11 Willingness to Pay in PA1 and City-wide Surveyed Areas



Source: JICA Expert Team

Figure 4.12 Opinion on PPWM in PA1 and City-wide Surveyed Areas

4.5.5 Social Survey: PPWM Satisfaction of Current Users in Other Water Authorities

(1) Survey plan

This section of the report is prepared based on the findings from the social survey conducted for the current users of PPWM.

The purpose was to learn their opinions and experiences on using PPWM, any challenges or issues that could help the Project on any decisions on PPWM.

Attachment 5 presents the social survey form. A total of 20 questionnaires were filled out randomly, including:

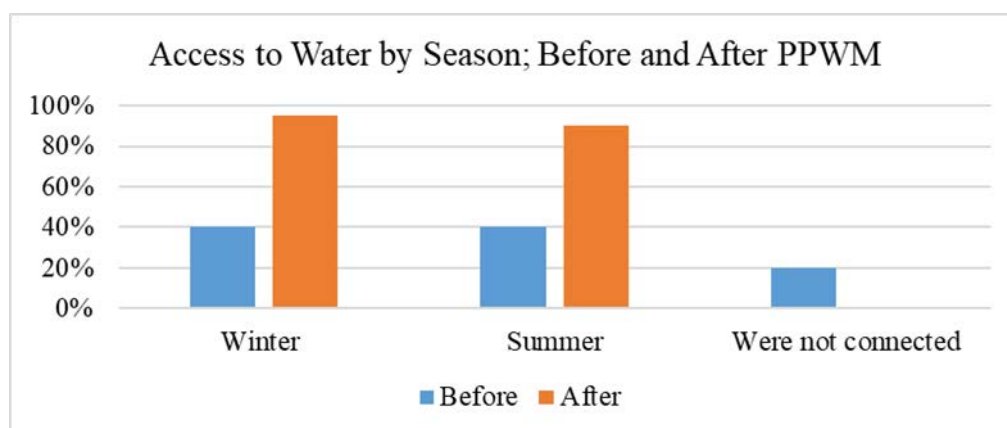
- West Jenin JSC (9 questionnaires)
- JSC- Tubas (3 questionnaires)
- Aqraba village (3 questionnaires)
- Nablus city (5 questionnaires)

The study team included two members including one from the JET/local staff, one from the C/P staff, and one from the surveyed authorities.

To review the condition of the PPWM project history and the current status in the above surveyed authorities, refer to 5.4.

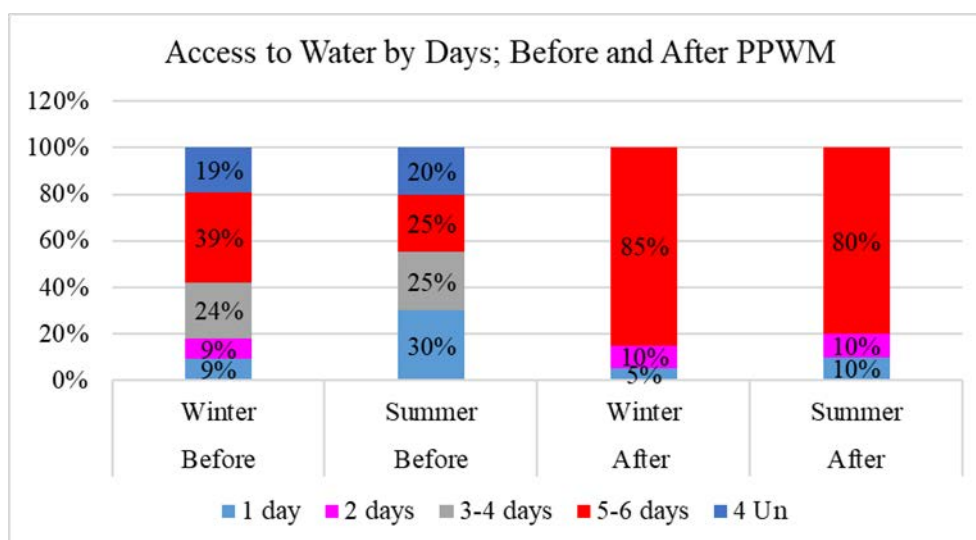
(2) Basic findings; before and after PPWM

1. Access to water before and after PPWM has increased both in winter and summer.
2. Access to water has increased by number of days in both seasons compared with the pre-PPWM; mostly now have water 5-6 days with PPWM.
3. Water consumption decreased after PPWM.
4. Mostly moved to PPWM due to the project requirements. (Figure 4.13 through Figure 4.16)



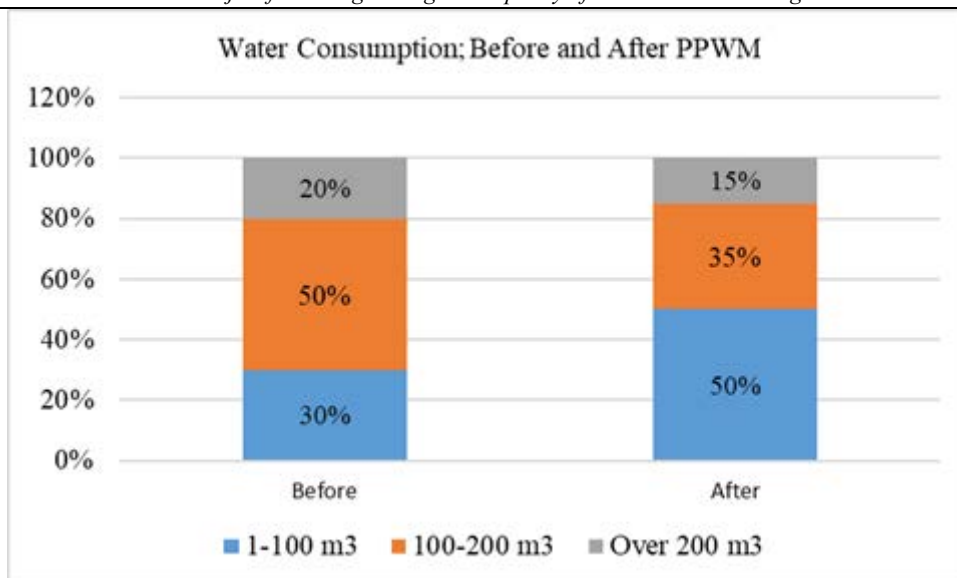
Source: JICA Expert Team

Figure 4.13 Access to Water by Season Before and After PPWM



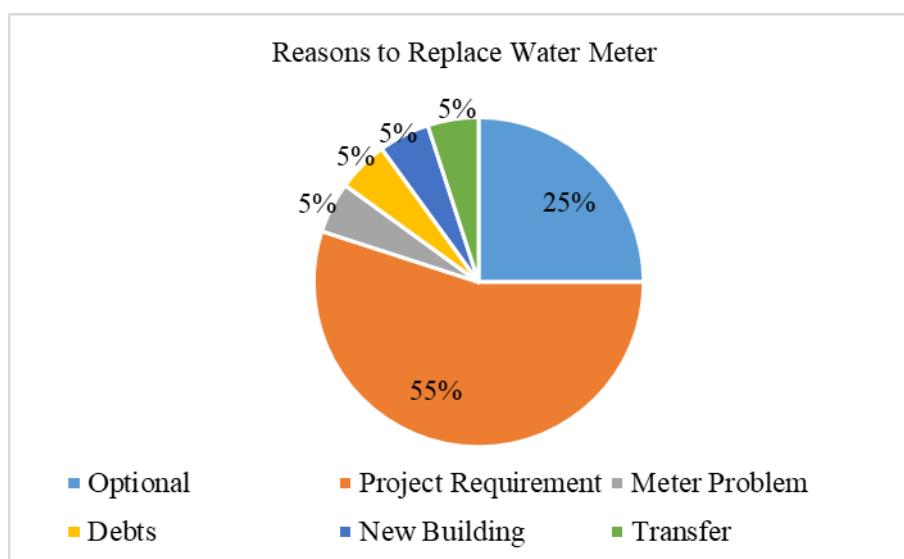
Source: JICA Expert Team

Figure 4.14 Access to Water by Days Before and After PPWM



Source: JICA Expert Team

Figure 4.15 Water Consumption Before and After PPWM



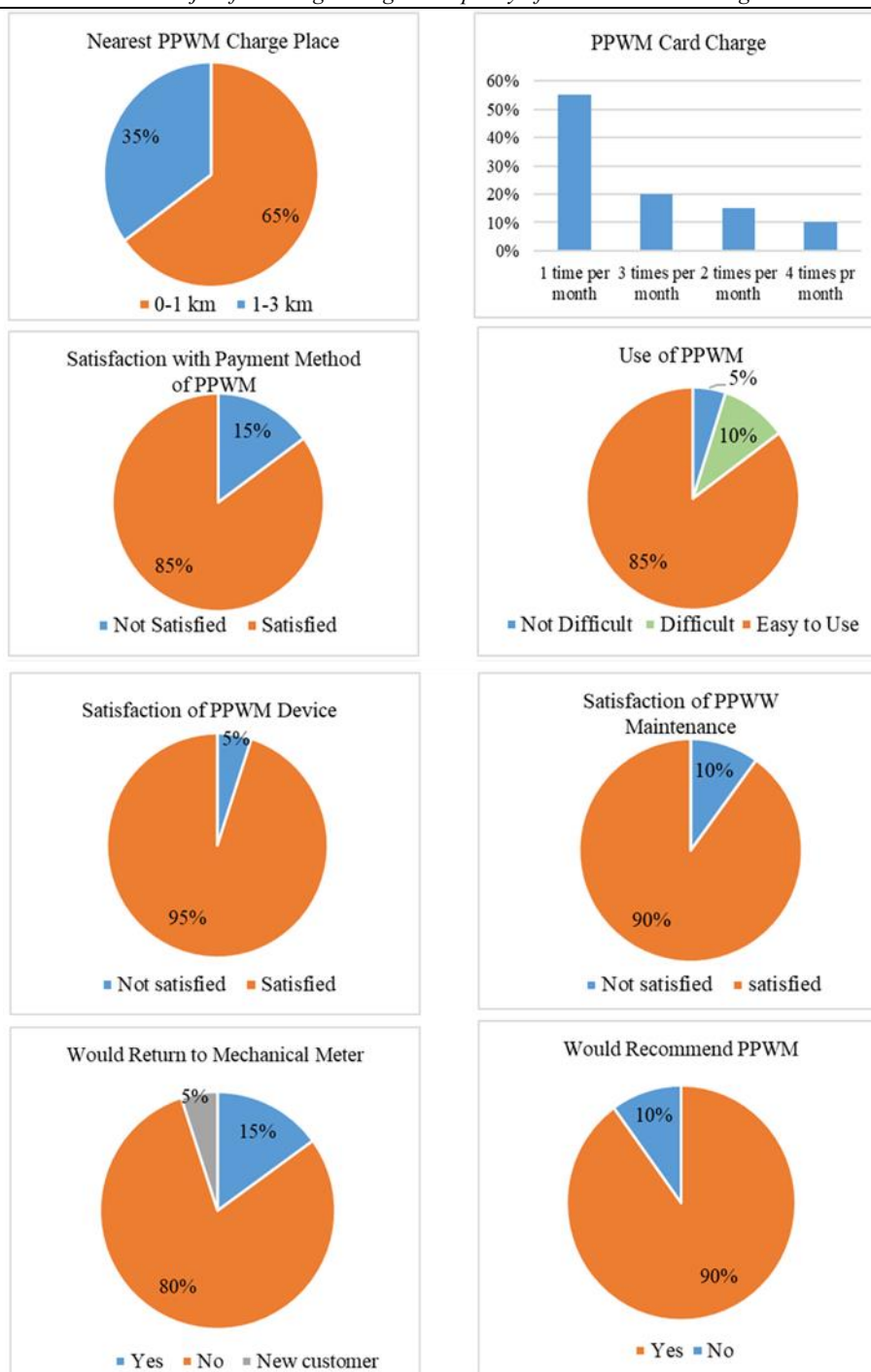
Source: JICA Expert Team

Figure 4.16 Reasons to Replace Mechanical Water Meter to PPWM

(3) Satisfactions

In general, as seen in Figure 4.17, the users are highly satisfied with the PPWM and recommend to others. The reasons for their satisfaction are that the

1. The charge center for PPWM card is close and within 0-1km for most of them. Distance to the charge center has a high impact of the satisfaction.
2. Most of users charge once a month and it is more convenient to them.



Source: JICA Expert Team

Figure 4.17 Satisfaction of PPWM among the Surveyed Users

(4) Other

1. The followings changed since they use PPWM:

Have saved money.

Have saved water.

Have more water available.

Water quality is better.

Water quantity is more accurate and cheaper.

2. There are, however, some issues with the PPWM screen language, the need to have the card to read

the screen, and also no signals of warnings.

3. Only 10% of the respondents received training on how to use the PPWM.
4. 65% are satisfied with the brand of PPWM they are using.
5. Mostly charge up to 100NIS per month.

4.6 Baseline and End-line Assessment (Summary of the Findings)

Table 2.27 is a summary of the overall assessment of the current status at the Customer Service Section of the water department and also the PR department. This table has been prepared to record the summary status of the Before and After assessment. It is planned that the table to be completed for current status in the PA2 and PA3 areas as well as the Project next year. In the end of the Project, the improved status will be recorded in the same table for all three PA areas for evaluation of the progress.

Table 2.27 Assessment of the Current Status (baseline) at the Customer Service Section of the WWD

Assessment Related to Bill Collection		Base line Assessment					End line Assessment					Note
1	Bill collection rate %	PA1	PA2	PA3	Avg.	City	PA1	PA2	PA3	Avg	City	
		61	%	%	%	39.3	%	%	%	%	...%	
2	Number of subscribers	601	...	...	...	10,220	...	...	...	...	...
3	Water use per customer in m ³ /month	9m ³	m ³	m ³	m ³	13m ³	m ³	m ³	m ³	m ³	m ³	
4	Water pressure	?	.....	.....	.....	?	.....	.....	.....	.....	.....
5	Number of available days of water	No fixed days/hours (unclear)					No fixed days/hours (unclear)					
6	Customer satisfaction (through survey data)	PA1	PA2	PA3	Avg.	City	PA1	PA2	PA3	Avg	City	
	Bill delivery %	92.6	%	%	%	95.6	%	%	%	%	%	
	Payment method%	92.6	%	%	%	97.8	%	%	%	%	%	
	Meter reading by meter %	86.1	%	%	%	94.5	%	%	%	%	%	
	Meter installation %	65	%	%	%	91.2	%	%	%	%	%	
	Satisfied with type of water meter%	72	%	%	%	84.6	%	%	%	%	%	
	Water quality %	39	%	%	%	38.5	%	%	%	%	%	
	Water availability %	19.4	%	%	%	35.2	%	%	%	%	%	
	Meter re-connection/owner change %	18.5	%	%	%	15.44	%	%	%	%	%	
	New-application process %	14	%	%	%	7.7	%	%	%	%	%	
7	Public awareness strategy/plan	Yes/Some extend/No					Yes/Some extend/No					
	Public awareness activities	Facebook/Social media		Yes/Some extend/No			Yes/Some extend/No					
		Public meetings		Yes/Some extend/No			Yes/Some extend/No					
		Others		Yes/Some extend/No			Yes/Some extend/No					
		Specific staff in charge		Yes/Some extend/No			Yes/Some extend/No					
8	Customer complain	Average number of response days					3-7 days depends on the matter					days
		Customer complain form exists					Yes/Some extend/No					Yes/Some extend/No
		Results of investigation is recorded					Yes/Some extend/No					Yes/Some extend/No
		Name of investigator is recorded/date					Yes/Some extend/No					Yes/Some extend/No
		Action procedure is clear					Yes/Some extend/No					Yes/Some extend/No
9	Customer opinion on water tariff (thro survey data)	PA1	PA2	PA3	Avg.	City	PA1	PA2	PA3	Avg	City	
	Expensive %	44.3	%	%	%	36	%	%	%	%	%	
	Fair %	50	%	%	%	52	%	%	%	%	%	
	Cheap %	1.6	%	%	%	8	%	%	%	%	%	
	No opinion %	4.1	%	%	%	4	%	%	%	%	%	
10	Customer's willingness to pay (thru survey date)	64.5	%	%	%	50	%	%	%	%	%	
11	Accept PPWM (through survey data))	65	%	%	%	56	%	%	%	%	%	

12	Operational status	Sufficient number of meter readers	Yes/No	Yes/No	
		Sufficient number of bill collectors	Yes/No	Yes/No	
		Smooth monthly operation of reading & collection	Yes/Some Issues/No	Yes/Some Issues/No	
	Clear operational procedure (workflow)	New customer registration	Yes/Needs Improvement/No	Yes/Needs Improvement/No	
		Meter reading	Yes/Needs Improvement/No	Yes/Needs Improvement/No	
		Billing	Yes/Needs Improvement/No	Yes/Needs Improvement/No	
		Customer complains	Yes/Needs Improvement/No	Yes/Needs Improvement/No	
		Meter ownership transfer	Yes/Needs Improvement/No	Yes/Needs Improvement/No	
		Absent customers	Yes/Needs Improvement/No	Yes/Needs Improvement/No	
		Reconnection/disconnection	Yes/Needs Improvement/No	Yes/Needs Improvement/No	
		Illegal Connection	Yes/Needs Improvement/No	Yes/Needs Improvement/No	
		Water meter relocation	Yes/Needs Improvement/No	Yes/Needs Improvement/No	
Meter temporary stop		Yes/Needs Improvement/No	Yes/Needs Improvement/No		
	PPWM	Yes/No	Yes/No		
13	Prepares financial reports	Yes/Some tables/No	Yes/Some tables/No		
14	CS software status (AlShammeli)	Working customer service software	Yes/Some Issues/No	Yes/Some Issues/No	
		Enough knowledge of software use	Yes/Some Issues/No	Yes/Some Issues/No	
		Use of GIS	Yes/Some Uses/No	Yes/Some Issues/No	
		Needs GIS training	Yes/No	Yes/No	
		Integration of GIS and CS software	Yes/No	Yes/No	
		Computer knowledge and MS office	Yes/No	Yes/No	

CHAPTER 5. PREPAID WATER METER STUDY

5.1 Introduction

The prepaid customer meters (PPWM) has been first introduced in JSC-JWV in the governorate of Jenin, which is one of the best successful cases. Now many municipalities and JSCs such as Tubas, Nablus, Aquraba, Bethlehem and Hebron have introduced PPWM.

5.2 Outline of Prepaid Water Meter Study

The following items on prepaid water meter (PPWM) are covered in this chapter.

- Type of Flow Meter for PPWM System
- Existing PPWM system in other water supply utilities
- Social survey on PPWM
- Workshop for strategy of introduction of PPWM based on study results of existing PPWM system
- Lesson learned, issues and challenges on PPWM
- Next steps

5.3 Type of Flow Meter for PPWM System

5.3.1 Comparison of flow meter

There are three types of flow meters for PPWM: velocity (impeller), volumetric and ultrasonic. The following table compares these flow meters. Prices of three types are not much difference. Ultrasonic is technically the best. However, the issues on ultrasonic meter are: no ultrasonic introduction in Palestine in the actual water supply conditions and possible air bubbles in water, in which ultrasonic cannot count water flow.

Table 5.1 Comparison between Three Types of Flow Meter for PPWM

Type	Velocity (impeller)	Volumetric	Ultrasonic
Advantage	<ul style="list-style-type: none"> • Maintenance is simple. 	<ul style="list-style-type: none"> • Does not count air. • Can be installed in any position. 	<ul style="list-style-type: none"> • Ultrasonic meters do not measure air • Minimum flow is small • High sensitivity even at low flow. • No moving parts and probably long life with good accuracy. • Low pressure loss. • Does not count air.
Disadvantage	<ul style="list-style-type: none"> • Count air in intermittent supply. • Installed in horizontal position only. • Mechanical parts can be damaged, making frequent accuracy testing necessary. • Prone to wear in silty water, resulting in loss of accuracy and frequent need for replacement. • Short service life. • Some head loss possible. • Low flow rata is insensible. 	<ul style="list-style-type: none"> • With silty water (particles) and calcification, meter does not work accurately. • Low flow rata is insensible 	<ul style="list-style-type: none"> • There may be air-water mix in intermittent supply, and ultrasonic do not measure water as long as the water contains air bubbles. • No experience in actual conditions • (Experiment for accuracy under different situation of water supply using test meter bench has been planned for early Feb).

Type	Velocity (impeller)	Volumetric	Ultrasonic
Life time	<ul style="list-style-type: none"> In general, 7 years or more and depend on raw water quality. 	<ul style="list-style-type: none"> In general, 7 years or more and depend on raw water quality. 	<ul style="list-style-type: none"> In general, 7 years or more and depend on raw water quality. Life type of electrical parts is also 7 year or more. The battery life is more than 5 years depends on the frequency of charges. It is easily exchangeable.
Comments		<ul style="list-style-type: none"> Additional strainer to remove particles is required. But is causes frequent choking of filter. Need to check water quality in Jenin. 	
Experience	<ul style="list-style-type: none"> Many but they ae getting older since they are installed long time ago Decreasing installation due to air problem 	<ul style="list-style-type: none"> Many Increasing installation 	<ul style="list-style-type: none"> No experience in real conditions It is installed by testing purpose only in JSC-JWV.
Unit price (sample only)	<ul style="list-style-type: none"> Around 130 USD 	<ul style="list-style-type: none"> Around 140 USD 	<ul style="list-style-type: none"> Around 150 USD
Preliminary Evaluation	<ul style="list-style-type: none"> Poor Air problem is prevailing so that it introduction of the meter is not preferable. 	<ul style="list-style-type: none"> Fair Particle problems should be solved. 	<ul style="list-style-type: none"> Good technical performance No experience in actual conditions. Measurement in air bubble in water is uncertain.

5.3.2 Water supply conditions in Jenin to be considered in selecting flow meter

To select type or class of water meter to be adopted in Palestine, very low flow rate of water supply to household and particles in water/calcification shall be considered.

(1) Very low flow rate

- All houses in Jenin have rooftop tanks. They are fitted with float valves. When water is used in the house water level in the tank decreases only slightly after tank is filled. So the float valve also opens very slightly and very small flow is passed to the tank from supply line.
- Due to this, significant quantity of water flows to rooftop tanks at very low flow rate.
- Velocity type meters have higher starting flow rate (Q1), so they cannot measure the low flow. This low flow passes unregistered in these meters. It also counts air in intermittent supply.
- Low flow problem in Jenin increases in winter because the supply duration increases from one or two days per week to several days per week due to lower water demand. Some areas even get continuous supply in winter.
- Volumetric meters are better than velocity meters for measuring low flow

(2) Particles in water

- All water sources of Jenin are ground water (which usually contains sand particles) and since it is supplied without any sedimentation
- According to the social survey, 46.2% of the samples complain about removal of particles of sand. Therefore, there are particles of sand in supplied water.
- Volumetric meters get stuck by sand particles or dirt in water.

(3) Calcification in meter

- Groundwater contains much mineral and causes calcification in intermittent supply because water

containing minerals is evaporated during no water supply period, which may cause calcification in water meter. Counting of volumetric meter is affected by calcification, which may cause faster counting than actual flow.

5.3.3 Testing of ultrasonic type

(1) Hearing from JSC-JWV

JICA experts discussed with JSC-JWV and get feedback on the suitable type of customer meters in Jenin from JSC's experience and testing of ultrasonic type PPWM at a residence.

A small experiment in which an ultrasonic meter has been installed in series with existing velocity type meter has been made. As a result, for a duration of about 2 months in summer the velocity meter showed 63 m³ while the ultrasonic meter showed 97 m³. Comparing with velocity and volumetric meters, ultrasonic meter can reduce NRW by about 28% and 15%, respectively.

JSC will purchase 1,000 ultrasonic prepaid meters soon. The budget will be procured by the fund of Ministry of Local Government. It took 5 years for the approval process.

Regarding the strategy of implementation, JSC's suggestions are:

- a. To provide the meters for free as an incentive to the customers,
- b. To improve the services and supply duration together with the introduction of PPWM so that the customers will have the feeling that introduction of PPWM is for overall system improvement and for their benefit.

(2) Meter test bench experiment

1) Objective

To observe whether the measurement of ultrasonic type water meters is affected by water bubbles in water.

2) Observation

- 1) Visited site was at Ajja. Water test bench located at the service center of Technical Company for Electrical Engineering was used for test.
- 2) 20 mm Elektromed brand ultrasonic type PPWM was tested.
- 3) Initially, volumetric type (R=200), multijet velocity type (R=80) and the ultrasonic type (R=250) were tested together in series.
- 4) The test bench used pumping system, so there were a lot of air bubbles in water in the beginning of test.
- 5) While the volumetric and velocity type registered flow from the beginning, the ultrasonic type did not register any flow until the water with air bubbles was finished. The result was that ultrasonic meter measured only about 50 L while the test bench recorded about 70 L. In the same time the volumetric showed 71.1 L and multijet recorded 63.1 L.
- 6) When the ultrasonic meter was tested after stabilizing the flow (no air bubbles in water) its accuracy was good. Results of the 4 tests are summarized below.

Table 5.2 Test results of various flow meter types by tect bench

Test condition	Test bench reading (L)	Multijet velocity (L)	Volumetric (L)	Ultrasonic (L)
Air bubble not finished. Arrangement was Volumetric > Velocity > Ultrasonic	70.5	63.1 Error (-10.5%)	71.1 (0.85%)	50.0 (-29.1%)
Arrangement changed Volumetric > Velocity > Ultrasonic air bubble not appearing	70.8	70.0 (-1.13%)	71.3 (0.71%)	69.68 (-1.58%)

Ultrasonic alone, no air bubble	70.4			67.78 (-3.72%)
Ultrasonic alone, no air bubble	70.5			70.97 (0.66%)

- (3) Further study
- 1) After the experiment in Ajja, JICA Experts feel the experiment for ultrasonic meter could not completely give a reliable result on air bubble in water and it needs further experiment and pilot test in the actual conditions in Jenin to demonstrate the effectiveness of ultrasonic meter.
 - 2) In addition, meter accuracy test of the existing water meters using portable test bench as sample survey will be required to understand how accurate are the existing meters.

5.4 Existing PPWM system in Specific Towns in Palestine

5.4.1 Study outlines

The site observation tour by the Counterparts and JICA Experts was carried out to understand existing PPWM system in following towns in Palestine. Two methods of studies for this purpose were employed: interview to the persons concerned with PPWM management based on the check list and interview survey to sampled PPWM users.

- JSC-JWV
- Nablus Municipality
- JSC-Tubas
- Aqraba Municipality

The study items are as follows:

- a. Organization
- b. Background
- c. Fund Source
- d. Classification of introduction of PPWM (new and/or replacement)
- e. Start of PPWM
- f. After and before introduction of PPWM and project
 - Water supply conditions
 - NRW
 - Bill collection efficiency
 - Revenue
- g. Water sources & supply condition
- h. Nos. of customer
- i. Nos. of PPWM customer
- j. Regular meters
- k. Meter owner and location
- l. Type of PPWM introduced and warranty/maintenance contract
- m. House connection
- n. Public awareness campaign
- o. Water tariff and debt recovery
- p. Payment method (Vending station)
- q. Meter problems
- r. Illegal use and penalty
- s. Operation and maintenance
- t. Social case
- u. Challenge encountered and encountering
- v. Reason for success
- w. Recommendations for PPWM introduction strategy

5.4.2 Study results of interview survey to the persons concerned with PPWM management

(1) Comparison of result of the study for 4 towns

The comparison of result of the study for 4 towns is given in Attachment 6 and the summary is shown in the table below.

Table 5.3 Summary of comparison of result of the study for 4 towns

Items	JSC-JWV	JSC-Tubas	Nablus Municipality	Aqraba Municipality
1. Classification of introduction of PPWM	Replacement	New installation and replacement	Replacement in small number of meters	New installation
2. Change of water supply conditions after PPWM	From 1 day/week to 24/7 hours with infra development	24/7days with infra development	Not changed Intermittent supply One day in every 5 days	Before, by tanker. After project, normally, 24/7 days
3. NRW	40 % to 13%~16%	Not measured	Not measured	Only minor leakage after PPWM
4. Bill collection efficiency 5. Revenue	40% to 100%	Tamoon: 95% (after PPWM) Before PPWM, 50%	Recovered 304,038 NIS of 4,086,308 NIS debts	100% (after PPWM) Before PPWM, 60%
6. Nos. of customer	6,040	8,800	40,000	2,000
7. Nos. of PPWM customer	6,000 (99.3%)	7,000 (79.5%)	1,450 (3.6%)	2,000 (100%)
8. Regular meters	40 (0.7%)	1,800 (20.5%)	38,550 (96.4%)	None
9. Meter owner and location	Owned by JSC, installed at private or public premises	Owned by JSC, installed at entrance or outside	Owned by customer	Owned by customer
10. Type of PPWM introduced and warranty/maintenance contract	Mechanical 10 years guarantee with 6 USD/meter/year	Volumetric and Mechanical 1 year warranty No maintenance contract	Mechanical Satoco 3 years free maintenance Baylon 1 year free maintenance	Volumetric 5 year free maintenance
11. House connection	Installed by JSC	Installed by JSC	-	Installed by municipality
12. Public awareness campaign	Not conducted	Public meeting, relevant institution meeting	Awareness message on the bill	Public meeting
13. Payment method (Vending station)	11 stations, 14 supermarkets	6 stations,	1 station at municipality	1 station at municipality
14. Meter problems	Working well with only 1% deficiency, inaccurate meter counting by calcification	Software issues. They want to use SDK system, which use any PPWM brand.	Over-registration by air problem	Over-registration by air problem
15. Illegal use and penalty	Thief detection function with penalty	Consumed amount is checked to find illegal connection. if it is found, PPWM is installed	Penalty	No penalty because no illegal connection

16. Operation and maintenance	Meter checked every 6 months	Meter readers involve in technical works (multi-functioned)		Monthly consumption check
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(2) Success factors and recommendations for PPWM introduction

In the study, following success factors for PPWM introduction were explained by the towns.

- Free meter replacement cost for customer
- 24/7 water supply service
- 24 hour water supply
- Affordable quality water
- 24 hour customer service
- Good and responsive customer service
- Earn trust from customer by good communication

The followings are the recommendations for PPWM introduction made by the towns.

- PPWM strategy should focus on water supply improvement but not revenue increase
- Volumetric or ultrasonic PPWM are recommended because of its high accuracy
- Pilot project and make a success story
- Improvement cycle:
 1. New resource development
 2. Storage capacity expansion
 3. Main line improvement
 4. Install PPWM
 5. Illegal use control
 6. Rehabilitation
 7. NRW control
 8. Expansion
- Start introducing PPWM with influential people. i.e. Mayor, JSC manager, member of council, board member, employees.
- Cancel old network and replace with new network

5.4.3 Result of interview survey to sampled PPWM users

(1) Survey samples

Interview survey to sampled PPWM users was implemented with following samples.

- JSC-JWV (9 questionnaires)
- JSC- Tubas (3 questionnaires)
- Aqraba village (3 questionnaires)
- Nablus city (5 questionnaires)

(2) Access to water before and after PPWM

The results on access to water before and after PPWM are below and shown in the figures below.

- The access to water has increased both in winter and summer.
- The access to water increases by number of days in both seasons; mostly have water 5-6 days with PPWM. (Reduce of water consumption by customer increase more water pressure and increase the access.)
- Note: In all cases except of Nablus, an infrastructure improving project to improve water supply networks was accompanied with introduction of PPWM, which increases supply hours too.
- Water consumption decreased after PPWM. (The customers became more conscious to consume water as they have to pay when they need water.)
- Mostly moved to PPWM due to the project requirements.

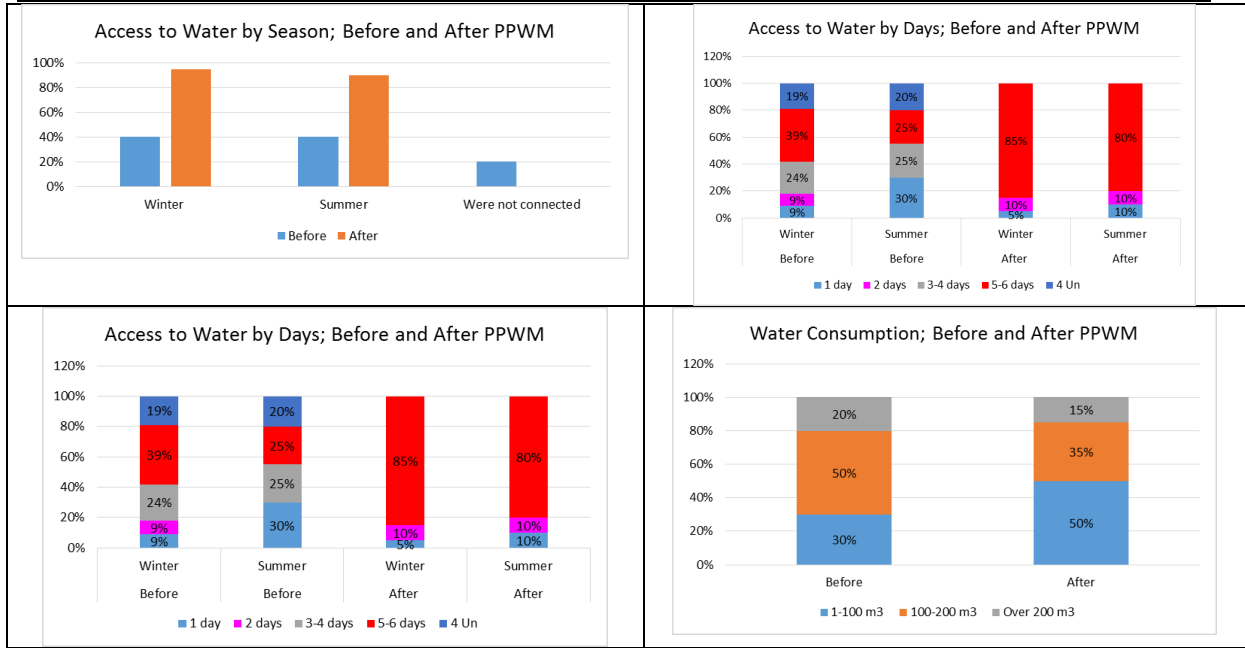
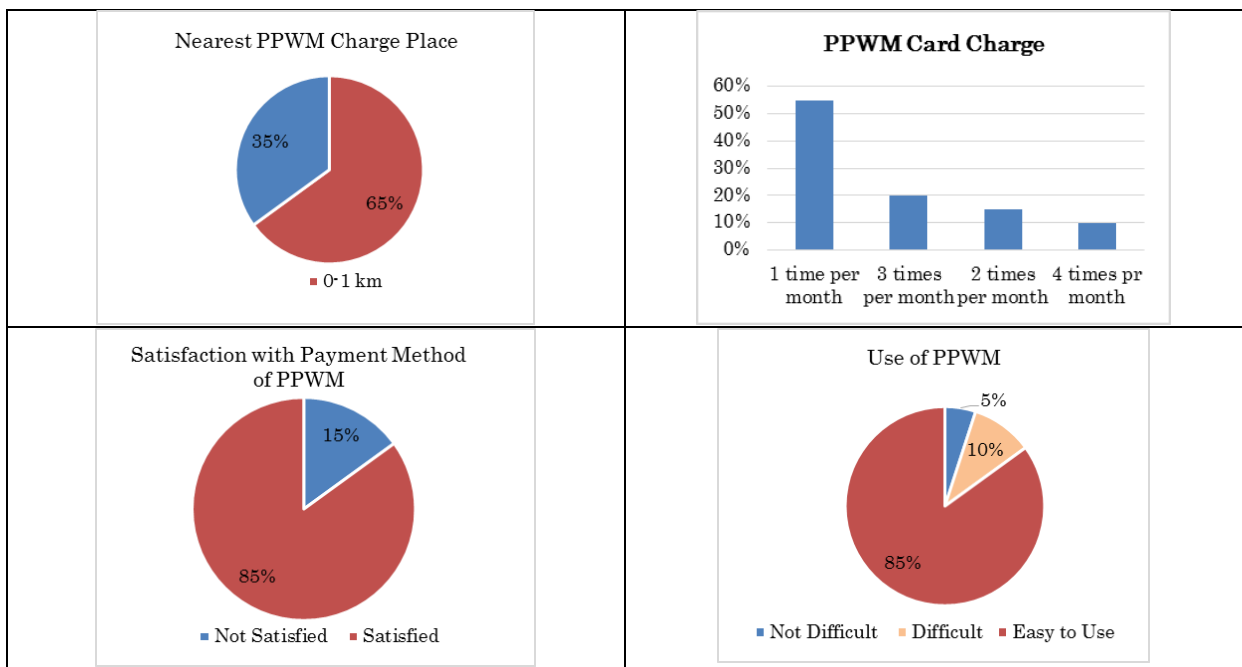


Figure 5.1 Access to water before and after PPWM

(3) Satisfaction of PPWM

As shown in the figures below, in general, the users are highly satisfied with the PPWM system and recommend to others.



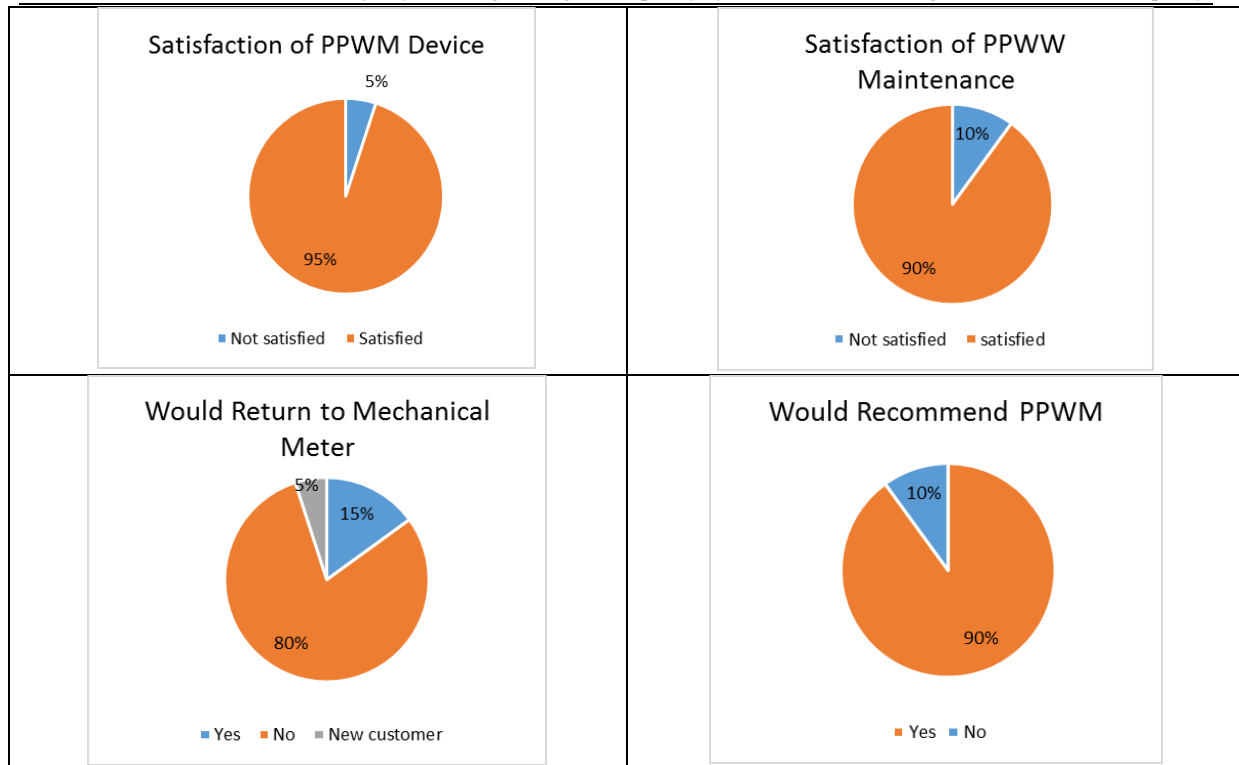


Figure 5.2 Satisfaction Level for PPWM

(4) Other findings on PPWM

- The following things changed since they have used PPWM:
 - Saved money, saved water, have more water available, water quality is better, water quantity is more accurate, and is cheaper.
- There are, however, some issues with the PPWM screen language, the need to have the card to read the screen, and also no signals of warnings.
- Only 10% of the respondents received training on how to use the PPWM.
- 65% are satisfied with the brand of PPWM they are using.
- Mostly charge up to 100NIS per month.

5.5 Social survey on PPWM in pilot area 1 and whole city

This section is summary of the result of social survey on PPWM in pilot area 1 and whole city, discussed in the chapter 4.

5.5.1 Opinion on PPWM in pilot area 1

The result of the social survey on opinion of PPWM in pilot area 1 is summarized as follows.

- 65% of samples prefer PPWM and the rest don't.
- If Jenin municipality takes a decision to install PPWM, slightly a higher number of residents accept PPWM (67%).
- The reasons for accepting PPWM were:
 1. Customer pays regularly
 2. Makes customer periodic
 3. To get water every day without cutting.
 4. This system is better.
 5. Easier for customers and municipal.
 6. More accurate and depends on how much people consume.
- Reasons for not accepting were:

1. Not enough money to charge regularly.
2. It cost more money.
3. Don't trust municipality.
4. We are paying cash so no need for this system.
5. This water meter reads more than consuming.
6. Not suitable for poor people.

5.5.2 Opinion on PPWM in whole city

The results of the social survey on opinion of PPWM in pilot are in whole city is summarized as follows.

- 56 % prefer PPWM and the rest don't.
- If Jenin municipality takes a decision to install PPWM, slightly a higher number of residents accept PPWM (61%). This means an obligatory PPWM will not make a difference in the public acceptance of PPWM.
- The reasons for accepting PPWM were:
 1. Customer pays regularly
 2. Makes customer periodic
 3. To get water every day without cutting.
 4. This system is better.
 5. Easier for customers and municipal.
 6. More accurate and depends on how much people consume.
 7. We don't pay attention for bills every month.
 8. Water will be available always.
 9. More accurate and depends on how much people consume.
 10. Better control consumption
- Reasons for not accepting were:
 1. Not enough money to charge regularly.
 2. It cost more money.
 3. Don't trust municipality.
 4. We are paying cash so no need for this system.
 5. This water meter read more than consuming.
 6. Not suitable for poor people.
 7. More difficult system.
 8. Lack of money.
 9. Paying every month is better, and the financial status is bad.
 10. Too much commitment.
 11. This WM read more than consuming.
 12. Not suitable for poor people.

5.6 Workshop for strategy of introduction of PPWM

To share the results of PPWM study and obtain the opinion of the counterparts, a workshop was held with the managers of Water Section and Customer Service Section. The followings are summary of opinions of the managers after they understand results of the study.

(1) Success Factors:

According to priority:

- 1- Improvement of water resources, network, water supply conditions, water quality.
- 2- Good service, trust, good management.
- 3- Social situation (public awareness, tools to communicate)
- 3- Implementation by Pilot Area (make a success story)
- 3- Willing to change (of customers)

- (2) Meter:
- Ownership: customer
 - Location: Outside house, entrance
 - Type: the municipality selects the type and specification for customer
 - Maintenance fee: 6.2 NIS for maintenance per month same as current
- (3) Strategy to introduce:
- Installing PPWM for new building and high rise houses (apartment)
 - Make deal with the customer debts and deal to schedule the debts
 - Commercial customer is mandate to install the prepaid meter. (Probably, the willing to accept PPWM is higher than domestic customers)
 - Rental building to be prepaid meters in order the owner grantees that all renters pay all the money.
 - The replacement to the customer should be free as a motivation
 - Installing prepaid meters is optional for customers who are out of PAs.
- (4) Water tariff and debt recovery:
- Water tariff: Exiting water tariff is losing and doesn't cover the O&M costs. The tariff will be increased. This decision should be discussed with municipal council for approval.
 - Reduce maintenance and operation costs: Head of Water Section suggests reducing it by 5%, or go to minimum consumption, even if it needs to be based on calculations.
 - Motivation charge: free consumption of 3-5 m³ when charge for the first time.
 - Debit recovery: It will be not mentioned when PPWM introduce and decided it later after introduction. The percentage of discount from the charging amount and legal agreement is required. If he paid (1/3) of the amount of debt, the remaining is to be scheduled.
- (5) Requirement of municipality:
- 1) Customer Service Section
- To create meters maintenance division (5 technicians to be hired to work on defect meters, broken meters, meters with higher consumption rate)
 - Equipment: Car for 24 hours work.
 - Collection division: 7 meter readers for the existing system. Separate readers from collectors.
 - Customer contract to be modified.
- 2) Water Section
- Increase the number of technicians and their qualities for maintenance, illegal connections
 - Equipment required for leakage
 - Materials required for repair (pipes, clamps)
- (6) Required public awareness:
- Prepare a good strategy for public relation (PR) as a whole.
 - Activate public relation in water division linking customer service, with complains division, with public service center in order to make the correction action as soon as possible.
 - The need for creating materials for PR in different subjects
 - Social media, paid face book advertisements, publish the advertisements in other most popular face book pages and new technology.
 - SMS mobile system.
 - Making films and slogan/ logo.
 - Slogan (PR contents):
 - Benefits of using prepaid meters
 - Reduce your debit
 - Save water
 - Wise management of water use

- Continuous supply of water
- Save water for other areas
- Scheduling water supply table
- Religion side
- Understanding of accurate consumption (accurate meter)

5.7 Lessons learned, Issues and challenges on PPWM

The issues and challenges on introduction of PPWM are summarized as follows.

(1) Type of meters.

In Palestine, problems on water meters are air count, particles in water, and very low flow rate incense by water meter. Ultrasonic flow meter may solve these technical problems. However, no ultrasonic has been introduced in Palestine so that the operation performance is not sure in the actual water supply conditions, especially in intermittent supply. In intermittent supply, air bubbles may be contained in water. Ultrasonic cannot count such air bubble. It is not sure how long water bubbles continue after start of water supply. It is recommended that experiment in actual water supply condition in Jenin shall be made before introducing ultrasonic meter. Ultrasonic meter can be introduced in Jenin if the performance of ultrasonic meter is confirmed by the experiment. Experiment plan should be prepared. Before the results of experiment, volumetric type is suitable for PPWM at this stage. The experiment can be implemented together with PPWM in PA1.

(2) Success factors

PPWM should be succeeded once PPWM is introduced in Jenin. The following are success factors and the introduction project shall meet these factors.

- Free meter replacement cost for customer
- 24/7 water supply service
- 24 hour water supply
- Affordable quality water
- 24 hour customer service
- Good and responsive customer service
- Earn trust from customer by good communication

(3) Improvement of water supply conditions

In the success factors, 24/7 water supply service and 24 hour water supply is not possible to achieve without an infrastructure improvement project. However, the water supply conditions may be improved from the existing conditions with existing infrastructure if water distribution management is improved. In this project, water distribution management in the pilot areas shall be improved for improvement of water supply conditions at first. The water quality is checked again and the results should be informed to the residents to obtain the confidence through public awareness activities.

(4) Improvement of service

According to the social survey, the customers do not satisfy with water supply service of Jenin Municipality. If Jenin municipality obtains the trust of customers, the acceptance of PPWM becomes easier. To obtain the trust, Jenin municipality shall improve their service of water supply at the time of introduction of PPWM, especially in the pilot area at first. For this purpose, capacity of operation and maintenance of water supply system in Jenin municipality should be strengthened forming teams to tackle NRW and manage PPWM system and the water supply service in general should be improved.

(5) Willingness to accept introduction of PPWM

According to the social survey, willingness to accept PPWM is 67 % and 61% in pilot area and in whole city. Therefore, PPWM can be installed to 61 % of the customers without difficulty. However, the strategy to install water meter to the remaining 39 % of the customers should be developed.

5.8 Next steps

- (1) Financial sustainability
 - Cost burden (Customer and Municipality/utility)
 - Required total cost
 - Fund raising for future replacement/repair
 - Maintenance cost
- (2) Social sustainability (results of social survey)
 - Willing to accept of PPWM in PA1
 - Willing to accept of PPWM in entire city
 - Result of social survey on existing PPWM customers
- (3) Technical sustainability
 - Technical specification of meters, way of installation, operation and maintenance, software, and operational setup to ensure quick response to repair and replace, illegal connection
- (4) Political will and backup
 - What kind process is required to acquire political backup
- (5) Feasible strategy to install/replace meters
 - Recommendations by study tour

Simultaneously, an action plan of introduction of PPWM should be prepared. The contents of plan are as follow.

1. Comparison of PPWM with Mechanical meter and selection of PPWM
2. Set up purpose of introduction of PPWM in Pilot Areas
 - Improvement of water supply conditions in target area
3. Benefits and costs (advantages and disadvantage)
 - Customers
 - Municipality
4. Selection of meter system
 - Type
 - Owner
 - Replacement policy
 - Maintenance policy
 - Required options of meter function
 - Software and vending machine
 - Operation and maintenance
5. Water tariff and meter maintenance fee (e.g. discount or not)
6. Strategy of introduction
 - by customer type and by existing/new customers
 - schedule to introduction
7. Strategy of public awareness campaign
8. Strategy of extension after Pilot Areas

CHAPTER 6. ORGANIZATION AND HUMAN RESOURCE MANAGEMENT

6.1 Organizations Structure of Jenin Municipality

(1) Organization Structure

The organogram of the Jenin Municipality (JM) as of December 2017 is shown in Figure 6.1, which was prepared by the Expert Team and includes the pictures of the heads of departments /units /sections /divisions for visualization and the breakdown of staff number according to job titles. The JM (the Quality Unit as the chief working member) started the revision of the organogram for the FY 2018 in line with the commencement of the Project, and the Expert Team has given advice and recommendations and assisted the Quality Unit in developing the new organogram and getting its approval from the Mayor and the Municipal Council. The advised points are as follows:

- For the Water and Wastewater Department, to abolish the Pumps & Wells Division (since 2015 the operation and maintenance of main pumps and wells has been outsourced); to rename the Project Management Section as the Studies & Planning Section; to create the Wastewater Treatment Plant Section;
- For the Engineering Department, to rename the Agriculture Section as Building Section; to rename the GIS Section as Surveying Section; to create the GIS Division under the Surveying Section;
- For the Public Services and Collection Unit, to separate the Public Service Center as an independent unit and put it under the direct control of the Municipality Director.
- For the Administration Department, to create the Central Archiving Division under the Service and Archiving (Diwan) Section.

The structural requirements from the “Related Regulations of the Local Authority No. 7 for 2009” and the status of the JM are compared in Table 6.1. The current organogram does not satisfy the requirements in some points e.g. No. 8 (maximum number of units) and Nos. 14 & 15 (minimum staff in a section/division), which shall be corrected as soon as possible.

Table 6.1 Structural Requirements and Status of Current Organogram

No	Factors	Regulations for Local Body Class I	Status (Jenin Municipality)
1	Organizational title for administrative first level	Department	Department
2	Position of "Executive Manager"	Yes	Yes (Municipality Director)
3	Upper limit for the number of administrative levels from the position of head to the lowest supervisory level (Division Head)	5	5 (1. Mayor; 2. Municipality Director; 3. Director of Department; 4. Head of Section; 5. Head of Division)
4	Maximum number of organizational units in the first executive management level of the Manager or the Mayor	8	6 (number of departments)
5	Maximum number of sections per department	6	2-5
6	Maximum number of divisions per section	3	0-3
7	Upper limit for the number of units associated with the Mayor and oversees its work directly	2	2 (Quality Unit & Legal Unit)
8	Maximum number of units associated	2	3

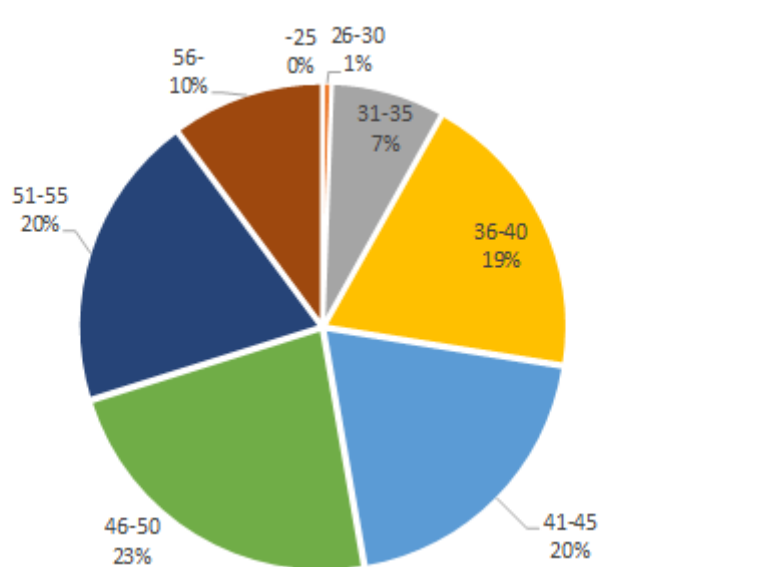
Report on Baseline Survey
Project for Strengthening the Capacity of Water Service Management in Jenin Municipality

No	Factors	Regulations for Local Body Class I	Status (Jenin Municipality)
	with Municipality Director and supervises its work directly		(Investment & Development Unit, IT & Programming Unit and Public Services & Collection Unit)
9	Upper limit for number of Assistants of Municipality Director	2	0 (only Secretary)
10	Percentage of organized units for main processes in local body (core business)	At least 60%	66% (except Financial Dep. and Administration Dep. among 6 deps.)
11	Percentage of organized units supporting operations in local body (business support)	At most 40%	34% (Financial Dep. and Administration Dep.)
12	Percentage of employees in main processes	At least 70%	
13	Minimal staff in the department	7+1	14+1 (Financial Dep.)
14	Minimal staff in the section	3+1	0+1
15	Minimal staff in the division	1+1	0+1
16	Function of strategic management (planning and performance evaluation)	Must be in the organizational structure in the form of a unit connected to the Mayor.	Yes (Quality Unit)
17	Procurement and tenders function	Independent and connected to the Mayor.	Yes (Procurement Sec. but connected to Municipality Director)
18	Internal control (administrative, financial and technical etc.)	Independent and connected to local body council.	Yes (Monitoring & Internal Auditing Unit)
19	Conflicting jobs separated from each	Managerial references must be separated fully.	No (e.g. Water & Wastewater Dep. (Customer Service Sec.), Public Services & Collection Unit, Service & Archiving Sec., and Revenue Div.)
20	Development of organizational units	By a decision of the Council and the approval of the Ministry at the beginning of a new year.	Yes & No (Ministry of Local Government has approved only the structure, not the staffing from 2015.)
21	Cancel organizational units	By a decision of the Council and the approval of the Ministry at any time of the year.	
22	Financial degree for basic supervisory titles	Financial degree according to local body employee bylaw.	No (2 department heads have been acting with previous salary.)
23	Municipality Director	B-A4	C
24	Municipality Director Assistant	C-A	N.A.
25	Head of Department	C-A	C-B (2 persons are in Grade 2 but they are acting.)
26	Manager of the office of the head of local body	Head of section	Yes (Head of Mayor's Office)
27	Legal consultant	1	1 (Head of Legal Unit)
28	Legal consultant assistant	-	0
29	Legal assistant	1	1

(4) Breakdown of employees

Total number of employees of the JM is 363, of which the permanent employees are 325 and the contract based employees (with the contract period not more than 1 year) are 38. The average age of the permanent employees is 45.4 years old, and its breakdown according to the age block is shown in Figure 6.2. The share of the employees more than 45 years old is 53%, while that of the employees less than 35 years old is 8%. This unbalanced age hierarchy of the permanent employees has been partly adjusted by the recruitment of contract based employees who are mostly young persons. In Palestine, the employees who worked in governmental institutions for more than 15 years⁴ can have the right to request early retirement and to claim the retirement salary (pension), and thus most of the employees of over 45 years old may be retired at any time. Thus, a short/middle term recruitment plan and a detailed and systematic training program for the younger generation should be developed and implemented, in order to ensure the transfer of knowledge and skills from the older generation to the younger generation.

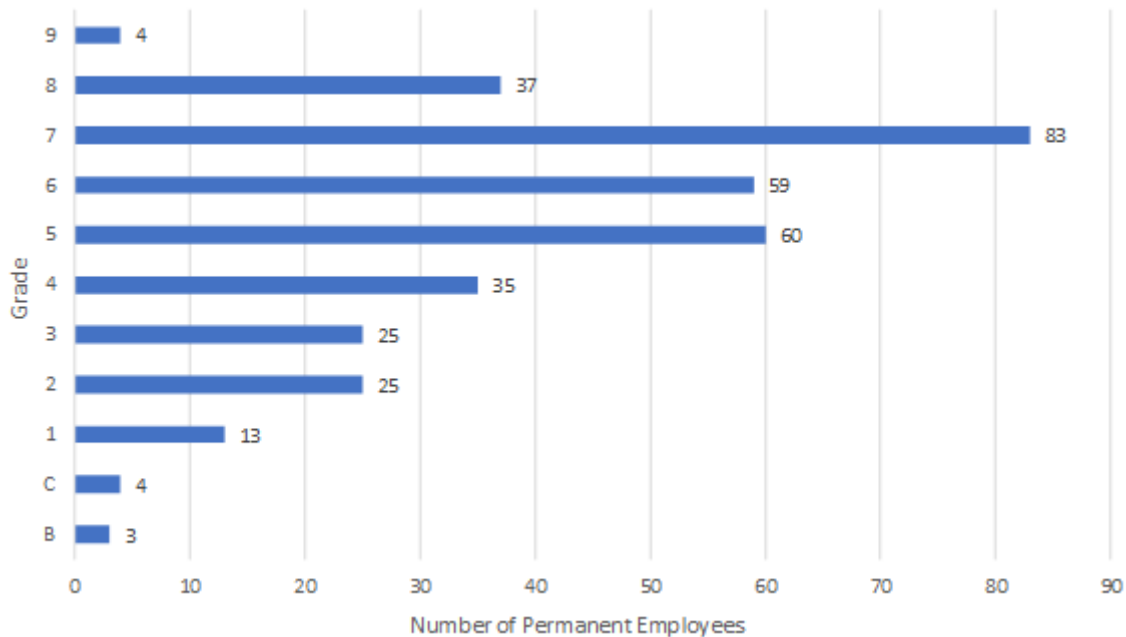
The breakdowns of the permanent employees into grades and into education are shown in Figure 6.3 and Figure 6.4 respectively. The number of employees from Grade 5 to Grade 1 who belongs to the Third Category (clerical and secretarial job) and the Second Category (specialized positions) is 158 as shown in Figure 6.3. Table 6.2 shows the list of permanent employees holding master and BA. Among the 158 employees from Grade 5 to Grade 1, the holders of master and BA are 3 and 42 respectively (refer to Table 6.2; the share is 13.8% ((3+42)/325). Since only the holder of BA and above can be promoted to the managerial positions, the number of more qualified employees should be increased.



Source: JICA Expert Team

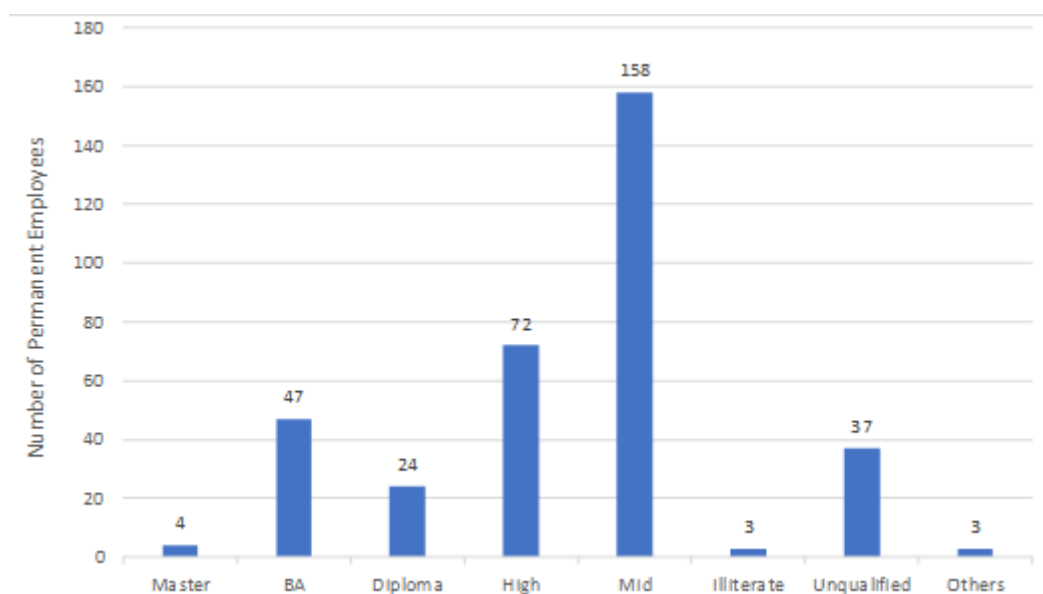
Figure 6.2 Breakdown of Permanent Employees into Ages

⁴ In the current “Law of Public Retirement 2005” article 36.1, another condition was added that the employee should reach the age of 55 for claiming the early retirement salary.



Source: JICA Expert Team

Figure 6.3 Breakdown of Permanent Employees into Grades



Source: JICA Expert Team

Figure 6.4 Breakdown of Permanent Employees into Education

Table 6.2 Permanent Employees with Master and BA

No.	Name	Department/Unit	Section	Division	Job Title	Age as of 1st Dec 2017	Grade	Education
1	Motaseem Jamal Ameen Alshalabi	Administration	Service and Archiving		Head of Section	49	1	BA
2	Keffah Khaled Mohamad Abu Sorour	Administration	Library	Youth Activities	Head of Division	44	4	BA
3	Islam Hasan Marouf Albarbari	Administration			Director of Department	46	2	BA
4	Lila Tayeb Abd al-Karim Jaradat	Administration	Library	Youth Activities	Secretary	52	3	BA
5	Souher Yousef Abd al-Qader Dalbeh	Administration	HR		Head of Section	50	2	BA
6	Mamdouh Riyad Khaled Assaf	Municipality Director				38	C	BA
7	Yousef Mahmoud Mohamad Lahlouh	Administration	HR		Program monitor	46	4	BA
8	Ali Mohamad Ali Mohamad Abu Morar	Monitoring and Auditing			Head of Unit	36	4	BA
9	Mohamad Faye'q Rabe'c Musmar	Administration	Warehouse		Head of Section	37	4	BA
10	Rami Abdallah 'Mohamad Saeed' Haj Saleh	Administration	HR		Asst Section Head	36	3	BA
11	Ayman Hasan Asa'd Aliat	Financial	Accounting	Expenditure	Head of Division	53	1	BA
12	Imad Mohamad Abd al-Rahman Atoum	Investment and Development			Head of Unit	47	B	BA
13	Hussein Na'im Abu Al Hasan	Financial	Accounting		Head of Section	42	1	BA
14	Kefaya Dawoud Yousef Jarrar	Financial	Accounting	Revenue	Head of Division	57	1	BA
15	Samer Hussein Khalil al-Omari	Financial			Head of Department	45	2	BA
16	Amjad Fayez Mohamad Mustafa	Financial	Cashier		Head of Section	50	2	BA
17	Mohamad Ghalib Sadeq Alawneh	Financial	Cashier		Asst Treasurer	37	3	BA
18	Faisal Mohamad Hussein Abu Mouis	Engineering	Supervision	Lighting		58	1	BA
19	Fawzi Ahmad Mahmoud Awis	Engineering	Studies and Projects		Head of Section	54	1	Master
20	Rabab Omar Teab Jaradat	Engineering	Building	Building Control	Secretary&Data Entry	41	3	BA
21	Ziyad Mohamad As'ad Faisal	Water and Wastewater	Wastewater		Head of Section	54	3	BA
22	Mohamad Idrees Mohamad Zahalkeh	Engineering	Studies and Projects	Traffic		58	1	Master
23	Mustafa Wasif Mustafa Fazah	Financial	Accounting	Revenue	Accountant	36	4	BA
24	Abd Alhadi Mohamad Abdallah Hamran	Water and Wastewater	Studies and Planning		Head of Section	35	2	BA
25	Sheren Ahmad Mahmoud Abu Wa'ar	Engineering			Head of Department	42	B	Master
26	Taher Mohamad Taher Salameh	Engineering	Surveying	Surveying	Head of Division	31	3	BA
27	Ata Abd al-Karim Ali Hamdouni	Mayor's Office				49	4	BA
28	Seren Abd Ahmad Khazmeh	Legal Unit and Court Counciller			Head of Unit	53	3	BA
29	Nidal Kamel Asa'd Samoudi	Legal Unit and Court Counciller	Municipal Court		Head of Section	38	3	BA
30	Yasser Fawzi Aref Jafer	Quality Unit			Head of Unit	47	B	BA
31	Ihab Hashim Mahmoud Abu Fareh	Movements and Mechanics	Mechanics		Mechanical Technician	49	2	BA
32	Tawfiq Mustafa Tawfiq Abu Obiad	Health and Environment			Head of Department	34	C	BA
33	Abdul Baset Mohamad Hussein Abu Mouis	Public Services and Collection			Auditor	53	3	BA
34	Ahmad Mustfa As'ad Jaradat	Health and Environment	Slaughterhouse		Veterinary Doctor	33	3	BA
35	Na'im Ahmad Mohamad Ghazzawi	Engineering	Surveying		Head of Section	56	1	BA
36	Ghader Khaled Ali Al Barbari	Water and Wastewater			Asst Warehouse Secretary	42	2	BA
37	Reda Khaled Sadeq Abu Saif	Health and Environment	Slaughterhouse		Head of Section	45	2	BA
38	Abd al-Karim Ibrahim Mohamad Ikme'el	Water and Wastewater	Customer Service	Connection and Data Entry	Head of Division	38	4	BA
39	Omar Ahmad Mohamad Fazah	Water and Wastewater	Customer Service	Connection and Data Entry	Data Entry	32	5	BA
40	Mohamad Lutfi Ahmad Shita	Water and Wastewater	WWTP		Head of Section	58	1	BA
41	Bashar Fatahi Sahfe Attari					54	5	BA
42	Mutaz Salah Ibrahim Kakuban	Public Services and Collection			Accountant for Water Tariff	38	5	BA
43	Raghib Mustafa Raghib Malhis 294+	Water and Wastewater			Director of Department	40	C	BA
44	Reema Abd al-Rahman Al Ahmad 297+	Water and Wastewater	Studies and Planning	Laboratory	Head of Division	39	1	BA
45	Mysoun Abd Rahman Dawoud Dawoud	Administration	Statistics		Head of Section	44	1	Master
46	Nabil Burhan Mohamad Omari	PR and Media			Head of Unit	59	2	BA
47	Mohamad Fawzi Khaled Al Zaabi	PR and Media				47	3	BA
48	Saham Nayef Othman Hindawi	Procurement			Head of Unit	58	1	BA
49	Hasna Rashid Hasan Abhari	Administration	Youth Activities		Computer Engineer	49	1	BA
50	Mahmoud Musa Ali Nasser	Public Services and Collection	Public Service Center		Head of Center	32	4	BA
51	Sara Walid Hasan Suboh	IT and Programming			Programmer	30	4	BA

6.2 Human Resources Management

6.2.1 Personnel Management System

(1) Staff database

A staff database on Excel basis has been kept in the Financial Department for the purpose of payroll calculation, but the department/section/division and job title of each employee has not been updated since 2015, when the Ministry of Local Government (MoLG) started rejecting the approval of organogram of the JM. The MoLG has approved only the organization structure and rejected the nomination plan of managers because of the large portion of personnel cost in the budget of the JM; hence the JM has been forced to fill the vacant posts with the acting employees temporarily, without any official promotion competition and subsequent salary increment.

The Expert team collected the existing Excel staff database in October 2017 and updated it based on a series of interviews with the directors of all departments and heads of units /sections /divisions until its completion of updating in December 2017.

(2) Job description

The MoLG started the preparation of a template and the development of a set of standard job descriptions for the employees of local governments by the assistance of the CHF in 2009 and distributed it to all the municipalities in Palestine in 2011; but this set of standard job descriptions was only for managers and there has been no update from the MoLG since then.

In the JM, the Engineering Department and the Water and Wastewater Department prepared their job descriptions for the heads of departments /sections /divisions, but they have not been updated and remain to be unofficial i.e. have not been approved by the Municipal Council and the MoLG.

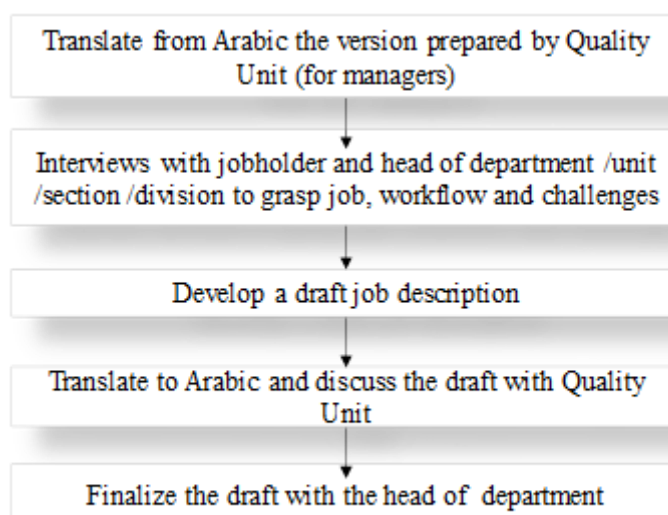
In October 2017 the Quality Unit started the preparation of new job descriptions in line with the Project, and the Expert team has been cooperating with this unit (a) to make them more in detail; and (b) to expand them to all job titles. Since the management of water supply service is closely related to many other departments /sections /units than the Water and Wastewater Department, e.g. the Legal Unit, the Quality Unit, the Monitoring & Internal Audit Unit, the IT & Programming Unit, the Collection Unit, the Public Service Center, the Public Relations Section, the Procurement & Tenders Section, the Financial Department, the Administration Department (particularly the sections of Human Resources, Warehouse and Service & Archiving), the Engineering Department and the Movement and Mechanics Department, the Expert team has been working on the job descriptions for the job titles as shown in Table 6.2; the departments/units other than the Water and Wastewater Department are included such as the Public Service and Collection Unit, the Public Relations Section and the Financial Department. The development process is comprised of the following five steps: (1) to translate from Arabic to English the version prepared by the Quality Unit (for managers); (2) to have interviews with the director of the department, the head of unit/section/division and the jobholder to grasp the job, workflow and challenges; (3) to develop a draft job description; (4) to translate from English to Arabic and discuss the draft with the Head of Quality Unit; and (5) to finalize the draft with the manager of the department. Refer to Figure 6.3 for these work steps.

Table 6.3 Detailed Job Description under Development

Department/Unit	Section	Division	Job Title	Status	
Water and Wastewater	-	-	Warehouse Manager	Step (3) finished	
			Warehouse Clerk	Step (3) finished	
	Water	-	Head of Section	Step (4) finished	
			Distribution	Head of Division	Step (3) finished
			Network Maintenance and Extension	Head of Division	Step (3) finished
				Water Technician	Step (3) ongoing

Department/Unit	Section	Division	Job Title	Status
	Wastewater	-	Head of Section	Step (3) finished
		Network Maintenance	Head of Division	Step (3) finished
		WWTP	Head of Division	Step (3) finished
	Studies and Planning	-	Head of Section	Step (4) finished
		Laboratory	Head of Division	Step (3) finished
	Customer Service	-	Head of Section	Step (4) finished
		Connection and Data Entry	Data Entry	Step (4) finished
Archive			Step (3) finished	
Public Service and Collection	-	-	Head of Unit	Step (4) finished
	Public Service Center	-	Head of Center	Step (3) ongoing
	-	-	Meter Reader & Collector	Step (3) ongoing
	-	-	Collector	Step (3) ongoing
Financial	-	-	Head of Department	Step (1) finished
	Accounting	-	Head of Section	Step (3) ongoing
		Revenue	Head of Division	Step (3) finished
	Planning & Budget	-	Head of Section	Step (1) finished
	Cashier	-	Head of Division	Step (3) ongoing
		-	Assistant Treasurer	Step (3) ongoing
Properties	-	Head of Section	Step (1) finished	
Administration	-	-	Head of Department	Step (1) finished
	Human Resources	-	Head of Section	
	Service & Archiving	-	Head of Section	
	Warehouse	-	Head of Section	
Public Relations	-	-	Head of Section	Step (3) finished
Legal	-	-	Head of Unit	Step (1) finished
	-	Court Counselor	Head of Division	
IT and Programming	-	-	Head of Unit	
Procurement and Tenders	-	-	Head of Section	

Source: JICA Expert Team



Source: JICA Expert Team

Figure 6.5 Flowchart to Develop Detailed Job Description

In the development process, the Expert Team found that (a) the employees who belong to lower categories (e.g. Category 4 (handicrafts job) and Category 5 (service job)) such as Water Technicians sometimes do not have the same skills, among whom some are skilled while others are unskilled in the required fields of technical expertise; (b) some employees have been doing other than what the job title expects e.g. the Head of Revenue Division has been working mostly as a “Tenders Accountant” in the procurement process and most of its original job as the Head of Revenue Division has been conducted by its superiors i.e. the Head of Accounting Section and the Director of Financial Department.

For the problem (a) above, the Expert Team decided to develop a "generalized" job description for water technicians (no different job description for each technician) that can be sketched from a series of interviews with these technicians and the job description for superiors.

For the problem (b) above, the job description for the Head of Revenue Division is shown in Table 6.3 as an example, where the items 2: critical results area, 3: job context, 4: number and level of immediate subordinates, 5: knowledge and skills requirement and 6: environmental and other features were agreed to be added to the current format of job description. Since this kind of mismatching of actual jobs and nominal jobs should be corrected as soon as possible to clarify the responsibility, to avoid the duplication and to ensure the normal direction & reporting line between the superior and the subordinate, the Expert Team will continue the development of (a) workflows (standard operation procedures) and (b) job descriptions based on the interviews and discussions with the C/P (especially the members of the Water Service Management Task Force) and based on these (c) identify the challenges and countermeasures; (d) develop revised workflows and job descriptions; (e) revise the organogram and develop and implement a staff recruitment /reallocation plan for the FY 2019; and (f) develop and implement a staff training program for each employee related to water service management.

Table 6.4 Detailed Job Description of Head of Revenue Division

Job Title: Head of Revenue Section, Financial Department		
Department: Finance	Section: Accounting	Division: Revenue
The responsibility: To the employees in the division	Belongs to: Head of Accounting Section	
Job Description Summary	(1) To assist the Head of the Financial Department in all matters relating to tenders and bidding in terms of financial auditing of bill of quantities (BOQ) quoted and submitted by the service providers. (2) To follow-up the signing of the agreement between the municipality and the service provider and the bid guarantees, to represent the Financial Department in the Tenders and Procurement Committee and to do the necessary documentation for tenders and biddings. (3) To assist the Head of Accounting Section in auditing delivery notes from collectors, to do the documentation and registration of receipts and the customers deposit balance, and to follow up all related works.	
1. Main Tasks and Detailed Activities		
Main Tasks	Detailed Activities	
Project Guarantees	<ul style="list-style-type: none"> • Receive bid bond guarantee and confirm the value of 10% of the value of the total tender. • Ensure that the guarantee meets the standards and regulations set by the Financial Department and that the guarantee is in the form of a bank guarantee or a certified and stamped check. • Check the validity of the guarantee and ensure that it meets the specified period of time, provided that it is valid for up to 90days. • Return the bid bond guarantee to the contractor and receive a performance bond guarantee, which amounts to 10% of the value of the tender. • Receive and check the maintenance guarantee in terms of the value of 5% 	

	<p>and the time period shall be one year.</p> <ul style="list-style-type: none"> • Return the maintenance guarantee after coordination with the department concerned that there is no objection to the exchange and that the contractor has done the necessary maintenance work required. • Calculate financial fines resulting from delay and prepare relevant financial requests. • Do the necessary documentation for guarantees.
Opening Bids and Awarding	<ul style="list-style-type: none"> • Check BOQs priced by contractors in cooperation with the members of the Tender and Procurement Committee and sign all BOQs which were audited from all members of the committee. • Fill out and sign the M/M template of opening bids, which includes financial and technical analysis and the recommendation to award the bid of the lowest price. • Announce the contractors of the prices of tenders verbally on the same day of opening the bids. • Send the signed M/M of opening bids to the Municipal Director and the Municipal Council for approval/bidding award. • Follow up the Tenders and Procurement Committee for the Municipal Council decision. • Receive an official letter from the Municipal Council on bidding award; send it to MoLG for approval. • Notify the contractor of awarding the bid in written notification.
Contracts (Infrastructure and Supplies)	<ul style="list-style-type: none"> • Participate in contract preparation documents particularly in financial issues in cooperation with Legal Unit and the department involved in it and each one of them shall sign the contract. • Receive the signed contract from the Mayor and the contractor. • Create a file in name of bidding and file the signed contract inside with all relevant documents such as guarantee and BOQ. • Follow up amendments, changing or variation orders.
Projects Invoices (Infrastructure Projects)	<ul style="list-style-type: none"> • Receive and audit a prepared invoice with financial request for payment which includes a table of agreed quantities between the department involved and the contractor with a cover page summarizing the quantities and the prices. • Prepare and send a payment voucher with all required documents to the Head of Financial Department. • Deduct the fees of bid advertisement from the first paid invoice (usually this fee is paid in cash by the contractor). • Follow up the payment for contractors and do the financial closing of each contract.
Supplies Bid Invoices	<ul style="list-style-type: none"> • Audit the invoice of supplies which was checked by the Head of Warehouse Section. • Send the audited invoice to the Head of Financial Department.
Custody Management and Following Up	<ul style="list-style-type: none"> • Register custodies related to water, building, education tax, municipal court and income tax. • Follow up returning back of custodies to citizens who fulfilled the conditions related to them.
Revenue Auditing	<ul style="list-style-type: none"> • Audit the delivery notes from collectors and send them to the Cashier Section. • File audited cashier receipts.
Auction (Vegetable and Fruit Markets, Deposits Investment and Bank Interest, Taxis and Buses)	<ul style="list-style-type: none"> • Receive an official approval letter on auction and a newspaper advertisement with the date and time of the auction. • Participate in opening the auction and fill out the auction templates from the participants. • Prepare a M/M and recommend in high prices. • Send the M/M and filled-out templates to the Municipality Director and the Municipal Council. • Follow up the Tenders and Procurement Committee for the approval by the Municipal Council. • Receive an approval on awarding from the Municipal Council.

	<ul style="list-style-type: none"> • Receive an approval on awarding by MoLG on the awarding by the Municipal Council. • Notify the bidder that it won the auction officially. • Send an official invitation letter to banks for the investment in the deposits (there is no advertisement on it).
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2. Critical Result Areas

- The jobholder shall enter the financial contract value on the financial accounting software (Al-Shamel) with a link to the contract payments, so that the municipality can follow up the payment, close the procurement orders and requests and ensure the payment to correspond to a specific budget item.
- The jobholder shall ensure the necessary managerial sequence, such as planning the date to open bids, following up the decision by the Municipal Council and MoLG for the bidding approval and the in-time response to/from contractors and relevant departments, so that the municipality can achieve a wise management of tendering process.
- The jobholder shall keep effective communications and connections among the Procurement and Tenders Section, the involved departments, the Internal Auditing Unit, the Public Service Center, the Diwan Section and the Municipal Council, so that (1) all the relevant departments/units can be kept updated on the tender program proposed for the fiscal year; (2) the municipality can improve its relationship with contractors and ensure the best cooperation between the Municipal Council and the involved departments.

3. Job Context (Sphere of Action and Influence/Relations)

The jobholder shall deal with all municipality departments and closely cooperate with the Procurement and Tenders Section and the Municipality Director, because tendering is related to all the departments and needs managerial decision on financial aspects. Since the jobholder shall represent the Financial Department in the Tenders and Procurement Committee, he/she shall be diplomatic and tactic for quick solutions and responses and keep positive relationship with all departments including the Procurement and Tenders Section.

4. Number and Level of Immediate Subordinates

No subordinates.

5. Knowledge and Skills Requirement

5.1 General Education	B.A in Accounting/Economics
5.2 Professional /Vocational Qualification	Null
5.3 Relevant Pre-Job Experience	Working experiences in procurement, accounting and/or public relations are preferable.
5.4 Managerial Skills	Ability to organize team working.
5.6 Communication Skills	Very good communication skills.
5.7 Numeric /Computing Skills	Precision in mathematical calculations: Having practical knowledge and skill on Microsoft Office and Al-Shamel.
5.8 Responsibility for Resources	There is no responsibility in any financial resources.
5.9 Human Relations	Tact and diplomacy in dealing with suppliers /contractors and JM departments /units.

6. Environmental and Other Features

6.1 Working Conditions	Office and minor site visitations.
6.2 Hazards	Mental stress possibly to avoid wrong calculation and documentation.
6.3 Committees Membership	Tenders and Procurement Committee

Source: JICA Expert Team

(3) Performance evaluation

The JM has no active performance evaluation system of the employees and the annual periodic increment of the salary and the promotion have been implemented according to the regulations stipulated by the Palestine Authority.

(4) ICT software

The 3 ICT software applications related to human resources management are being used in the JM

namely the ETLAK for leave management, the HR for attendance tracking using fingerprint and the RAWATEB for payroll calculation. There was a software for performance evaluation provided by the MoLG, but it was found useless, neglected and already deactivated.

6.2.2 Salary, Allowance and Incentives

The salary and allowance of the staff are defined in the “Cabinet Decision No. 1 of 2009 Regarding the System of Employees of Local Bodies” and the “Related Regulations of the Local Authority No. 7 for 2009”.

(1) Salary

The initial salary according to categories and grades is shown in Table 6.4, and the initial grade and scale according to qualifications are shown in Table 6.6.

For example, the salary of a new employee who has passed the Tawjhi (an examination to certify the graduation from high schools) will start from the Category 4, Grade 9 and Scale 0, which corresponds to 1,330 NIS/month as shown in Table 6.4. The annual periodic increase rate is basically 1.25% and the employee shall receive his salary from the 2nd year as 1,346.63 NIS/month (the salary corresponding to the Category 4, Grade 9 and Scale 1) as shown in Table 6.5. The promotion shall occur after the minimum stay years at the shortest, namely minimum 5 years for this employee as shown in Table 6.4. If he is promoted, he jumps from the Category 4, Grade 9 and Scale 4 to the Category 4, Grade 8 and Scale 0, where the basic salary shall be 1,410.00 NIS/month as shown in Table 6.5. In addition to this, a 5% premium shall be paid once for his first promotion. Since the highest grade for the employees who belong to this Category 4 is the Grade 6, no promotion shall occur after he reached this Grade 6 and the basic salary will continued to be increased annually by 1.25% until his retirement according to the scale as shown in Table 6.5.

Table 6.5 Categories and Grades of Staff Salary

		Basic Salary (NIS/month)	Minimum Stay Years	Grade	
Fifth Category: service job	Upper Category	3,470	2	A3	
		3,220	2	A4	
	First Category	2,970	6 years	A	
		2,720	6	B	
		2,470	6	C	
	Third Category: clerical and technical job	Second Category:	2,220	5 years	1
			2,090	5	2
		specialized positions	1,960	5	3
			1,830	5	4
			1,700	5	5
1,570			5	6	
Fourth Category: handicrafts job		1,490	5	7	
		1,410	5	8	
		1,330	5	9	
		1,250	5	10	

Source: JICA Expert Team

Table 6.6 Basic Salary Corresponding to Grade and Scale

Grade/Scale	0	1	2	3	4	5	6	7
10	1250.00	1265.63	1281.45	1297.46	1313.68	1330.10	1346.73	1363.56
9	1330.00	1346.63	1363.46	1380.50	1397.76	1415.23	1432.92	1450.83
8	1410.00	1427.63	1445.47	1463.54	1481.83	1500.36	1519.11	1538.10
7	1490.00	1508.63	1527.48	1546.58	1565.91	1585.48	1605.30	1625.37
6	1570.00	1589.63	1609.50	1629.61	1649.98	1670.61	1691.49	1712.64

Grade/Scale	0	1	2	3	4	5	6	7
5	1700.00	1721.25	1742.77	1764.55	1786.61	1808.94	1831.55	1854.45
4	1830.00	1852.88	1876.04	1899.49	1923.23	1947.27	1971.61	1996.26
3	1960.00	1984.50	2009.31	2034.42	2059.85	2085.60	2111.67	2138.07
2	2090.00	2116.13	2142.58	2169.36	2196.48	2223.93	2251.73	2279.88
1	2220.00	2247.75	2275.85	2304.29	2333.10	2362.26	2391.79	2421.69
C	2470.00	2500.88	2532.14	2563.79	2595.83	2628.28	2661.14	2694.40
B	2720.00	2754.00	2788.43	2823.28	2858.57	2894.30	2930.48	2967.11
A	2970.00	3007.13	3044.71	3082.77	3121.31	3160.32	3199.83	3239.83
A4	3220.00	3260.25	3301.00	3342.27	3384.04	3426.34	3469.17	3512.54
A3	3470.00	3513.38	3557.29	3601.76	3646.78	3692.37	3738.52	3785.25

Source: JICA Expert Team

Table 6.7 Initial Grade and Scale According to Certificate

Category	Certificate	Grade	Scale
Upper: A3-A4		To be decided by the salary prior to the selection and nomination through an internal competition.	
First: A-C	Minimum BA in the field of specialization; Head of department		
Second: 5-1	Minimum BA in the field of specialization	5	0
	PhD	3	0
	Master in Engineering And Veterinary medicine/ Pharmacy/ Agronomy 5 years	4	4
	Master Except the above mentioned	5	4
	B.A in Engineering And Veterinary medicine/ Pharmacy/ Agronomy 5 years	4	0
	B.A except the above mentioned/ agriculture 4 years	5	0
Third: 7-2	B.A where the Bachelor is not in the work field	5	0
	Diploma 3 years	6	2
	Diploma 2 years with shamel	6	1
	Diploma 2 years without shamel/ work field	6	0
Forth: 9-5	Diploma which not in the work field	9	0
	Tawjhi/ Technical	9	0
	Driver	9	0
	Less than diploma/ tawjhi	9	0
Fifth: 10-6	Services jobs/ workers/ office boys/ messengers/ guards	10	0

Source: JICA Expert Team

(2) Allowance

There are 8 types of allowance as shown in Table 6.7 namely the social allowance, the fixed mobility allowance, the dearness allowance, the risk allowance, the nature of work allowance, the administrative allowance, the scientific qualification allowance and the overtime allowance.]

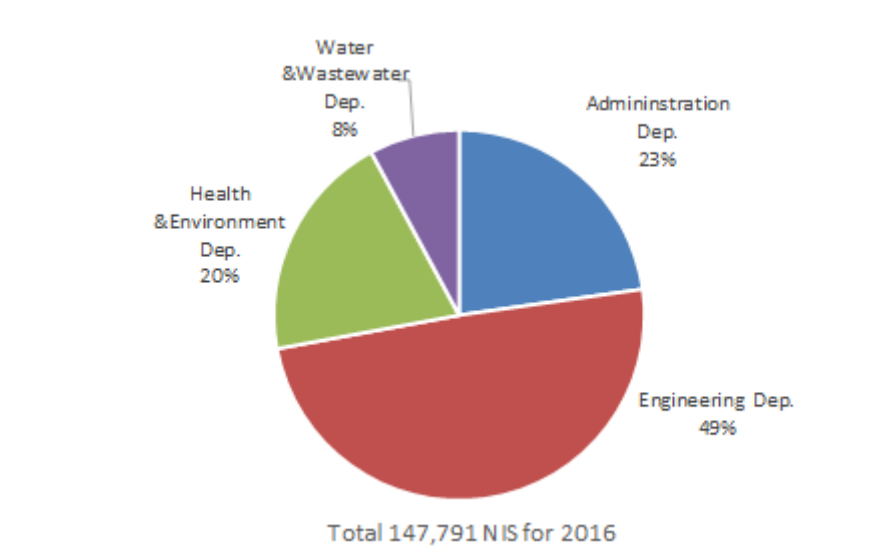
Table 6.8 Allowances

Category	Synopsis	Amount /Percentage
Social Allowance	Allowance for unemployed spouse and children	60NIS for unemployed spouse; 20NIS for each child till the age of 18
Fixed Mobility Allowance	Allowance for going back and forth to the work place	Ranges from 70.83NIS to 418NIS according to the location of living place
Dearness Allowance	Allowance for inflation	16.89% of basic salary as of 2017
Risk Allowance	Allowance for the work which is directly exposed to risk or infection	Ranges from 10% (for guard, driver of heavy duty machines and mechanic /maintenance technician) to 25% (electrical worker) of basic salary; cannot be combined with Administrative

Category	Synopsis	Amount /Percentage
		Allowance.
Nature of Work Allowance	Allowance for functional degree and career	Ranges from 10% (for 5 th category) to 150% (for legal advisor) of basic salary
Administrative Allowance	Allowance to supervisory employees	Ranges from 200NIS (for head of division) to 550NIS (for A3/A4 grade)
Scientific Qualification Allowance	Allowance to high scientific qualification	Ranges from 200NIS (for master except in engineering) to 500NIS (for PhD)
Overtime Allowance	Allowance to overtime work upon the permission of responsible manager and the Mayor	Salary equivalent to 1.5 hour for each additional work hour; overtime should not be over 60 hours/month

Source: JICA Expert Team

Regarding the overtime allowance, the paid amount and its breakdown into departments is shown in Figure 6.2. The total amount is around 150 thousand NIS for the FY 2016, of which 50 % is for the Engineering Department and the share of the Water &Wastewater Department is 8 %. According to the interviews with each concerned department and with the Financial Department, most of the overtime allowance is paid to the drivers dispatched from the Movement and Mechanics Department to carry the employees and equipment of the concerned department. Though the number of employees is said to be insufficient in the Movement and Mechanics Department, it can be suggested that more strict review and justification shall be necessary for the directors of concerned departments to give a permission to the overtime work.



Source: JICA Expert Team

Figure 6.6 Overtime Allowance Paid in 2016

(3) Incentives

The JM has no incentive scheme for its employees, except the regular bonus granted 1 time in every 2 years based on a by-law on civil employees, but this bonus is irrelevant to a performance evaluation.

6.2.3 Recruitment, Transfer and Retirement

(1) Recruitment and transfer

The Personnel Affairs Committee which is headed by the chairman of the Municipal Council and consisted of the Municipality Director, the Director of Administration Department and other concerned directors is engaged in the recruitment, transfer and promotion (from a grade to a higher degree) of the employees. The recruitment shall be decided by the Municipality Council based on the recommendation of this committee, and this decision is subject to the approval of the MoLG. Any

recruitment and promotion are made only for a vacant post. In order to fill the vacancy in the First Category and Upper Category (equal to and above the managerial class of department director), an internal competition followed by an internal announcement shall be arranged.

As of December 2017, the 25 posts of directors of departments and heads of units/sections/divisions are acted by the employees temporarily nominated by the Mayor (refer to Figure 6.1), without any official nomination by the Personal Affairs Committee and the Municipal Director. In response to the suggestion by the Expert Team, the JM officially announced the competition for some of the vacant job titles in November 2017 and started the internal selection procedure.

(2) Retirement

The employees who worked for the JM more than 15 years⁵ have the right to request an early retirement and to claim the retirement salary, which is at maximum 75% of the total salary. The age of compulsory retirement is 60.

⁵ In the current “Law of Public Retirement 2005” article 36.1, another condition was added that the employee should reach the age of 55 for claiming the early retirement salary.

CHAPTER 7. CAPACITY ASSESSMENT

7.1 Organizational Core Capacity

(1) Assessment of Organizational Core Capacity

1) Background of Core Capacity Assessment

It is acknowledged that the elements of capacity can be categorized into 3 dimensions such as core capacity, technical capacity and enabling environment⁶. The conceptual image is shown in the Figure 7.1.

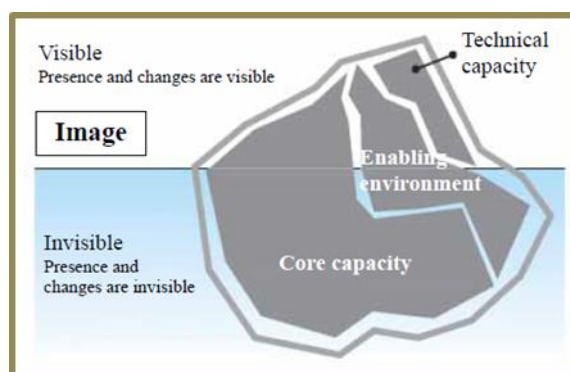


Figure 7.1 Conceptual Image of Capacity Elements

Technical capacity is particular technical capabilities in the form of techniques, knowledge and skills. Core capacity is underlying capabilities to handle and resolve the various issues by using technical capability. In other words, core capacity is management capability including leadership, problem-solving, the practical capability for executing operations, human resource development, empowering environment, culture in general.

Core capacity should be considered together with technical capacity, since technical capacity is solely not able to solve the issues without appropriate core capacity. Hence, the project carried out core capacity assessment at the beginning of the project. We focus on the four dimensions of organizational core capacity such as leadership, adoptive, management and operation which are mentioned in “Items of Assessment”.

2) Target of Assessment

The interview for organizational core capacity assessment was carried out in November 2017 as one of the baseline survey component of the Project. Core capacity assessment targeted on 10 heads of the department/section/unit of Jenin Municipality, which are likely related to water supply service, as listed in Table 7.1.

In the Water and Wastewater Department (WWD), the assessment focuses on key sections which play major roles in the department, such as the head of WWD, Water Section and Customer Service Section.

Table 7.1 Department/Section/Unit for Core Capacity Assessment

Division	Section
Water and Sewage Department (WWD)	1. Water and Sewage Dept.
	2. Water Sec.
	3. Customer Service Sec.
Other Department/ Section/ Unit	4. Public Relation & Media Dept.
	5. Financial Dept.
	6. Administration Dept.
	7. Engineering Dept.
	8. Procurement Dept.
	9. IT & Programming Dept.
	10. Collection unit

⁶ JICA (2008) Capacity Assessment Handbook – Project Management for Realizing Capacity Development –

3) Items of Assessment

Organizational core capacity is a wide concept and may include common management related issues regardless of the each duty of department, section and unit.

In this assessment, we apply four core capacity dimensions which are consisted of leadership capacity, adoptive capacity, management capacity and operational capacity. It is considered that these four capacity dimensions are to maximize the effectiveness and efficiency of an organization.

Table 7.2 Four Core Capacity Model

Capacity	Description
Leadership	the ability of an organization to monitor, assess and respond to, and create internal and external changes
Adoptive	the ability of all organizational leaders to create and sustain the vision, inspire, model, prioritize, make decisions, provide direction, and innovate, all in an effort to achieve the organizational mission.
Management	the ability of an organization to ensure the effective and efficient use of organizational resources.
Operational	the ability of an organization to implement key organizational and programmatic functions

Reference: Patrick J. Rogers, Institute for Human Services, Inc. "Organizational Capacity Building"

All targeted department, section and unit are assessed with questionnaire and the unified criteria as shown in Table 7.3.

Table 7.3 Items of Assessment of Organizational Core Capacity

Category	Items	Criteria
A. Leadership	1. Vision and mission of department/or div. is set up and shared within staff members	1. No written vision and mission
		2. Existing but not clear and little shared
		3. Existing, but staff's understanding is limited and rarely used to direct actions/ to set priorities
		4. Existing with enough understanding by staff members, and consistently used to direct actions/ to set priorities
		5. Can be a model for benchmarking
	2. Strategy or an action plan is set up and shared within staff members	1. No written strategy or an action plan
		2. Existing but no clear goals without time frames
		3. Somewhat clear goals, but not fully to be acted
		4. Clear goals and fully to be acted and be linked day-to-day works
		5. Can be a model for benchmarking
	3. Trust and smooth relationship with internal persons are built with sharing experiences	1. Difficult to build trust and smooth relationship
		2. Partially difficult to build trust and smooth relationship with others
		3. Actively and easily builds trust and smooth relationship with others by sharing relevant experiences
		4. Constantly establishing successful, win-win relationships with others by sufficiently sharing experiences
		5. Can be a model for benchmarking
	4. Top manager/or head of division have sufficient ability to motivate and mobilize staff members	1. Mostly difficult to motivate and mobilize staff members
2. Basically difficult to motivate and mobilize staff		

Category	Items	Criteria
		<p>members, but possible for a small members</p> <p>3. Possible to motivate and mobilize some members in some extent</p> <p>4. Possible to motivate and mobilize a broad range of members</p> <p>5. Can be a model for benchmarking</p>
B. Adaptive	5. Performance is measured and progress of activities are monitored	<p>1. Not measured and monitored</p> <p>2. Performance is partially measured and progress is partially tracked</p> <p>3. Performance is partially measured with Performance Indicators (PIs) and progress is partially tracked on a regular basis</p> <p>4. Performance and progress is sufficiently and systematically monitored</p> <p>5. Can be a model for benchmarking</p>
	6. Performance data is used for the improvement of activities	<p>1. Not used for adjustment/improvement of program and organization</p> <p>2. Rarely used for adjustment/improvement of program and organization</p> <p>3. Occasionally used for adjustment/improvement of program and organization</p> <p>4. Systematically used for adjustment/improvement of program and organization</p> <p>5. Can be a model for benchmarking</p>
	7. Assessment of gap between action plan and actual performance is assessed	<p>1. No assessment of gap between action plan and actual performance</p> <p>2. Limited assessment gap between action plan and actual performance</p> <p>3. Occasionally assessment gap between action plan and actual performance</p> <p>4. Continual assessment gap between action plan and actual performance</p> <p>5. Can be a model for benchmarking</p>
	8. Performance data and assessment results are used for the improvement of activities	<p>1. Not used for adjustment/improvement of program and organization</p> <p>2. Rarely used for adjustment/improvement of program and organization</p> <p>3. Occasionally used for adjustment/improvement of program and organization</p> <p>4. Systematically used for adjustment/improvement of program and organization</p> <p>5. Can be a model for benchmarking</p>
	9. New improvement activity is consistently considered and compiled in action/activity plan	<p>1. Limited ability to create new improvement activity</p> <p>2. Some ability to create improvement activity; Action rarely taken</p> <p>3. Ability to create improvement activity; Action occasionally taken</p> <p>4. Full ability to create improvement activity; Action consistently taken</p> <p>5. Can be a model for benchmarking</p>
C. Management	10. Budget is requested based on planning.	<p>1. Not existing</p> <p>2. Existing but not working</p> <p>3. Working to some extent</p> <p>4. Working well</p> <p>5. Can be a model for benchmarking</p>

Category	Items	Criteria
	11. Execution of budget is periodically monitored.	1. Not existing
		2. Existing but not working
		3. Working to some extent
		4. Working well
		5. Can be a model for benchmarking
	12. The number and quality of staff is adequate for assigned duties.	1. Necessary for fundamental improvement, strengthening
		2. Necessary for major improvement, strengthening
		3. Necessary for partial improvement
		4. Not necessary for modification
		5. Can be a model for benchmarking
	13. Duties and responsibilities of each staff is clear and staff is working according to them.	1. Necessary for fundamental improvement, strengthening
		2. Necessary for major improvement, strengthening
		3. Necessary for partial improvement
		4. Not necessary for modification
		5. Can be a model for benchmarking
	14. Effective organizational process is established. Organizational process --- planning, monitoring, review, improvement, information dissemination	1. Not established
2. Some elements of organizational process is exist, but not established as a process		
3. Established, but the process is not sufficiently working		
4. Established, and the process is sufficiently working		
5. Can be a model for benchmarking		
15. Decisions are made clearly with good dissemination, and is linked with strategic planning	1. Decisions made unclearly and informally; Not sufficiently disseminated to staff; Not linked with strategic planning	
	2. Decisions made somehow clearly and formally but in some issues; Disseminated to some staffs but not all; Weak linkage with strategic planning	
	3. Decisions made clearly and formally in most issues; Disseminated to most of staffs but not all; Moderate linkage with strategic planning	
	4. Decisions made clearly and formally in all issues; Disseminated to all staffs; Well-linkage with strategic planning	
	5. Can be a model for benchmarking	
16. Necessary human resources and its qualification is planned	1. Not considered; No job description is exist.	
	2. In some areas, considered and planned; Job description is old and not sufficiently match to the existing situation	
	3. Planned and updated according to changing needs; Job description is exist in some parts and match to the existing situation.	
	4. Planned and updated according to changing needs; All job description is exist and updated regularly	
	5. Can be a model for benchmarking	
D. Operational	17. Annual action plan is shared among members of the section/office.	1. Not existing
		2. Existing but not working
3. Working to some extent		
4. Working well		
5. Can be a model for benchmarking		
	18. The activities are compiled as a report periodically.	1. Necessary for fundamental improvement, strengthening
		2. Necessary for major improvement, strengthening

Category	Items	Criteria
		3. Necessary for partial improvement 4. Not necessary for modification 5. Can be a model for benchmarking
	19. There is regular occasions to share information among the members.	1. Not existing 2. Existing but not working 3. Working to some extent 4. Working well 5. Can be a model for benchmarking
	20. Daily or weekly operational works are carried out with prioritization and exact timeframe in the line of action plan and strategy	1. No prioritization and no time schedule 2. Limited consideration of prioritization and limered time schedule 3. Prioritization of operational works and time schedule is considered, but actual operation is different from the planning some extent 4. Prioritization of operational works and time schedule is considered, and actual operation is mostly done according to the planning 5. Can be a model for benchmarking

(5) Results of Core Capacity Assessment

The results of the assessment are shown in Table 7.4 and Figure 7.2.

The assessment sheets were given to the respondents of the target department/section/unit by JICA Expert and asked them to answer during interviews. The each question in the assessment sheet has 5 answer choices. 5 answer choices were prepared in accordance with the status of progress/or development in each topic. The numbers of answer choices is also equal to the rating of the status of progress/ or development. For instance, the rating was given along a scale ranging from, “Can be a model for benchmarking” with the highest “5” to “Not exist” with the lowest “1”. The respondents were asked to select one answer among the 5 choices which is reflecting current status more accurately.

In some items, the cognitive discrepancy can be seen between respondents’ scores and Expert’s observation. For instance, there was a tendency that the respondents put relatively higher performance rather than the actual observation results of the Expert. In that case, the Expert carefully adopted the score.

Table 7.4 Results of Assessment of Organizational Core Capacity

Category	No.	Topic	Results			
			Water dept. Average	Other dept. Average	All Average	By category
A. Leadership	Q1	Vision & Mission	1.7	1.7	1.7	2.6
	Q2	Action Plan	1.7	1.6	1.6	
	Q3	Relationship	3.0	3.9	3.6	
	Q4	Motivation	3.3	3.4	3.4	
B. Adoptive	Q5	Performance measurement	1.7	2.0	1.9	1.6
	Q6	Data usage	1.0	1.7	1.5	
	Q7	Gap assessment	1.5	1.4	1.5	
	Q8	Feedback to improvement	1.0	1.7	1.5	
	Q9	Improvement plan	2.0	1.4	1.6	
C. Management	Q10	Budgeting	2.7	2.3	2.4	2.6
	Q11	Monitoring of budget	3.0	1.7	2.1	
	Q12	Quality & quantity of staff	1.3	1.4	1.4	
	Q13	Duty and responsibility	3.3	3.6	3.5	

Category	No.	Topic	Results			
	Q14	Organizational process	1.7	1.9	1.8	
	Q15	Decision-making	3.7	4.0	3.9	
	Q16	Human resource planning	3.0	3.0	3.0	
D. Operational	Q17	Sharing plan	1.7	1.4	1.5	2.5
	Q18	Activity report	2.5	2.4	2.5	
	Q19	Sharing information	2.8	3.0	3.0	
	Q20	Operational planning	3.5	3.0	3.2	
Average			2.3	2.3	2.3	

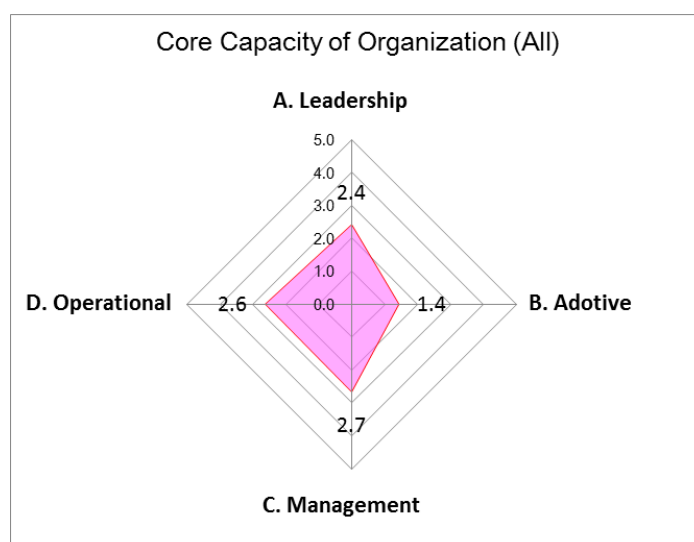


Figure 7.2 Average Score of Organizational Core Capacity Assessment of JM



Figure 7.3 Average Score of Organizational Core Capacity Assessment of JM by Items

(7) Overall Assessment of Organizational Core Capacity

Some features of the organizational core capacity of JM are acknowledged through the assessment and interview despite of the limited and short assessment. The some main features by preliminary observation are described as follows.

[Overall Assessment]

- Level of core capacity of JM is relatively low in the overall dimensions and it remains at 2.3 scores as the average, which is below the moderate level of 3.0 scores.
- The capacity of adoptive dimension was especially weak, which includes performance measurement, performance assessment, improvement of activity and its linkage and consistency with action/ activity plan, etc.
- The weakness of core capacity in adoptive dimension is attributed to weakness of planning function and to a lack of plan including strategy, activity plan and management plan.
- In the connection with the above issue, the function of monitoring, assessment and feedback for improvement of the activities is also inevitably weak.
- Hence the management cycle of Plan-Do-Check-Action (PDCA) is likely not formulated except for the budget planning.
- Financial retrenchment of JM has been a critical issue and the financial situation has been getting even worse. It has largely influenced on the limited exercise of planning function, recruit and staffing, and the deterioration of staff's awareness, motivation.
- The number and the quality of staff members are not adequate in the most of departments.
- Human resource development plan does not exist, thus comprehensive and systematic training scheme is not yet developed.
- There is no outstanding discrepancy in the results of core capacity assessment between WWD and other department/division/unit.

(8) Approaches for Improvement

1) Enhancement of Planning and Reporting Function

JM and the respective department need to make a short- and mid-term plan as a first step to strengthening its core capacity. JM has been under the situation of financial retrenchment, so that the first priority of JM could be to prepare the strategic plan/ management plan on how to pave the way for JM to break away from the tight financial conditions and how to sustain the municipal service and its operation. For the respective department, especially the department associated with public services, they need to prepare an activity plan including the targets.

Quality Unit established in 2010 is an authorized unit to request an annual plan and reports to all departments of JM. The main duties of the Unit are 1) to carry out the internal monitoring on municipal technical works (engineering, health and environment, water, electricity, transportation and mechanic, and 2) to report the results of quality monitoring, and 3) to submit suggestions for development and proposals for increase of technical performance level. The investigation of the service quality of JM is one of main mission of the Unit, so that it can be a key section to play the vital role.

The Unit used to request an annual plan and reports during 2012-2016. The brief summary of the plan/ reports were submitted to Mayor and the director of JM. It was taught, however, that this activity has been stopped due to a lack of staff members as one of main reasons. Hence, its importance should be acknowledged and this planning cycle needs to be reformulated.

For this purpose, the clear authority should be given to the Unit and the staff members need to be increased from only one person possibly by internal transferring of staff members.

2) **Enhancement of Performance Measurement and Monitoring of Public Service**

It should be enhanced that the performance of public services including water service is quantitatively measured and monitored. And the results shall be shared among the departments and shall be feedback to the modification of existing plan or development of next short- and mid-term plan. By doing so, an ideal PDCA cycle will be formulated and continuous improvement will be translated into practice in JM and the respective departments.

With regard to monitoring the status of the municipal revenue collection such as water tariff, waste charge and building license fee, it seems to be regularly checked and monitored by Collection Unit through the Alshamel system. The results and the lessons learnt of collection needs to be more reflected on strengthening increase of revenue collection with a strategic planning.

3) **Initiative by the Municipal Council with Clear Policy and Its Enforcement**

In connection with the above (1) and (2), the role of Municipal Council is significant, especially in the formulation of PDCA cycle for the operation of public services by JM. It was taught that the municipal strategic plan is under preparation, so that it is expected for the Municipal Council to enforce the measures of the plan.

In addition, the strong leadership should be demonstrated in the area of municipal revenue collection. As established Collection Unit as a kind of taskforce unit in 2014, increase of collection ratio and its amount has been one of prioritized issues for JM. The Collection Unit, however, has faced various challenges such as weak policy on collection of outstanding, political interference in clearances and collection procedures, no protection from troubles between employees and customer, weak enforcement of detention order, no policy on reward and punishment etc. Thus, the Municipal Council is also expected to take leadership to resolve the issues.

4) **Optimization of Staffing and Development of Job Description**

Under the circumstance of financial retrenchment, new recruitment of permanent staffs has basically been passed alternated by contract-based employment. Also reduction of employees is a critical issue requested by the Palestine Authority. Hence, a realistic solution may be the internal optimization of human resources within JM by rearrangement of the existing employees, reallocation and transferring. The standard job description as a sample of the Ministry of Local Government should be revised in accordance with the realistic operation and authorized by the municipal council. Clearly defined and written job description is critical elements of the consistency of organization and its service. Employees should know their official duty and responsibility, which are not a list of ordinary routine works, but are required for the position and the section where they belong.

5) **Formulation of Systematic Human Resource Development**

A strategy and plan for human resource development in mid- and long-term should be considered and developed. HRD department sent some limited employee in the manager level to seminars in case that they receive invitation letters. The employee's participation in external training courses is not organized due to the limitation of budget. It is important, however, to secure some budget and allocate to develop and enrich employee's knowledge and skills, particularly for young employees. If the budget allocation is really severe, internal training such as on-the-job training should be more enhanced within JM or department. The aged employees share a large portion of personnel composition of JM, so that to hand down the knowledge and skills to the younger generation is an urgent matter.

7.2 Technical Capacity

7.2.1 Summary of Issues on Technical Capacity

At Technician's level

- They have sufficient educational level (14 of 16 having secondary or higher level) for the nature of works they are supposed to do.
- Only a few (3 out of 16) have formal training related to their jobs. Opportunities for formal

training seem to be limited.

- The result of tests and interview indicate that despite the limited formal training, they seem to be aware of some basic technical concepts related to their jobs. All of them correctly answered the questions related to effect of pressure on leakage, correct use of metallic pipe locator and listening stick, and the meaning of meter under registration.
- Their work output efficiency could be significantly improved by making adequate provision of essential equipment, pipe fittings, spare parts, and transportation to sites because they repeatedly pointed those as constraints to their work.
- Their main tasks are to repair pipe burst, operate valves, and make new connections. If the supply system could be converted to continuous in future which will eliminate the need to operate valves daily and also reduce the number of pipe bursts, their work load will decrease. And they can be used for other important works such as proactive leak detection and network maintenance.
- Though they have some basic technical concepts they need trainings on various aspects of water distribution management and NRW reduction. For example, none of them could read a bulk meter correctly which is essential for accurate assessment of system input.
- Their motivation level seems to be reasonably good. Except one, all others are willing to learn new things.
- Majority of them say they can spare about 1.5 hrs daily for trainings.

At Engineer's level

- The engineers in WWD are qualified and have sound academic background.
- They have the knowledge acquired from university courses but practical knowledge related to water distribution management and NRW is limited.
- Their knowledge is particularly weak in the subject of DMA and conceptual analysis of NRW.
- Their time is mostly spent at office. They have limited time for visiting site.
- They hardly have any opportunity for applying their knowledge of civil engineering learned at the university.
- One of the engineers (the head of GIS section) has a good experience of GIS. She has a heavy work load. Her workload has increased significantly because of this project.
- They have only a basic knowledge of hydraulic modelling software. Capacity to use hydraulic modelling software (such as EPANET, WaterCAD, or WaterGems) is desirable at this level for efficient distribution management.

At Organization (WWD) level

- WWD has GIS and hydraulic modelling software programs. It also has reasonably accurate GIS maps of both water and wastewater network.
- The department has a qualified professional for surveying. It has recently acquired a high sensitivity GPS machine and has started correcting pipe network alignment. Once completed this will be a very useful asset.
- Within WWD there is a 'Water' section and under this section there is a 'Network maintenance and extension' division. All the 16 technicians are currently clubbed in this division. Establishing specialized divisions for NRW reduction within the water section will be required for better management of NRW reduction work.
- Lack of adequate and proper equipment and tools is a major concern which is limiting the WWD's technical performance. Among the most important are:
 - Lack of a working water meter test bench,
 - Lack of an excavator in the department. The WWD needs to depend on the excavator from Engineering department of municipality which sometimes causes delays in pipe burst repair.
- Despite the lack of excavator in the department, the department has managed to repair leaks quickly (less than 1.5 days for distribution and less than 2 days for house connections).
- There is no system of pressure and flow monitoring in the distribution system which is

essential for proper distribution management and equitable supply. The WWD lacks required plans (zoning system) and equipment (pressure gauge, flow meter).

- The department has only a brief and paper-based reporting system of pipe network maintenance / leak repair works. This needs to be improved with more details which will be helpful for future planning of pipe replacement program.
- There is no planned replacement program of pipe network.
- WWD calculates some Performance Indicators (total – 37 out of which 11 are technical). Since all water sources and customer connections are metered (though the accuracy and working status of these meters are not always perfect) calculating PIs related to NRW as a whole is possible. But they do not have any authentic basis to divide the NRW into real and apparent loss components.
- Linkage of customer database to customer locations on GIS map is very helpful for NRW reduction. This has not been achieved yet in Jenin. Alshamel computer program is used for meter reading and billing system. How to make linkage of customer database in Alshamel program to GIS needs to be studied and established.

7.2.2 Background

Technical capacity assessment was done at three levels; at technician's level, at engineer's level, and at organizational level. At technicians' level the assessment was done by two methods; by test questions and by one-to-one interview. At engineers' level, two regular engineers of the municipality / WWD and one intern were given a set of questions and their answers were evaluated and analyzed. At organizational level, a self-evaluation matrix of NRW was completed by the head of WWD who is also the manager of the project. The questions were of different levels for engineers and technicians. Technicians' questions were mostly related to practical aspects whereas engineers' questions were the mix of concept and practical aspects.

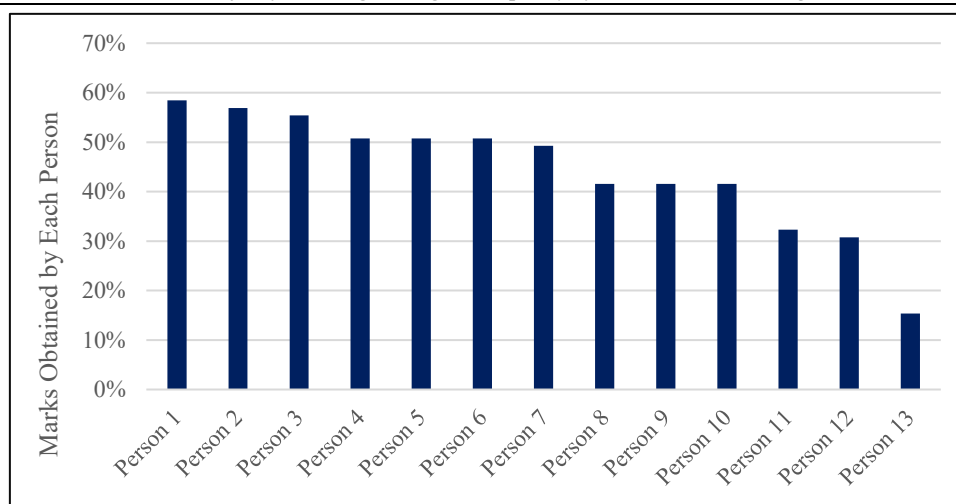
7.2.3 Technical Capacity Assessment of Technicians

Technicians are the backbone of daily operation and maintenance of water network. They operate the valves on daily basis and fix pipe burst and leaks. They are also the key members of NRW reduction team in the project. Assessing their technical capacity is important to prepare capacity development strategy. The assessment by questionnaire focusses mainly on their technical capacity on NRW and related subjects while the assessment by one-to-one interview gives idea about other aspects like their experience, motivation level, their perception of problems and challenges, and suggestions for improvement of water system in Jenin.

(1) Technical Capacity Assessment of Technicians by Questionnaire

The test questions were first prepared in English and then translated into Arabic. The English version of the questions is given in Attachment 7. There were a total of 65 questions divided into three subject categories; A, B, and C. The category A contained questions related to water leakage, water pressure, and NRW in general. Category B included questions related to leak detection, repair tools/equipment, and their use. And category C included the questions related to water meters and pumps.

The questions were objective type and a total of 13 technicians took the test. Performance of each person is shown in Figure 7.4.

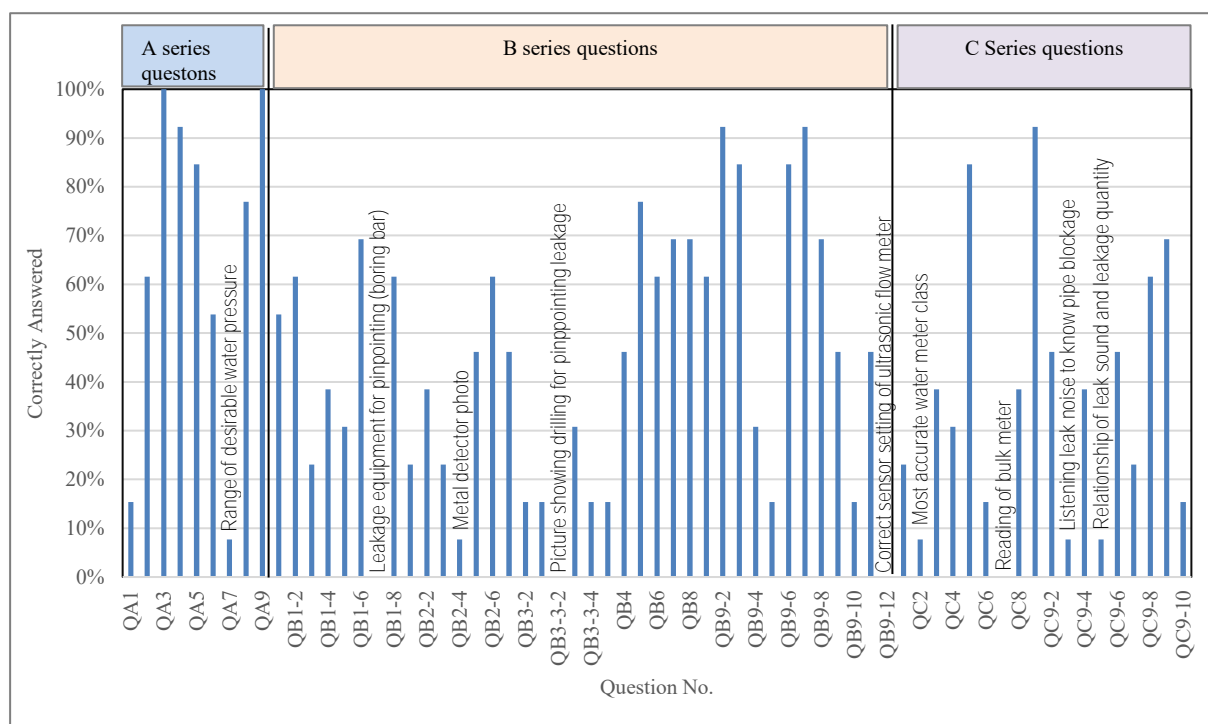


Source: JICA Expert Team

Figure 7.4 Marks Obtained by Each Person

Analysis of the result showed that 6 of the 13 technicians scored in between 50% to 60%, 4 between 40% to 50% and the remaining 3 scored less than 40%. This result indicates that 6 of the 13 technicians have a moderate level of knowledge of NRW and related subjects, six of them have some basic knowledge, and the remaining one has almost no knowledge of the subject.

The test result was also analyzed by subject group and question. The result is shown in Figure 7.5. Only 2 questions (QA3 and QA9) were answered correctly by all. Four questions (QB1-7, QB3-3-2, QB9-12, and QC-7) were not answered correctly by anybody. Five questions were answered correctly by only 1 person and 9 questions by only 2 persons.



Source: JICA Expert Team

Figure 7.5 Correctly Answered Percentage for Each Question

The four questions which nobody could answer are:

QB1-7 This question asks which equipment is used to confirm the location of leakage by pinpointing.

Its correct answer is Boring bar, but nobody could correctly answer it.

QB3-3-2 There is a photo showing drilling to pinpoint leakage, but none of them could recognize it.

QB9-12 The question was to identify the statement ‘When setting up ultrasonic flowmeters, it is good to place the sensors either on top or bottom of the pipeline’ as correct or incorrect. Everybody got wrong answer.

QC7 In this question, a photo of a bulk meter dial has been shown and they are asked to take the reading in m³. There is a clear indication on the meter dial that the reading has to be multiplied by 10 to get the reading in m³. But nobody could understand that.

These results will be taken into consideration while designing technology transfer programs to technicians in future.

(2) Technical Capacity Assessment of Technicians by Interview

Sixteen technicians (13 as above + 3 additional) were individually interviewed regarding various technical and non-technical issues. For clarity and uniformity, the questions were prearranged and translated into Arabic. The results are summarized in the following section. The questions are given in Attachment 8.

Q1. Position and working experience

The responses are as below.

Sub-questions	1-5 yrs	5-10 yrs	10-15 yrs	15-20 yrs	20-25 yrs	25-30 yrs	Total
1.How long you are working in this Department?	5	0	6	4	0	1	16
2-How long you are working in this post?	5	0	6	4	0	1	16
3.Had you worked in any other position before this post?	Yes	No					
	2	14					16
4.If yes, for how many years	1-5 yrs	5-10 yrs	10-15 yrs	15-20 yrs	20-25 yrs	25-30 yrs	
	1			1			2
5. Are you a temporary or permanent employee	Temporary	Permanent					
	4	12					16
6.Your academic qualification:	No education	Primary school	Secondary school	Diploma	University		
	0	3	12	1			16

The results show that 11 of the 16 technicians have experience of 10 years or more, 12 of the 16 are permanent staff and 13 technicians have secondary or higher education.

Q2. Main tasks

They were asked what their main tasks were. The result arranged on the descending order is shown below.

Main Tasks	Nos ⁷
1-Network repairing activities	11
2-Following water distribution schedule/open-close valves	9
3-New pipes connections / installation works	7
4-Staff direction and monitoring / following maintenance progress	2
5-Leak detection	2
6-Checking ahead for new connections	2
7-Procurement of fittings and equipment	1
8-Pumps installation / maintenance	1
9-Reinstatement works	1
10-Communications / transfer correspondences	1
11-Office works	1
12-Pipe welder	1

The result shows that 11 of the technicians are involved in network maintenance work. Following this, 9 are involved in daily valve operation works for rationing water supply, and 7 in new pipes connections / installation works.

Q3 was about their behavior in emergency situation. They were asked “What's the additional issues you needed to do in the emergency conditions”? Their responses were as follows.

General action	Nos	Technical action	Nos
1-Inform WWD manager	9	1-Try to stop the water by closing the valves	8
2-Request urgent assistance	5	2-Try to repair as much as possible	7
3-Give priority to the emergency condition	1		
4-Work in late time	2		
5-Inform the emergency afternoon shift	1		

The purpose of this question was to know if they were essential in case of emergencies and if they could be involved in additional tasks of the project. The result is not clear in this sense.

Q4 & 5. Availability of deputy during absence

Availability of Deputy during absence	Nos.	Comment
1-No official deputy	16	All of them replied that any person from the department can follow the works
2-There is official deputy	0	

The above result shows that there was no system of appointing official deputy in the absence of any one of them.

Q6. Type of challenges during daily work

Subjects	Challenges	Nos
0- No challenges	1-No challenges	3
1-Machinery & vehicles	2-Problem in transportation to site	6

⁷ They were allowed have multiple answers, thus the total number is more than the total number of staff interviewed

Subjects	Challenges	Nos
	3-Lack of machinery	7
2-Stock management	4-Lack of equipment	10
	5-Lack of repair fittings	9
3-Administrative issues	6-Lack of manpower	2
	7-Weak coordination with other departments (i.e to provide machinery)	2
	8-Changing the job duties	1
4-Technical issues	9-Very old network	1
	10-Problem in valves (buried, very old, not distributed properly)	1
	11-Difficulty in stopping the leakage due to high pressure	1
	12-Difficulty to find the leakage location	1
	13-Irrigular water distribution schedule	1
	14-Diffirent sources supply one area	1
5-Safety issues	15-Lack of safety clothes	2
	16-Lack of safety at site/cause problem with drivers	1
6-Public issues	17-Residents are not cooperative	2

The above result shows that lack of equipment was the biggest problem followed by lack of repair fittings, lack of machinery, and lack of transportation to site in that order.

Q7. How do they try to solve the challenges?

Challenges	Approach they use to solve	Nos
1-No challenges	Nothing to do	4
2-Problem in transportation to site	Go to the site by walking	3
3-Lack of machinery	Take more spare parts to avoid lack of machinery	1
4-Lack of equipment	Do manual excavation	1
5-Lack of repair fittings	Use the personal equipment	1
	Inform WD about lack of fittings	1
6-Lack in manpower	Work for additional hours	1
7-Weak coordination with other departments (i.e., to provide machinery)	Proceed in working and try to solve as much as possible	3
8-Changing the job duties		
9-Very old network	Change the fittings from others (use recycled fittings)	5
10-Problem in valves (buried, very old, not distributed properly)	Install additional valves to control the problems	1
11-Difficulty in stopping the leakage due to high pressure		
12-Difficulty to find the leakage location		
13-Irrigular water distribution schedule		
14-Diffirent sources supply one area		
15-Lack of safety clothes		
16-Lack of safety at site/cause problem with drivers		

17-Residents are not cooperative	Try to keep calm as much as possible	3
----------------------------------	--------------------------------------	---

The above result shows that they try to find solutions to their best but some of the solutions like using recycled fittings are not good to reduce NRW.

Q8. Percentage of problems they cannot solve on their own

Nos.	Percentage of problems they cannot solve on their own
5	0-5%
5	5-10%
3	15-20%
2	30-35%
1	35-40%

Q9. Reasons for not being able to solve the problem on their own

Reasons for not being able to solve the problems	Nos
1-Main line with high pressure	3
2-No proper machinery	5
3-No assistant due to insufficient staff	5
4-Lack of fittings	4
5-Problems in valves (old, buried, etc)	2
6-Lack of equipment	2
7-Residents' dissatisfaction	1
8-Technician is not authorized to decide	2
9-Not enough experience	3
10-Narrow roads / need coordination with police	2

The majority of reasons for not being able to solve the problems on their own seem to be related to constraint of resources such as lack of proper machinery, fittings, and staff. Lack of decision making power seems to be not high, only 2 of 16 pointed this.

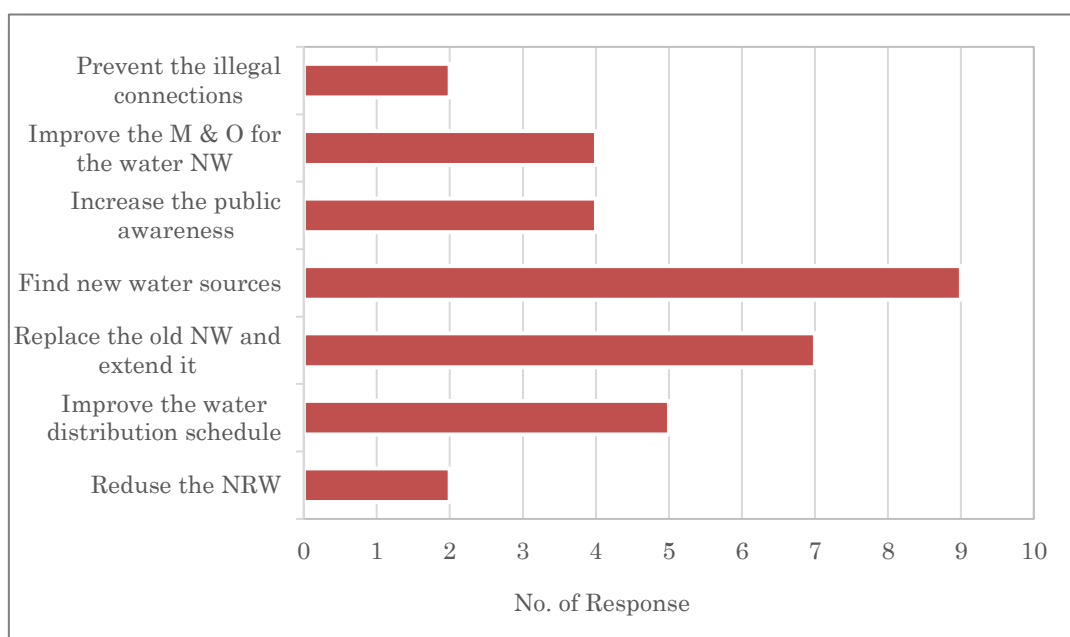
Q10. To the question, "Do you want to improve the WD?", all of them replied 'Yes'. They pointed out the following issues to be improved.

Issues need to be improved	Nos.
1-Provide enough & proper equipment	9
2-Provide proper machinery	5
3-Provide enough fittings	4
4-Increase staff	5
5-Improve the technician experience	3
6-Replace the old NW	1
7-Install prepaid meters	1
8-Create motivations	1
9-Provide safety clothes	1
10-Make the job contract permanent	1
11-Find new water sources	2

12-Improve the staff organization	2
13-Maintanance for valves and champers	1

Their suggestions to improve WD indicated again the lack equipment and machinery. Other important suggestions were to increase the number of staff and improve the technicians' experience (skill).

Q11. To the question "Do you want to improve the water situation in Jenin?" all of them replied 'Yes'. They pointed out the following issues to be improved.



The above result shows that most of them think new water sources are the solution to the water problem in Jenin which is only partially correct. Only two of them think reducing NRW is important.

Q12. A set of 21 issues were given to them and they were asked to select 5 most important issues from these. The result is as shown below.

Main challenges for the water sector in the city	Nos
Many water leaks	13
Insufficient materials and equipment	9
Insufficient water source	8
Illegal connection	7
Customers' dissatisfaction for water supply	7
Water shortage	7
Old pump station	6
Inadequate water supply network	4
Insufficient staff	4
Low tariff collection rate	3
Weak management	3
No motivation to work	2
Low salary	2
Bad water quality	2

Meter malfunction or inaccuracy	1
High operation and maintenance cost	1
No operation and maintenance plan	1
Low water tariff	0
High cost of bulk water purchase	0
Less skill and technology of staff	0
Low water revenue	0

The highest numbers (13) think that high number of leaks is the most critical challenge. For year 2017 there were 445 leak repairs in Jenin. Given the total length of pipe network in Jenin is 163 km, the number of leaks per km of pipe length is 2.73 leaks.

Q13. If they have taken any training during the job.

Training during the job	Nos	Period	Description
Yes	1	15 days	Leak detection
	1	6 months	Meter maintenance
	1	5 days	Leak detection
No	13		

Only three of them had taken some training; two of them in leak detection and one in meter maintenance. They could be the key persons for leak detection and meter maintenance tasks in this project, and also as trainers to other technicians.

Q14. What motivation they have in the job

Motivation	Nos	What are the motivations
Yes	5	<ul style="list-style-type: none"> • Like the job • Cooperation between the staff • Good treatment by others • To provide the water for residents
No	11	

Q15. If they were willing to learn new subjects / skills

Willing to learn new subjects / skills	Nos	Remarks
Yes	15	
No	1	This one person seems to be very dissatisfied with his / her job

This shows their willingness to participate in the trainings to be conducted under this project.

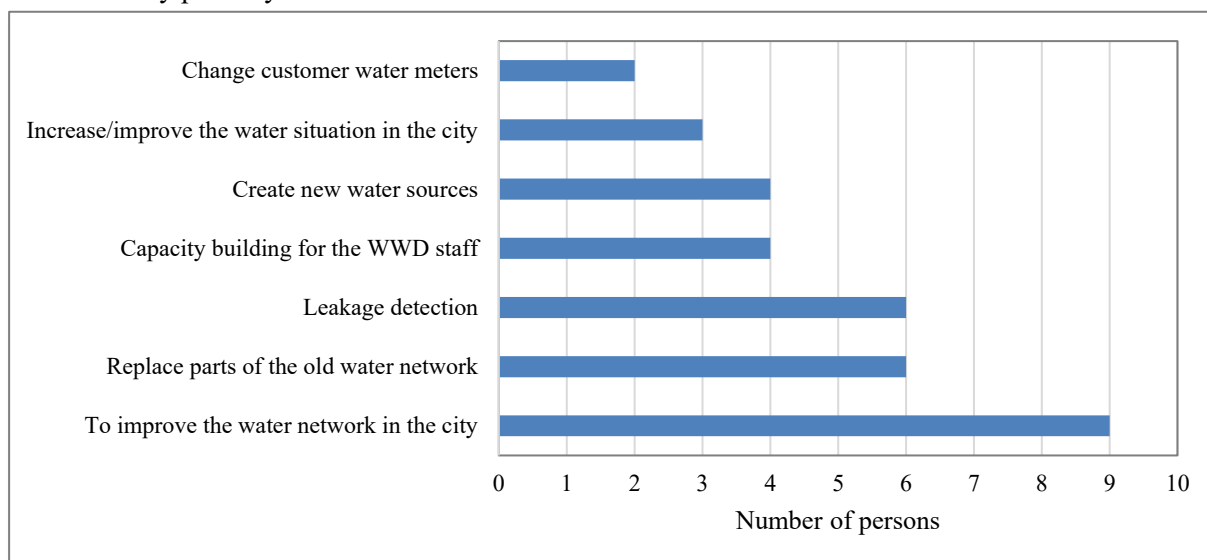
Q16. How many hours they can give for training / learning new things daily

Daily time they can give to training	Nos
No time	2
1-2 hrs	6
2-4 hr	7
4-6 hr	1

The result shows that 13 of them can allocate about 2 hours daily for training. So the training program of the project will need to be designed according to this.

Q17. Their awareness of scope and target of this project

As per their understanding, the scope and target of this project are as shown in the following figure. These are only partially correct.



Source: JICA Expert Team

Figure 7.6 Technicians' Understanding of the Scope and Target of this Project

Almost all of them had perception that this project was also like an infrastructure improvement project.

Q18. If they had any question about the project

Their response to the above question is as follows.

Their Questions	Nos
1-Will the WWD staff be increased?	2
2-Will the stock be improved?	1
3-Will the project create new water sources?	2
4-Will the project provide new equipment?	2
5-Will the project include some activities on the ground or it is only study?	1
6-Will the old water network be replaced?	2
7-Will the project provide training to the WWD staff?	2
8-What is the project period and phases?	3
9-No questions	6

7.2.4 Technical Capacity Assessment of Engineers

A written test was first taken of two C/P Engineers; head of GIS section and head of water section in WWD. The test was also taken of one intern who is yet to graduate and who comes to WWD sometimes, once or week or so. The test consisted of 25 questions grouped into three subjects; (1)

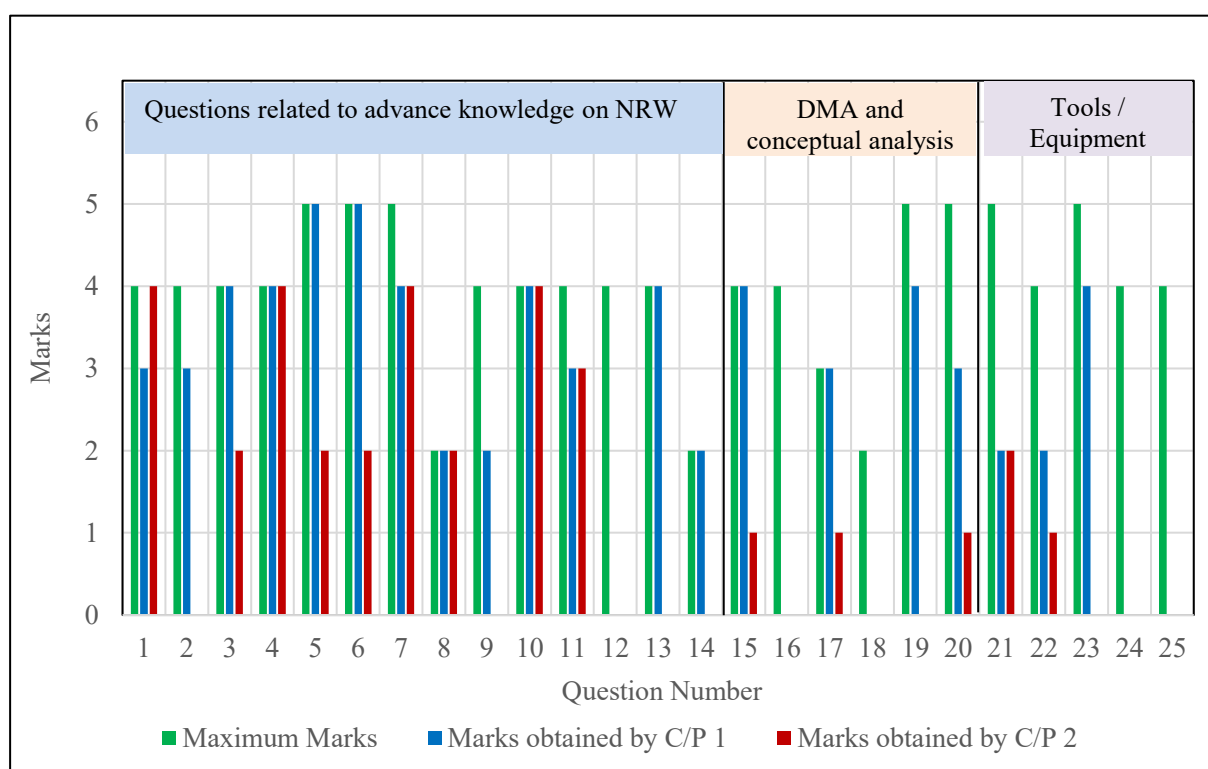
Advance knowledge on NRW, (2) DMA and conceptual analysis, and (3) Tools / equipment.

Summary of the result of the two regular engineers is given in Table 7.5. Result of the intern is not included here because he could hardly reply any question except a few those related to hydraulic. Including his answer together with the other two regular engineers would give wrong result. So the results and analysis mentioned henceforth are for the two regular engineers only.

Table 7.5 Summary of Result of Test to C/P Engineers

Subject Group	Score of C/P 1	Score of C/P 2	Average score
(1) Advance knowledge on NRW	82%	49%	65%
(2) DMA and conceptual analysis	61%	13%	37%
(3) Tools / equipment	36%	14%	25%
Overall	67%	33%	50%

Detail result of the test including maximum mark assigned to each question and marks obtained by each C/P is shown in Source: JICA Expert Team



Source: JICA Expert Team

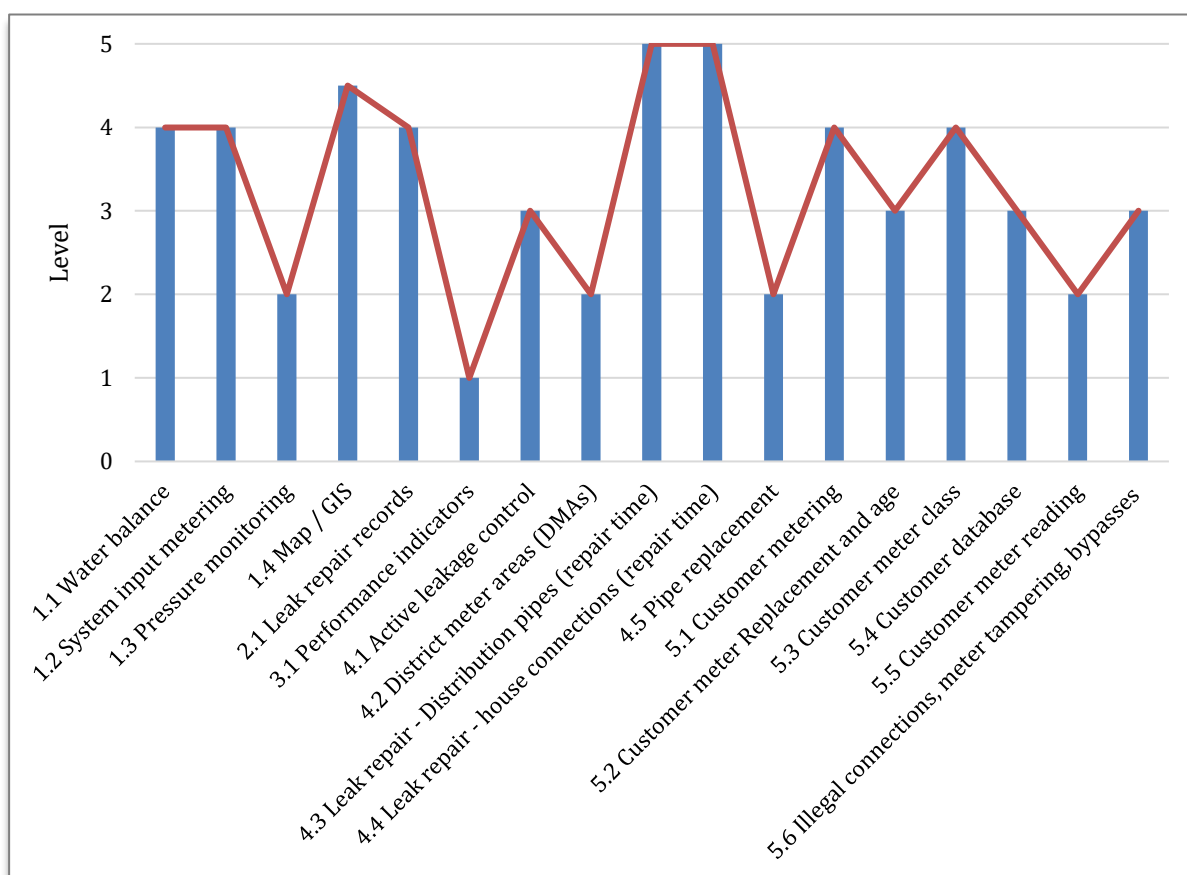
Figure 7.7 Result of Technical Capacity Assessment at Engineer's Level

The result shows that the C/Ps (Engineers) have some understanding of general NRW concept but their understanding of DMA concept and tools / equipment is only basic and needs substantial improvement. This fact will be taken into consideration while designing future capacity development programs.

The questions of this test are given as Attachment 8.

7.2.5 Technical Capacity Assessment at Organizational Level by Self-Evaluation

In order to understand where the Jenin municipality (WWD) stands in terms of various indicators of NRW, a self-evaluation matrix often used in developing country's situation was used. Summary of the self-evaluation by WWD head is shown graphically in Figure 7.9 and also in Table 7.6. The complete matrix showing the meaning of various levels from basic to high along with the self-evaluated position is shown in Figure 7.9.



Source: JICA Expert Team

Figure 7.8 Summary of Self-Evaluation on NRW

Table 7.6 Summary of Self-Evaluation on NRW

S.N.	Issues, questions	Current level [Level 1 (basic) to Level 5 (high)]	Remarks
1	Water balance, flow and pressure monitoring, mapping		
1.1	Water balance	<u>Level 4</u> - We establish an annual water balance in accordance with the international form	
1.2	System input metering	<u>Level 4</u> - Our system input is metered with mechanical and/or magnetic flow meters that are rarely calibrated	System input is measured with mechanical meters.
1.3	Pressure monitoring	<u>Level 2</u> - We have a few pressure recorders at pumping stations and treatment plants installed	
1.4	Map / GIS	Somewhere <u>between Level 4 and 5</u> - We have GIS maps but they are not updated regularly	
2	Leak repair records		
2.1	Leak repair records	<u>Level 4</u> - We keep detailed records that indicate location, pipe diameter, material and type of	JET's experience shows that WWD has not

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		leak as well date of detection and date and duration of repair	achieved Level 4 yet.
3	Performance indicators		
3.1	Performance indicators	<u>Level 1</u> - The only PI used is % NRW. No PI directly linked to condition of asset	Water loss PIs are included in WWD's report, so they have achieved at least Level 2.
4	Active leakage control		
4.1	Active leakage control	<u>Level 3</u> - We do leak detection occasionally if there is a specific problem in an area	
4.2	District meter areas (DMAs)	<u>Level 2</u> - We have started to establish the first DMAs	
4.3	Leak repair - Distribution pipes (repair time)	<u>Level 5</u> - Our average repair time is less than 1.5 days	This is possible because the system is still small and manageable
4.4	Leak repair - house connections	<u>Level 5</u> - Our average repair time is less than 2 days	
4.5	Pipe replacement	<u>Level 2</u> - Only where replacement is inevitable	
5	Customer metering		
5.1	Customer metering	<u>Level 4</u> - Nearly all of our customers are metered, except public fountains, stand pies and similar	
5.2	Customer meter Replacement and age	<u>Level 3</u> - We only change meters if they are obviously not functioning anymore. No approve meter replacement policy in place	
5.3	Customer meter class	<u>Level 4</u> - All customer meters are Class C and D	Many of the older meters are Class B, so they are likely in Level 2, not 4.
5.4	Customer database	<u>Level 3</u> - We are in the process of updating our customer database	
5.5	Customer meter reading	<u>Level 2</u> - We only rotate meter readers if we are suspicious of inaccuracies	
5.6	Illegal connections, meter tampering, bypasses	<u>Level 3</u> - We occasionally detect illegal connections and other forms of fraud	

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	Level	1 Basic	2	3	4	5 High
1	Issues questions					
Water Balance, Flow and Pressure Monitoring, Mapping						
1.1	Water Balance	We do not establish a water balance	We have tried to establish a water balance but gave up since we don't know the split in physical and commercial losses	We establish a water balance following our own format	We establish an annual water balance in accordance with the international form	We establish an annual water balance in accordance with the international form and also use 95% confidence limits to indicate accuracy bands.
1.2	System Input Metering	Most of our system input is not metered	Not all, but > 50% of our system input is metered	Our system input is metered but we are not sure about the accuracy of these (partly old) meters	Our system input is metered with mechanical and/or magnetic flow meters that are rarely calibrated	Our system input is metered with magnetic flow meters that are regularly calibrated
1.3	Pressure Monitoring	We do not have any pressure recorders installed	We have a few pressure recorders at pumping stations and treatment plants installed	We have a few pressure recorders at pumping stations and treatment plants installed and sporadically measure pressure in the distribution network with pressure gauges	We have a few pressure recorders at pumping station and treatment plants and sporadically measure pressure in the distribution network with pressure loggers	We have permanently installed pressure loggers and continuously monitor pressure in the distribution network
1.4	Maps/GIS	We do not have maps at all	The maps we have are not updated	We have started to update our maps	Our maps are updated but do not include GIS	We use GIS based on updated maps
2 Leak Repair Records						
2.1	Leak Repair Records	We have no records of leak repairs	The only way to know the number of leaks repaired is to look into the customer complaints book	We keep basic leak repair records that only tell us whether the leak was on a main pipe or a service connection	We keep detailed records that indicate location, pipe diameter, material and type of leak as well date of detection and date and duration of repair	We keep detailed records that indicate location, pipe diameter, material and type of leak as well date of detection and date and duration of repair and have linked this to our GIS
3 Performance Indicators						
3.1	Performance Indicators	The only PI used is % NRW. No PI directly linked to condition of asset	We have tried to calculate water loss performance indicators	We regularly calculate physical loss performance indicators	We regularly calculate physical and commercial loss performance indicators	We regularly calculate physical and commercial loss performance indicators and publish them in our annual report
4 Active leakage control						
4.1	Active leakage control	We only repair visible leaks.	We have leak detection equipment but we do not use it.	We do leak detection occasionally if there is a specific problem in an area.	We have started to do regular leak surveys.	We cover the network by leakage survey at least once a year.
4.2	District Meter Areas (DMAs)	We have no DMAs and have no plans to establish DMAs	We have started to establish the first DMAs	The first DMAs are established and we have already the first results	We have several DMAs and check and analyse inflow data sporadically	We have several DMAs and monitor flow and pressure on a regular basis
4.3	Leak Repair - Distribution Pipes(Repair Time)	We have no records and therefore don't know how fast our leaks repaired	Our average repair time is more than 7 days	Our average repair time is between 7 and 3 days	Our average repair time is between 3 and 1.5 days	Our average repair time is less than 1.5 days
4.4	Leak Repair - House Connections	We have no records and therefore don't know how fast our leaks repaired	Our average repair time is more than 14 days	Our average repair time is between 14 and 7 days	Our average repair time is between 7 and 2 days	Our average repair time is less than 2 days
4.5	Pipe Replacement	No knowledge of pipe age	Only where replacement is inevitable	Have a pipe replacement policy but not yet commenced implementation	Have a pipe replacement policy but not and have commenced systematic replacement	Have a pipe replacement policy which is strictly adhered to
5 Customer Metering						
5.1	Customer Metering	We have no customer metering	Only large customers are metered	We have started with universal customer meters but at present not all customers have meters installed	Nearly all of our customers are metered, except public fountains, stand pipes and similar.	100% of our customers are metered. Regular checks for large meters. No regular checks for small meters
5.2	Customer Meter Replacement and Age	We have no reliable information on the age of our customer meters	Many of our customer meters are older than 10 years, we have not yet introduced a regular replacement policy	We only change meters if they are obviously not functioning anymore. No approve meter replacement policy in place	We have a meter replacement policy but have not been able to change all meters so some of our customer meters are still older than 10 years	We strictly follow our customer meter replacement policy and replace ALL meters every 5 - 7 years
5.3	Customer Meter Class	All customer meters are class B	All customer meters are Class B and C	All customer meters are class C	All customer meters are Class C and D	All customer meters are class D
5.4	Customer Database	Our customer database has not been updated for a long time	We sporadically update our customer database	We are in the process of updating our customer database	We regularly update our customer database by house to house surveys and checks	We have an updated customer data base that is linked to the GIS.
5.5	Customer Meter Reading	We have no special system of controlling meter readers	We only rotate meter readers if we are suspicious of inaccuracies	We regularly rotate meter readers	We regularly rotate meter readers and make often spot checks	Our meter readers use handheld meter reading devices
5.6	Illegal Connections, meter tampering, bypasses	We have not made any assessment and have no program to deal with water theft	We occasionally detect illegal connections	We occasionally detect illegal connections and other forms of fraud	We have a thorough illegal connection detection program	We have a thorough illegal connection detection program and also try to identify bypasses

Figure 7.9 Self-Evaluation Matrix on NRW

ATTACHMENT

1. Job Description of Head of Department and Head of Sections in Water and Wastewater Department
2. List of Inventories
3. Social Survey Questionnaire Form (Arabic, English)
4. Social Survey Questionnaire Form (English)
5. Result of Site Observation Tour on Prepaid Customer (Water Meter) System in specific Towns in Palestine
6. Questionnaire for Non-revenue Water Management - Initial assessment (For Technician level)
7. Interview Questionnaire for Capacity Assessment of Individual Members
8. Questions for Engineer's Level

Job Description of Head of Department and Head of Sections in Water and Wastewater Department

1. Job Title: Director of Water and Wastewater Department		
Department: Water and wastewater	Section:	Unit:
Managerial following up: Municipality Director	Responsibility: employees of the department	
Job description summary	Follow up the preparation of studies and plans related to water and wastewater in the city; Participate in preparation of plans which warrantee the availability of water to citizens who are served by the municipality, suitable quantity, high quality and NRW reduction.	
Tasks and Activities		
Main Tasks	Detailed Activities	
Planning and budget	<ul style="list-style-type: none"> • Participate in preparation of annual plans and programs of the municipality. • Participate in preparation of municipality's annual budgets. • Prepare water department plans and budget in cooperation with section heads. • Participate in preparation of water department programs and supervise their implementation. 	
Following up work in studies and planning section	<ul style="list-style-type: none"> • Participate in preparation of long and mid-term plans on rehabilitation and extension of water and sewer networks. • Follow up the preparation of studies about the methodology to benefit from wastewater and reuse it. 	
Following up work in customer care section	<ul style="list-style-type: none"> • Follow up customer applications in the section and deal with the methodology of it. • Participate in putting plans and programs for determining response methodology for customers' requests within specific time. 	
Following up work in checking and meters section	<ul style="list-style-type: none"> • Follow up meter installation process for new customers. • Participate in preventive maintenance of customers meters. • Participate in putting programs in awareness of how to deal with meters according to different weather conditions in coordination with PR department. 	
Following up work in distribution section	<ul style="list-style-type: none"> • Participate in water distribution programs in populated areas which are served by the municipality according to specific standards. 	
Following up work in wastewater section	<ul style="list-style-type: none"> • Follow up subscription applications which are applied from citizens, companies and industries. • Supervise the connection work of customers to wastewater networks. 	
Preparing operational and development plans	<ul style="list-style-type: none"> • Participate in developing health and safety procedure manuals in water field. 	
Following up maintenance of water and wastewater networks with coordination with public works section	<ul style="list-style-type: none"> • Ensure effective operation and suitable maintenance of water and wastewater network. • Supervise preventive leakage controls and take the initiative to fix it. • Guarantee the availability of (workers/ materials) for emergency situations. • Supervise chemical and biological analysis. • Supervise maintenance of safety equipment. 	
Other works	<ul style="list-style-type: none"> • Prepare periodic and non-periodic reports on department performance and discuss them with the Assistant Municipality Director on electricity, water, movement and mechanical issues. • Submit development proposals which may develop the work in department. • Fulfill any tasks that the direct manager requests within the scope of work. 	

Membership in permanent committees:

- Planning
- Tenders and projects

Required qualifications:

- B.E in water and wastewater engineering, preferably in water resources management.
- Experience should be not less than 10 years in water resources management.
- Ability to work with computer applications related to water and wastewater.

2. Job Title: Head of Water Section		
Department: Water and wastewater	Section: water	Unit:
Managerial following up: Head of water and wastewater department	Responsibility: employees of the section	
Job description summary	Warrantee the availability of water to citizens who are served by the municipality according to the plan of the municipality, suitable quantity, high quality and NRW reduction.	
Tasks and Activities		
Main Tasks	Detailed activities	
Planning and budgets	<ul style="list-style-type: none"> • Participate in preparation of water and wastewater department annual plan. • Prepare water department annual programs. • Follow up annual programs of water section. 	
Operational development and plans preparation	<ul style="list-style-type: none"> • Participate in developing health and safety procedure manuals in water field. • Participate in water distribution programs in populated areas which are served by the municipality according to specific standards. • Participate in preparation of long and mid-term plans on rehabilitation and extension of water networks in coordination with planning and development department. 	
Following up work in customers applications and requests with customer service section	<ul style="list-style-type: none"> • Follow up customers applications for checking meters, transferring meter ownership and other applications. • Supervise customer connection process to water pipe network. • Follow up the archive of connection files of customers. • Conduct managerial supervision and follow up technical correction actions for water meters to secure quick response to the complaints. 	
Following up the maintenance of water and wastewater networks with coordination with public works section	<ul style="list-style-type: none"> • Ensure effective operation and suitable maintenance of waterworks. • Supervise preventive leakage controls and take the initiative to fix it. • Guarantee the availability of (workers/ materials) for emergency situations. • Supervise chemical and biological analysis. • Supervise maintenance of safety equipment. • Monitor all maintenance programs. 	
Other works	<ul style="list-style-type: none"> • Prepare periodic and non-periodic reports about section performance. • Submit development proposals which may develop the work in section. • Fulfill any tasks that the direct manager requests within the scope of work. • Calculate operational costs for the section in order to calculate the tariff in coordination with financial department. 	

Membership in permanent committees: Null

Required qualifications:

- B.E. in civil engineering preference to be to water resources management.
- Experience should be not less than 5 years in water resources management.
- Ability to work with computer applications related to water and wastewater.

3. Job Title: Head of Planning and Studies		
Department: Water	Section: Planning and Studies	Unit:

Managerial following up: Director of Water Department	Responsibility: employees of the section
Job description summary	Prepare studies and plans related to water and wastewater in coordination with planning and development department in order to provide the customers with best services.
Tasks and Activities	
Main Tasks	Detailed activities
Planning and budgets	<ul style="list-style-type: none"> Participate in preparation of water department annual plan. Prepare an annual program for planning and studies section. Follow up implementation of planning and studies section annual program.
Plans and studies	<ul style="list-style-type: none"> Prepare studies on citizen distribution in Jenin city in order to put water distribution schedules in the city according to populated areas which are served by the municipality, according to determined standards. Participate in the preparation of long and mid-term plans for rehabilitation and extension of water and sewer network in coordination with planning and studies department. Conduct studies on produced wastewater quantity and develop a best plan to benefit from it Participate in city planning in coordination with planning section in the municipality, which includes infrastructure planning of water and sewer network. Contribute to developing safety and health procedure manuals in water field.
Other works	<ul style="list-style-type: none"> Prepare periodic and non-periodic reports about section performance. Submit developing proposals which develop the work in section. Fulfill any tasks that are requested from the direct manager and within the scope of work.

Membership in permanent committees: Null

Required qualifications:

- B.E in Water and wastewater engineering.
- Experience should be not less than 5 years in studies and water planning.
- Ability to work with Computer applications related to water and wastewater.

4. Job Title: Head of Wastewater Section		
Department: Water and Wastewater	Section: Wastewater	Unit:
Managerial following up: Director of Water and Wastewater Department	Responsibility: employees of the section	
Job description summary	Follow up sewerage works in the city, from domestic, factories, NGOS connections; implement treatment and preventive maintenance of the network, in addition to the following up of the issues related to WWTP from maintenance, tests and expansions.	
Tasks and Activities		
Main Tasks	Detailed activities	
Planning and budgets	<ul style="list-style-type: none"> Participate in preparation of water and wastewater department annual plan. Prepare wastewater section programs. Supervise wastewater section programs implementation. 	
Following up work in customer care section	<ul style="list-style-type: none"> Follow up customers, industrial organizations and applications. Supervise customers in connecting process to wastewater network. Conduct managerial supervision and follow up technical correction actions; assure rapid responses to complaints in coordination with public works section. 	

Following up the maintenance of sewer network in coordination with public works section	<ul style="list-style-type: none"> • Ensure effective operation and suitable maintenance of sewer network. • Supervise preventive leakage controls and take the initiative to fix it. • Guarantee the availability of (workers/ materials) for emergency situations. • Supervise chemical and biological analysis. • Supervise maintenance of safety equipment. • Monitor maintenance programs. • Secure environmental and technical safety for workers, utilities and citizens
Following up all technical and managerial works implemented in WWTP and maintenance of WWTP equipment	<ul style="list-style-type: none"> • Follow up periodic preventive maintenance works for WWTP equipment • Follow up laboratory tests and other tests and take suitable decision according to test results in coordination with persons in charge of WWTP. • Follow up general maintenance works of WWTP building and infrastructure of WWTP. • Follow up connection applications which are submitted from factories and companies; give recommendations to them according to test results of their wastewater. • Participate in implementing the awareness programs specialized in wastewater and WWTP.
Other works	<ul style="list-style-type: none"> • Prepare periodic and non-periodic reports about operational process performance; hand them over and discuss about them with the director of water and wastewater department. • Submit development proposals which may develop the work in department. • Participate in developing safety and health procedure manuals in wastewater field in coordination with environment, health and agriculture department. • Perform any tasks that the direct manager requests within the scope of work. • Evaluate performance of section employees.

Membership in permanent committees: Health

Required qualifications:

- B.E. in civil engineering, preferably in wastewater.
- Experience should be not less than 5 years in wastewater field.
- Ability to work with computer applications related to wastewater.
- Having trainings specialized in wastewater field.

List of Inventories

Date: 31st October, 2017

Distinction	Product Name		End of Oct		
			In	Out	
Water Department	Item	Chasers in drop head 1/2 Inch	0	0	1
	Item	Chasers in drop head 3/4 Inch	0	0	9
	Item	Chasers in drop head 1 Inch	0	0	5
	Item	Chasers in drop head 2 Inch RIDGID	0	0	0
	Set	Electronic Chasers in drop head 2 Inch RIDGID	0	0	2
	Item	Chasers in drop head Anbiti 2 Inch	0	0	0
	Item	indentation threader machine 1/2 inch O R	0	0	0
	Set	indentation threader machine 2 inch R 200	0	0	0
	Meter	Pelgal"جال" Hose 1/2 inch	0	0	0
	Meter	Pelgal"جال" Hose 3/4 inch	0	0	0
	Meter	Pelgal"جال" Hose 1 inch	0	0	0
	Meter	LPDEhose Chlorine device hose	0	0	0
	Item	Tee 1/2 inch	0	0	50
	Item	Tee 3/4 inch	0	0	70
	Item	Tee 1 inch	0	0	105
	Item	Tee 2 inch	0	0	10
	Item	Tee 3 inch	0	0	25
	Item	Tee 4 inch	0	0	16
	Item	Welded padded Tee 6 inch	0	0	0
	Item	Welded iron Tee 3 inch	0	0	3
	Item	Welded Tee 8 inch	0	0	0
	Item	Welded padded Tee 4 inch	0	0	0
	Item	Padded welding Tee 4 inch	0	0	11
	Item	Welded iron Tee 6 inch	0	0	0
	Item	Welded padded Tee 8 inch	0	0	0
	Item	Copper Tee 1/2 inch	0	0	0
	Item	Reducing Tee 1-1/2 inch	0	0	0
	Item	Reducing Tee 1-3/4 inch	0	0	0
	Item	Reducing Tee 2-1 inch	0	0	0
	Item	Reducing Tee 2-1/2 inch	0	0	24
	Item	Reducing Tee 3-2 inch	0	0	14
	Item	Reducing Tee 4-2 inch	0	0	9
	Item	Reducing Tee 4-3 inch	0	0	0
	Item	Reducing Tee 3/4-1-2 inch	0	0	25
	Item	Reducing Tee 3-1 inch	0	0	0
	Item	Reducing Tee 6-4 inch	0	0	0
	Item	Reducing padded Tee 6-4 inch	0	0	10
	Item	Reducing padded Tee 4-3 inch	0	0	2
	Item	Reducing padded Tee 8-6 inch	0	0	1
	Item	Reducing padded Tee 8-4 inch	0	0	1
	Item	Reducer (step) 3/4-1/2 inch	0	0	0
	Item	Reducer (step) 1/2-1 inch	0	0	50
	Item	Reducer (step) 1-3/4 inch	0	0	0
	Item	Reducer (step) 2-1/2 inch	0	0	450
	Item	Reducer (step) 2-3/4 inch	0	0	290
	Item	Reducer (step) 2-1 inch	0	0	140
	Item	Reducer (step) 2-1.25 inch	0	0	0
	Item	Reducer (step) 2.5-3 inch	0	0	7
	Item	Reducer (step) 3-2 inch	0	0	0
	Item	Reducer (step) 4-2 inch	0	0	0
Item	Reducer (step) 4-3 inch	0	0	0	
Item	Reducer (step) 4-6 inch	0	0	0	
Item	Reducer (step) 10-12 inch	0	0	0	
Item	Reducer (step) 8-12 inch	0	0	0	
Item	Reducer (step) 2.5-2 inch	0	0	0	
Item	Welded Reducer 6-10 inch	0	0	0	
Item	Padded welded Reducer 8-6 inch	0	0	5	
Item	Reducer (step) 2-1.5 inch	0	0	0	
Item	Reducer (Gradual) 1-1/2 inch	0	0	0	
Item	Reducer (Gradual) 2-1 inch	0	0	8	
Item	Reducer (Gradual) 1-3/4 inch	0	0	0	
Item	Reducer (step) 1/2-3/8 inch	0	0	0	
Item	Padded Reducer (Gradual) 6-2 inch	0	0	0	

Item	Padded Reducer (Gradual) 4-6 inch	0	0	0
Item	Padded Reducer (step) 8-10 inch	0	0	0
Item	Padded Reducer (Gradual) 8-4 inch	0	0	1
Item	Faucet 1/2 inch	0	0	15
Item	Faucet 3/4 inch	0	0	0
Item	Faucet 1 inch	0	0	0
Item	Niggel Faucet 1/2 inch (Long leg)	0	0	0
Item	Niggel Faucet short leg	0	0	0
Item	Water Dresser 1 inch	0	0	0
Item	Water Dresser 2 inch	0	0	8
Item	Water Dresser 3 inch	0	0	2
Item	Water Dresser 4 inch	0	0	4
Item	Water Dresser 6 inch	0	0	6
Item	Water Dresser 10 inch	0	0	2
Item	Water Dresser 12 inch	0	0	5
Item	Ear Dresser	0	0	0
Item	Flenge Dresser 2 inch	0	0	90
Item	Flenge Dresser 3 inch	0	0	0
Item	Flenge Dresser 4 inch	0	0	0
Item	Flenge Dresser 6 inch	0	0	0
Item	Joint 1/2 inch	0	0	0
Item	Joint 3/4 inch	0	0	50
Item	Joint 1 inch	0	0	31
Item	Joint 1.25 inch	0	0	0
Item	Joint 1.5 inch	0	0	0
Item	Joint 2 inch	0	0	31
Item	Joint 3 inch	0	0	14-2
Item	Joint 4 inch	0	0	0
Item	Water Meter Joint	0	0	0
Item	Non return Valve 1/2 inch	0	0	0
Item	Non return Valve 3/4 inch	0	0	0
Item	Non return Valve 1 inch	0	0	0
Item	Non return Valve 2 inch	0	0	4
Item	Non return Valve 3 inch	0	0	0
Item	Non return Valve 4 inch	0	0	1
Item	Non return valve 6 inch 25 bar	0	0	0
Item	Non return Valve10 inch	0	0	1
Item	Non return Valve 8 inch	0	0	0
Item	Non return Valve 4 inch with sinker	0	0	3
Item	Non return Valve 6 inch 25 Bar	0	0	1
Item	Non return Valve 8 inch with sinker	0	0	1
Item	Electronis threader head	0	0	0
Item	Pipe blade cutter 2 inch	0	0	0
Item	Air Valve	0	0	0
Item	Air Valve 3 inch	0	0	0
Item	Turbine 1 inch	0	0	0
Item	Turbine 2 inch 7.5 horsepower	0	0	0
Item	Turbine 2 inch 20 horse power	0	0	0
Item	Pump 2 inch 15 horse power	0	0	0
Item	Pump 2 inch 3 horsepower	0	0	0
Item	Suction pump 3.5 horse 4 inch	0	0	0
Item	Turbine Pump 10 degrees	0	0	0
Item	Borewell Pump 30 horsepower	0	0	0
Item	Borewell Pump 10 horsepower	0	0	2
Item	Turbine 15 horsepower	0	0	0
Item	Vertical pump LURA Model 5003	0	0	0
Item	Vertical pump LURA Model 3004	0	0	0
Item	Turbid Pump 7 degrees	0	0	1
Item	Turbid pump 35	0	0	0
Item	LURA Turbid 4606	0	0	0
Item	Suction pump 1	0	0	0
Item	Normal pump 3/4	0	0	0
Item	LURA Turbine for pump 3220	0	0	0
Item	LURA pump 3220	0	0	0
Item	Pump 10 horsepower	0	0	0
Item	Borewell pump 50 horsepower with accessories	0	0	0
Item	Float 1/2 inch	0	0	6
Item	Float 1 inch	0	0	1
Item	Float 2 inch	0	0	0
Item	Electric Float	0	0	3

Item	Copper Float 1 inch	0	0	0
Item	Water meter 1 inch	0	0	0
Item	Water meter 3 inch	0	0	2
Item	Water meter 6 inch	0	0	0
Item	Kent Eater meter	0	0	3
Item	Flenge Water meter 2 inch	0	0	9
Item	Expantion joint 6 inch	0	0	0
Item	(Register unit screen) water meter	0	0	0
Item	(Plastic Register unit screen) water meter	0	0	0
Item	Cover plastic water meter	0	0	0
Item	(Rubber Register unit screen) Black water meter	0	0	0
Item	(Gaskit register unit screen) water meter	0	0	0
Item	Copper meter cover 1/2 inch	0	0	84
Item	Copper meter cover 1 inch	0	0	4
Item	Meter cover 2 inch	0	0	0
Item	Meter cover 6 inch with frame	0	0	0
Item	Stop valve Handle 2 inch	0	0	0
Item	Stop valve Handle and battery 1/2 inch	0	0	0
Item	WM Handle 1/2 inch	0	0	0
Item	WM Handle 3 inch	0	0	0
Item	WM Handle 2 inch	0	0	0
Item	WM Handle 1 inch	0	0	0
Item	Elbow 1/2 inch	0	0	0
Item	Elbow 3/4 inch	0	0	0
Item	Elbow 1 inch	0	0	70
Item	Elbow 1.25 inch	0	0	0
Item	Elbow 2 inch	0	0	23
Item	Elbow 3 inch	0	0	7
Item	Elbow 4 inch	0	0	1
Item	Wedded elbow 6 inch 45 degrees	0	0	0
Item	Ironic elbow 10 inch	0	0	0
Item	Tapped ionic elbow 10 inch 45 degrees	0	0	3
Item	Wedded ionic elbow 3 inch 90 degrees	0	0	0
Item	Tapped ionic elbow 3 inch 45 degrees	0	0	0
Item	Tapped ionic elbow 6 inch 90 degrees	0	0	0
Item	Tapped ionic elbow 6 inch 45 degrees	0	0	2
Item	Wedded ionic elbow 8 inch 90 degrees	0	0	7
Item	Wedded ionic elbow 4 inch 90 degrees	0	0	0
Item	Copper elbow 1/2 inch (16mm)	0	0	0
Item	Elbow 1/2 inch 45 degrees	0	0	95
Item	Elbow 1 inch 45 degrees	0	0	38
Item	Elbow 2 inch 45 degrees	0	0	24
Item	Tapped ionic elbow 3 inch 90 degrees	0	0	0
Item	Tapped elbow 8 inch 45 degrees	0	0	0
Item	Tapped welded elbow 8 inch 90 degrees	0	0	0
Item	Tapped welded elbow 10 inch 90 degrees	0	0	0
Item	Thread elbow 1/2 inch	0	0	30
Item	Thread elbow 3/4 inch	0	0	30
Item	Thread elbow 1 inch	0	0	40
Item	Elbow 1.25 inch	0	0	0
Item	Thread elbow 2 inch	0	0	23
Item	Thread Elbow 3 inch	0	0	0
Item	Coupling 1/2 inch	0	0	0
Item	Coupling 3/4 inch	0	0	0
Item	Coupling 1 inch	0	0	0
Item	Coupling 2 inch	0	0	0
Item	Coupling 3 inch	0	0	0
Item	Coupling 4 inch	0	0	1
Item	Pipes 1/2 inch 6 meters	0	0	25
Item	Pipes 3/4 inch	0	0	15
Item	Pipes 1 inch 6 meters	0	0	10
Item	Pipes 2 inch	0	0	9
Item	Tapped ionic pipes 10 inch	0	0	0
Item	Isolated Pipes 1/2 inch 6 meter	0	0	100
Item	Isolated pipes 3/4 inch 6 meter	0	0	50
Item	Isolated pipes 1 inch 6 meter	0	0	15
Item	Isolated pipes 2 inch 6 meter	0	0	65
Item	Tapped pipes 12 inch 12 meter	0	0	0
Item	Tapped pipes 8 inch 12.2 meter	0	0	0
Item	Tapped pipes 3 inch 12.2 meter	0	0	0

Item	Tapped pipes 4 inch 12.2 meter	0	0	0
Item	Tapped pipes 14inch 12.2	0	0	0
Item	Tapped pipes 6 inch 12.2 meter length	0	0	0
Item	Isolated pipes 2 inch 6 meter	0	0	0
Item	Isolated pipes 3 inch 6 meter	0	0	0
Item	Stopper 1/2 inch	0	0	0
Item	Stopper 3/4 inch	0	0	270
Item	Stopper 1 inch	0	0	310
Item	Stopper 2 inch	0	0	120
Item	Copper decreasing stopper 1/2 inch	0	0	0
Item	Gel stop valve 1/2 inch	0	0	0
Item	Gel stop valve 3/4 inch	0	0	0
Item	Gel Stop valve 1 inch	0	0	0
Item	Gel stop valve 2 inch	0	0	0
Item	Arka check valve 1/2 inch	0	0	0
Item	Arka check valve 3/4 inch	0	0	6
Item	Arka check valve 1 inch	0	0	25
Item	Arka check valve 2 inch	0	0	5
Item	Arka check valve 6 inch	0	0	4
Item	Arka check valve 8 inch	0	0	1
Item	Arka check valve 10 inch	0	0	1
Item	Nigara check valve	0	0	19
Item	Three way copper valve 1/2 inch	0	0	0
Item	Gate valve 3 inch	0	0	2
Item	Hydrant stop valve	0	0	2
Item	Polyetheline plastice stop valve 1/2 inch	0	0	19
Item	Gate stop valve 4 inch	0	0	11
Item	Long nick Niggle stop valve 1/2 inch	0	0	13
Item	Etholine Stop valve 3/4 inch	0	0	0
Item	Butterfly valve 8 inch	0	0	1
Item	Butterfly valve 4 inch	0	0	1
Item	Plastic Gel valve 2 inch	0	0	4
Item	Reducer Plastic valve 50-63	0	0	0
Item	Polyetheline stop valve 1 inch	0	0	0
Item	Cross joint 1/2 inch	0	0	0
Item	Cross joint 3 inch	0	0	0
Item	Galvanized check valve 1/2 inch 5 cm	0	0	0

Questionnaire Form

نموذج الاستبيان

عزيزي المواطن \ة :
تقوم بلدية جنين بالتعاون مع مؤسسة جاياكا بتنفيذ مشروع تحسين خدمات المياه في بلدية جنين ، والهدف من هذا الاستطلاع ليس فقط تقييم وضع المياه وقطاع الصرف الصحي الحالي في المدينة بل يهدف الى تحسين مشاركة المواطن في عملية التخطيط , والتعبير عن توقعاته لتحسين المشاريع في قطاع المياه والصرف الصحي ، نرجو منكم مساعدتنا في الاجابة على الاسئلة التالية .
شكرا لتعاونكم
بلدية جنين وفريق المسح الاجتماعي التابع لجاياكا

Dear Resident;

The Jenin Municipality with cooperation of JICA is conducting a project to improve the water service in the city. The purpose of this questionnaire is not only to assess the current water, sewage situation in your city but also to plan ways to address your expectations and enhance your participation for improvement projects in the water and sewerage sectors. Please help us by answering the following questions.

Thank you very much.

Jenin Municipality and JICA Survey Team

Questionnaire Code Number: رقم الاستبيان						
Name of interviewer: اسم الباحث		Date: ....d /.....m / 2017		Time: : AM / PM		
Name of interviewee: اسم المبحوث		Address العنوان				
Name of Neighborhood: اسم الحي		Property status: <input type="checkbox"/> Own <input type="checkbox"/> Rent <input type="checkbox"/> Family House حالة العقار: <input type="checkbox"/> ملك <input type="checkbox"/> إيجار <input type="checkbox"/> للعائلة				
Owner of water meter اسم مالك عداد المياه						
If household: للمنزل	Gender of interviewee: <input type="checkbox"/> Female <input type="checkbox"/> Male الجنس: <input type="checkbox"/> أنثى <input type="checkbox"/> ذكر	No. of family members: عدد أفراد العائلة			Age: العمر	Education level*: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 مستوى التعليم: 1 2 3 4
		F1 عائلة 1	F2 عائلة 2	F3 عائلة 3		
If hotel: للفندق	No. of rooms: عدد الغرف		No. of guest visitors per year: عدد النزلاء سنويا			
If factory: للمصنع	No. of employees: عدد العمال		Type of product: نوع المنتج			
If shop محل	No. of employees: عدد العمال		Type of service/product: نوع المنتج او الخدمة			

*: Illiterate (1), Elementary education (2), Secondary education (3), Post-secondary education (4) ما بعد الثانوية (4)، ثانوي (3)، ابتدائي (2)، أمي (1)

1. Access to the City Water الربط على شبكة مياه المدينة

1-1	IF your property IS connected to the Water Network, please answer the following questions. If Not connected, move to Question 1-2. اذا كان عقارك مربوط على شبكة مياه المدينة الرجاء الاجابة على الاسئلة التالية ، اذا كان لا انتقل للسؤال 1-2.						
a. Do you have access to Jenin municipality water every day? هل تصلك مياه بلدية جنين يوميا ؟	Winter الشتاء	Yes نعم		No لا			I D N
	Summer الصيف	Yes نعم		No لا			
b. If not every day, how many days per week? اذا كانت ليست يوميا كم مرة بالأسبوع ؟	Winter الشتاء	1 d	2d	3-4d	1/m	2/m	
	Summer الصيف	1d	2d	3-4d	1/m	2/m	
c. How many hours of running water do you have per available day? (on average) كم متوسط ساعات المياه التي تصلك باليوم ؟	Winter الشتاء	Up to 3h	4-6 h	7-12 h	12-24 h		
	Summer الصيف	Up to 3	4-6 h	7-12 h	12-24 h		

d. How is the water quality? كيف ترى جودة المياه في البلدية ؟	No problem لا يوجد مشكلة	Tastes bad مذاق سيء	Bad smell رائحة سيئة	Bad color لون سيء	Sandy رملية
e. Do you pay bill every month ? هل تدفع الفاتورة كل شهر ؟	Yes نعم	No لا	Sometimes احيانا		
f. Do you still need to buy water from venders even connected to the network? هل ما تزال بحاجة الى شراء المياه من الابار الخاصة حتى بعد وصول مياه البلدية ؟	Yes نعم		No لا		
g. How many tanks you have? كم تنك ماء لديك ؟	UG تحت الارض	G على الارض	Roof على السطح	Other اخرى	
h. How much do you pay on average for such out-of-network water per month for your household? NIS كم متوسط المبلغ الذي تدفعه شهريا لشراء المياه من الابار ؟	Water cost				Water use
	Size m ³ (a) الحجم (أ)	# of filling per month (b) عدد مرات التعبئة شهريا (ب)	Cost per filling NIS (c) تكلفة التعبئة لكل مرة (ج)	Total cost NIS/ m ³ (b) × (c) التكلفة الاجمالية	(a) × (b) ا * ب
	5 m ³				
	12 m ³				
	Other: اخرى				
i. How often do you clean your tank in a year? كم مرة تنظف الخزان سنويا ؟	1 time مرة واحدة	2 time مرتين	3 time 3 مرات	I don't clean it لا انظفه	
j. Are you receiving bill every month? هل تصلك الفاتورة شهريا بانتظام ؟	Yes نعم	No لا	Sometimes احيانا		
k. How do you pay your water bills? كيف تدفع الفاتورة ؟					
l. Do you still need to buy water from venders even connected to the network? هل ما تزال بحاجة الى شراء المياه من الابار الخاصة حتى بعد وصول مياه البلدية ؟	Yes نعم		No لا		
If "Yes": What is the reason(s)? اذا كان نعم ما هي الاسباب ؟					
• What is the name of the well ? ما اسم البئر ؟					
1- IF your property is NOT connected to the Water Network, please answer the following questions. 2 اذا كان عقارك غير مربوط على شبكة مياه البلدية الرجاء الاجابة على الاسئلة التالية :					
a. What is the reason(s) that you are not connected to the water network? ما هي الاسباب لعدم ربطك على شبكة المياه ؟					
b. How many tanks you have? كم تنك ماء لديك ؟	UG تحت الارض	G على الارض	Roof على السطح	Other: اخرى	
c. How much do you pay (average) for such out-of-network water per month for your household? كم متوسط المبلغ الذي تدفعه شهريا لشراء المياه من الابار ؟	Size	Time /mo	Pay/ mo	Time × size	Time × pay
	5m ³				
	12 m ³				
	Other				
d. How often do you clean your tank in a year? كم مرة تنظف خزان المياه ؟	1 time	2 times	3 times	I don't clean it	
e. What is the name of the well you receive water from? What is the reason(s)? ما اسم البئر الذي تشتري منه المياه وما هي الاسباب ؟					
f. How much do you pay on average your water per month for your household? In Shekel كم متوسط المبلغ الذي تدفعه شهريا اثمان مياه ؟					

2. Access to Public Sewer Network and Treatment **الربط على شبكة الصرف الصحي ومحطة المعالجة**

2-1	a. Is your property connected to public sewer network? هل عقارك مربوط على شبكة الصرف الصحي ؟	Yes نعم	No لا
	b. If No, which other sewage collection system is used in your building? إذا كان لا... أي نظام صرف صحي تستخدم تستخدمه ؟	Cesspit tank حفرة	Other.....
2-2	c. Did you know that your city has a STP? هل تعرف ان المدينة لديها محطة معالجة لمياه الصرف الصحي ؟	No لا	Yes: نعم Name:
2-3	d. Do you believe that users should pay for the treated wastewater in Jenin to cover the costs? Explain Yes or No answer. هل تعتقد ان المواطن يجب ان يدفع تكاليف معالجة المياه العادمة لتغطية التكاليف مع الشرح ؟		
2-4	e. Are you willing to pay for sewerage tariff every month? هل انت على استعداد لدفع رسوم الصرف الصحي كل شهر ؟		

3. Satisfaction of the Current System and Willingness to Pay **الرضا عن النظام الحالي والاستعداد للدفع**

3-1	a. Are you satisfied with the current water service by Jenin Municipality for any of the followings ----if used in past year: راض هل انت راض : عن خدمات المياه في بلدية جنين في المجالات التالية : • New-application process? اجراءات الطلب الجديد ؟ • Meter reading by meter readers? قراءة العداد من قبل القراء ؟ • Bill distribution every month? توزيع الفواتير شهريا ؟ • Payment method? طريقة الدفع ؟ • Type of water meter? نوع عداد المياه ؟ • Meter installation? تركيب العداد ؟ • Meter re-connection, owner name change? اعادة الربط وتغيير اسم المالك ؟ • Water availability in the pipes for your use? توفر المياه في الانابيب للاستخدام ؟ • Other • What would do you rate the performance of the current water supply service on a scale of 1 to 5 where 5 is the best and 1 is very poor? كيف تقييم اداء خدمات المياه من 5 مع العلم ان 5 هي الاعلى و 1 هي الاسوا ؟ b. Do you know how much is the water tariff rate by Jenin Municipality? هل لديك علم بتعرفة المياه في بلدية جنين ؟	✳ Please explain as much as you can. If not connected to water network, skip this part and move to question (b) below. الرجاء الشرح قدر المستطاع اذا كانت الاجابة لا.. تخطي هذا الجزء وانتقل للسؤال بالاسفل ب :				
		Yes نعم	No لا	Didn't use لم استخدمه		
		Yes نعم	No لا	Didn't use لم استخدمه		
		Yes نعم	No لا	Didn't use لم استخدمه		
		Yes نعم	No لا	Didn't use لم استخدمه		
		Baylan:	Yes نعم	No لا		
		Arad:	Yes نعم	No لا		
		Chaina:	Yes نعم	No لا		
		Derot:	Yes نعم	No لا		
		Yes نعم	No لا	Didn't use لم استخدمه		
		Yes نعم	No لا	Didn't use لم استخدمه		
		Yes نعم	No لا			
		Yes نعم	No لا			
		1	2	3	4	5
	/m ³		I don't know لا اعرف		
		Expensive	Fair	Cheap	No opinion	

<p>✘ Refer to the end of this form for the rates of Jenin and some other PA cities. في نهاية الاستبيان هناك جدول يشير الى تعرفه المياه في جنين ومدن فلسطينية اخرى</p> <p>c. What do you think about the water tariff in Jenin? ما رأيك بتعرفة المياه في جنين؟</p>				
<p>✘ Refer to the end of this form for the rates of Jenin and some other PA cities. في نهاية الاستبيان هناك جدول يشير الى تعرفه الصرف الصحي في جنين ومدن فلسطينية اخرى</p> <p>d. What do you think about the sewerage tariff in Jenin? ما رأيك بتعرفة الصرف الصحي في جنين؟</p>	Expensive	Fair	Cheap	No opinion
<p>e. More/improved water service by JM, water network, STP and sewer network mean a healthier life and urban living environment. However, it also could mean an increase in the tariff rate due to the constructions, O&M expense recovery. Would you be willing to pay the rate for water/sewage tariff if increased? تحسين خدمة المياه من قبل بلدية جنين وتحسين شبكة المياه ومحطة معالجة مياه الصرف الصحي وشبكة الصرف الصحي يعنى ذلك حياة صحية وبيئية وحضرية اكثر ، وهذا يعنى زيادة في معدل التعرفه بسبب الانشاءات والتشغيل والاجراءات ، هل ستكون على استعداد لدفع الزيادة على التعرفه ؟</p>	Yes	No. The reason.? ? الاسباب ؟		
<p>• If Yes, how much would you be willing to pay more for water tariff or sewerage tariff? اذا كان نعم كم انت مستعد ان تدفع نسبة الزيادة ؟</p>	Water tariff: /m ³ تعرفه المياه م ³	Sewerage tariff: /month تعرفه الصرف الصحي		
<p>f. Which system of payment do you think is fair? (for water and/or sewage). اي نظام دفع تعتقد انه عادل سواءا . للصرف الصحي او المياه ؟</p>	<input type="checkbox"/> Payment based on a fixed amount دفع مبلغ مقطوع <input type="checkbox"/> Payment based on a flat rate. حسب معدل الاستهلاك <input type="checkbox"/> Payment based on an increasing block tariff نظام شرائح			

1. Project Information Dissemination نشر معلومات المشروع

4-1	<p>What are the best ways to communicate with you about the City's future projects for water/sewage system improvement? Rank the following list from 1 to 5, with 1 being most effective, and 5 being least effective. ما هي افضل طريقة للاتصال بك واعلامك بمشاريع البلدية المستقبلية الخاصة بالمياه و الصرف الصحي وايهما اكثر فاعلية واقل فاعلية ؟</p>	<input type="checkbox"/> SMS رسائل قصيرة	<input type="checkbox"/> Newspapers الصحف	<input type="checkbox"/> City Facebook /Website مواقع التواصل الاجتماعي	<input type="checkbox"/> Radio الاذاعة المحلية
		<input type="checkbox"/> Email الاميل	<input type="checkbox"/> By mail صندوق البريد	<input type="checkbox"/> Neighborhood meetings لقاءات الاحياء	<input type="checkbox"/> TV التلفزيون المحلي
		<input type="checkbox"/> Phone الهاتف	<input type="checkbox"/> In person at door الزيارات المنزلية	<input type="checkbox"/> Public meetings at City hall لقاءات عامة في قاعة البلدية	<input type="checkbox"/> Other اخرى

5. Requests to City Authority طلبات من الهيئة المحلية

5-1	<p>On water supply service : خدمة تزويد المياه</p> <p>a. Improve pressure of supplied water تحسين ضغط المياه وتزويدها</p>	Yes نعم	No لا	Note ملاحظة				
	<p>b. Increase days/hours of water availability? زيادة عدد ساعات وايام توفر المياه.</p>	1d/h	2ds/h	3ds/h	4ds/h	5ds/h	6ds/h	All
	<p>c. Increase amount of current water availability. زيادة كميات المياه الحالية.</p>	1.5 times	2 times		3 times		More	
	<p>d. Expand pipeline network coverage . توسعة تغطية الشبكة</p>	Yes	No	Note ملاحظة				
	<p>e. Municipality should installation meters and connections البلدية يجب ان تقوم بتركيب العداد والربط .</p>	Yes نعم	No لا	Note: ملاحظة				
	<p>f. Quick response/fixation to/of complaints استجابة سريعة وتثبيت الشكوى .</p>	Yes نعم	No لا	Note: ملاحظة				
	<p>g. Do you prefer to use prepaid water meter? and why? (Answer this question if you are the owner) هل تفضل استخدام عداد الدفع المسبق ولماذا ؟ في حالة كان البيت ملك .</p>	Yes. Why?	نعم ولماذا ؟	No. Why?	لا ولماذا ؟			

	h. If Jenin municipality take decision to install prepaid water meter, do you accept ? اذا اتخذت بلدية جنين قرارا بتركيب عدادات الدفع المسبق للمياه هل ستقبل ؟	Yes why ? لماذا نعم	No. why? لماذا لا		
	i. How would you like your prepaid system 'disconnection and place of charge'? كيف تفضل ان يكون نظام عداد مسبق الدفع من حيث وقت القطع وإعادة الشحن ؟	Time of disconnect: Example: 1 pm – 9 Am not (disconnect)(9 Am – 1Pm اذا (disconnect) مثال : نفذت الكمية الساعة الواحدة ظهرا هناك احتياطي حتى التاسعة صباحا من اليوم التالي ، ومن التاسعة صباحا حتى الواحدة ظهرا من اليوم التالي يحدث القطع اذا لم يتم بإعادة الشحن ؟	Place of charge Municipality البلدية A place near you مكان قريب منك		
	h. Do you prefer to use prepaid water meter? and why? (Answer this question if you are renter/tenant) هل تفضل استخدام عداد الدفع المسبق (renter/tenant) ولماذا ؟ في حالة كان البيت مستأجر.	Yes. Why? نعم ولماذا؟	No. Why? لماذا لا؟		
5-2	On sewerage service: خدمة الصرف الصحي	Yes نعم	No لا	N/A محايد	Note ملاحظة
	• Fix blocked sewer/sewage اصلاح المجاري المغلقة				
	• Quick response/fixation to/of complaints تثبيت للشكوى واستجابة سريعة				
	• Expand sewer coverage توسعة تغطية شبكة الصرف الصحي				
	• Subsidize household connection دعم الربط المنزلي				
	• Improve quality of treated wastewater تحسين جودة المياه المعالجة				

i. Additional Questions (estimated amount is OK) اسئلة اضافية في حال موافقة المبحوث

6-1	Monthly household income (NIS) ; الدخل الشهري للأسرة	Less than 1500 أقل من 1500	1,500- 2,500	2,500- 3,500	3,500- 5,000	5,000-7,000	More than 7000 أكثر من 7000
6-2	Monthly household expenses: النفقات الشهرية للأسرة	Less than 1500 أقل من 1500	1,500 - 2,000	2,000 - 3,000	3,000- 4,000	4,000 - 5,000	More than 5000 أكثر من 5000
6-3	How much do you pay per month for water charge (total bill amount/month) on average? (unit: NIS) كم متوسط المبلغ الذي تدفعه لفاتورة المياه شهريا ؟	10-40	40-60	60-80	80-100	More than 100	
6-4	Please tell us how much you currently pay per month for your property/household for each of these الرجاء اعلامنا ان امكن حول ما تدفعه شهريا مقابل كل من التالية :	Electricity					
		LAN phone					
		Cellphone					
		Internet					
		Cooking gas					

للاطلاع : تعرفه المياه والصرف الصحي في جنين وبعض المدن الفلسطينية الاخرى .
The water and sewerage tariff rate for Jenin and some other cities for reference.

City	Water: Residential	Sewerage
Jenin	1- 50m ³ : 4.34NIS Above 50m ³ : 6.20NIS	Area A --- 78 JD (390 NIS) Once time Area B----66 JD Area C ----54 JD

Ramallah	1-10 m ³ = 4.5 NIS 40-60 m ³ =6.8NIS 60 and more =9 NIS	10-20 m ³ =4.5 NIS	20-40 m ³ =5.6 NIS	2.2 JD/m ² / Annual Ex: 2.2 * 100 m ² = 220 JD/year
Jericho	1-100 m ³ =1 NIS 150-200 m ³ =8 NIS 200 and more=10 NIS	100-125 m ³ =2 NIS	125-150 m ³ =4 NIS	0.5 NIS/m ³ /month
Nablus	1-10 m ³ =4.2 NIS 30 and more= 11.5 NIS	11-20 m ³ =7.2 NIS	21-30 m ³ =9.2 NIS	1.5 NIS /m ³ /month
Hebron	1-20 m ³ = 4 NIS	20 and more = 5 NIS		2 JD / m ² /One time

Comments: ملاحظات

Questionnaire Form

Dear Customer:

Thank you for giving us the opportunity to serve you better. Please help us by taking a few minutes to tell us about the satisfaction with the prepaid water meter in Nablus area through JICA Survey Team.

Questionnaire Code Number:.....		Date :...../...../2017
Name of interviewer:		Phone number:..... if OK.
Name of interviewee:		Address
Name of Neighborhood:		Property status: <input type="checkbox"/> Own <input type="checkbox"/> Rent <input type="checkbox"/> Family House
Owner of water meter		
Gender of interviewee: <input type="checkbox"/> Female <input type="checkbox"/> Male	Age:	Education level*:

*: Illiterate (1), Elementary education (2), Secondary education (3), Post-secondary education (4)

1. Before PPWM:						
a. Did you have access to water every day?	Winter	Yes			No	
	Summer	Yes			No	
b. If not every day, how many days per week?	Winter	1 d	2d	3-4d	5-6d	1/m
	Summer	1d	2d	3-4d	5-6d	1/m
c. How many hours of running water did you have per available day?	Winter	Up to 3h	4-6 h	7-12 h	12-24 h	
	Summer	Up to 3	4-6 h	7-12 h	12-24 h	
d. How much was, approximately, your water consumption per month before PPWM in m ³?					..... m ³	
2. Now with PPWM:						
a. Why did you decide to replace?						
b. Do you have access to water every day?	Winter	Yes			No	
	Summer	Yes			No	
c. If not every day, how many days per week?	Winter	1 d	2d	3-4d	5-6d	1/m
	Summer	1d	2d	3-4d	5-6d	1/m
d. How many hours of running water do you have per available day? (on average with the PPWM)	Winter	Up to 3h	4-6 h	7-12 h	12-24 h	
	Summer	Up to 3	4-6 h	7-12 h	12-24 h	
e. Do you think that the PPWM is accurate? (please explain)	Yes		No		Sometimes	
	Explain:					
f. How much is, approximately, your water consumption per month with PPWM in m ³?					..... m ³	
g. Is your consumption lower now than before PPWM? If yes, how do you save/control your water use?						

3. Card charge:	
a. How far is the nearest card charge place to you (in Km or meter)?	..... km or meter
b. How many times do you charge per month?	.... time(s)
c. How much do you charge per month?	.... NIS

d. How satisfied are you with the payment method?	Not Satisfied	Satisfied	Very Satisfied
4. On PPWM device and customer service			
a. How difficult is it to use the PPWM?	Not difficult	Difficult	Easy to use
	Explain if any.		
b. What else has changed since you switched to PPWM? Have you experienced any issues with the PPWM?	Explain.		
c. Do you have any issues with the customer service for PPWR? Explain	Explain.		
d. How satisfied are you with the PPWM?	Not Satisfied	Satisfied	Very Satisfied
e. How satisfied are you with the maintenance services?	Not Satisfied	Satisfied	Very Satisfied
f. Did you need some training on the PPWM device? What training?	Explain if yes.		
j. What brand of PPWM do you have?	Name:	I don't know.	
h. Would you switch back to mechanical?	Explain Yes or no.		
i. Would you recommend PPWM to other customers?	Yes	No	
	Why?		
j. Would you be willing to join public meetings with Jenin residents to explain how you benefited from PPWM to encourage them to connect? If yes, please confirm your phone number here again:			
Phone Number:			

Any comments:

Thank you!

Result of Site Observation Tour on Prepaid Customer (Water Meter) System in specific Towns in Palestine

(as of 16th November 2017)

Item	JSC-JWV	JSC-Tubas	Nablus Municipality	Aqraba Municipality
Organization	<ul style="list-style-type: none"> - Established in 1998 - 11 villages. - Staff: ??? 	<ul style="list-style-type: none"> - JSC established in June 2013 transferring water department in municipality to JSC. - Covered area: Tubas, Tamoon, Aqaaba, Tayseer, Aqaba, Atoof, Wadi Al-Faraa. 	<ul style="list-style-type: none"> - Department of Water and Wastewater, Nablus - Covered area is Nablus Municipality. 	<ul style="list-style-type: none"> - Aqraba Municipality and nearby villages - In August 2017, Aqraba Municipality separated from JSC due to conflict. But still pay 12,000 NIS/month for operation and maintenance costs for other service (sewer, equipment, etc). - 4 staff members in total: 1 advisor, 2 technicians and 1 collector (Charger)
Background	<ul style="list-style-type: none"> - The debt was high. - There were many water thieves - Water loss was high 	<ul style="list-style-type: none"> - AfD aid started in 2010. - Before AfD project and PPWM, 1 or 2 days/week water supply. - Pipe is old and corroded since 1967 and need to be rehabilitated. 	<ul style="list-style-type: none"> - 40,000,000 NIS in debt in Municipality. - Unbilled connection increase - Customer has consumption right (cannot cut water) - Refugee camp does not pay water bill. - Nablus started disconnecting commercial users first. Force to pay bill started for commercial sector. They cut commercial connection if they do not pay. And discussion started. (In Ramarah, they go to court and we will start such measure.) For success, force is needed and people should be cooperative. 	<ul style="list-style-type: none"> - Before project, no distribution network and water is supplied by tanker to individual tank. The water price is high (price sample: 200NIS/10m3). - Municipality has no income from water supply but pay some money to JSC.
Fund Source	<ul style="list-style-type: none"> - Gov. of Palestine (funded by prime ministers in that period - D. Salam FYAD - and he lunched the project). - Grant by USAID 	<ul style="list-style-type: none"> - PPWM was introduced 5 years ago. - AfD project includes development of 2 wells and some pipeline change. 	<ul style="list-style-type: none"> - JICA in 2014 - Municipality 	<ul style="list-style-type: none"> - KfW grant project started in 2011 through PWA and the operation of water supply system started in 2014. - The project components are network construction and PPWM.
Classification of introduction of PPWM (new and/or replacement)	<ul style="list-style-type: none"> - Replacement 	<ul style="list-style-type: none"> - New installation and Replacement 	<ul style="list-style-type: none"> - Replacement 	<ul style="list-style-type: none"> - New installation
Start of PPWM	<ul style="list-style-type: none"> - PPWM installation started in 2009. The first in Palestine. - JSC forced customer to install PPWM without public awareness. Before install JSC cut 200 to 300 connections who has huge debt (3,000 or so). When JSC was installing PPWM, these debtors want to install PPWM but JSC rejected. 	<ul style="list-style-type: none"> - AfD started from Tamoon, where new water supply facilities were developed with PPWM. - In Aqaba there is lack of water. And a project was implemented and water supply condition changed. Life is better than before and people agree to install PPWM. - Then the project went to Tubas for replacement of PPWM. - In Tubas, rehabilitation and extension of water supply system were implemented. PPWM is installed to new household. But replacement is big problem. JSC has solved one by one and prepared so many scenarios for convince. - (An example is that a customer came to complain on PPWM with invoice. But JSC explained the bill by PPWM was less than before (206 NIS to 120 NIS for 6 months). Then she was convinced.) 	<ul style="list-style-type: none"> - PPWM project started donation of PPWM by JICA. 830 PPWM with the Sotko (Chinese brand and test bench) were brought. - The project is located in all Nablus area and installation are widely scattered. - Nablus added 600 by Municipality budget. - It isn't a continuous project but we go on based on customer request for PPWM installation. - Commercial users with bad paying history get PPWM installed. - (on-going) - 12,000 replacements with PPWM are planned using municipality budget. In this scheme, mechanical water meters are free and we recommend them to install PPWM but optional. - We target at the distribution zones with high debt customers for replacement. Once the number of PPWM reach 20% PPWM will be mandatory. 	<ul style="list-style-type: none"> - No rejection of PPWM when it was installed. The Municipality carry out several public meetings. - (on-going) - They are expanding service to other remote villages. The distribution line is installed by Municipality and connection fee is paid by customers.
After and before introduction of PPWM and project				
- Water supply conditions	<ul style="list-style-type: none"> - 1 day/week to 24/7 hours - Family members became more aware about water use and consumption dropped. - Consumption decreased by 30-35%. - Customers are satisfied. 	<ul style="list-style-type: none"> - After PPWM and the project (source development, network, etc), 24/7days supply was achieved. Water volume in tanks is monitored by SCADA and can be seen through web. In future, JSC want to monitor operation of PS and bulk flow meter through SCADA. - Average per capita consumption is 75 L/c/day. In Tamoon, previously use tanker water and per capita is 25 l/c/d. After PPWM, they gradually have increased water consumption and now it is 65l/c/day. 	<ul style="list-style-type: none"> - The water supply in Nablus is like 1 day on and 4 days off by pressure zone. There are 26 pressure zones. - Without improving water supply condition, PPWM is acceptable. 	<ul style="list-style-type: none"> - Before project, water is supplied by tanker. After project, normally, 24/7 days water supply. In summer, water supply stops one day a week. - Average consumption in winter and summer is 10m3/month and 20m3/month. In winter low consumption and use of rainwater keeping in tank. In summer, water is used in agriculture and animal.

Item	JSC-JWV	JSC-Tubas	Nablus Municipality	Aqraba Municipality
- NRW	- 40 % to 13%~16%	- It is not full PPWM installation so that result has not been evaluated. NRW is not assessed. And Bill collection ratio is not assessed.	- No concrete statistic if NRW or bill collection rate is improved as there are very small number of PPWM.	- No NRW - Minor leakage. -
- Bill collection efficiency - Revenue	- 40% to 100% -	- The collection rate of Tamoon is 95% from 50 % before PPWM. - By PPWM, customers can monitor consumption and be aware more of water use. In post pay system, bill comes 2, 3 months later and invoice is some 200~300 NIS/month but with PPWM less bill. Customer is not aware of water use.	- Nablus had 4,086,308 NIS debts and recovered 304,038 NIS through prepaid water meters. - PPWM revenue: 1. 2016 ----124,396 2. 2017----843,258 - A good point is people become aware, better control of finance.	- The collection rate in JSC was 60%. The collection rate is 100%. - Revenue is 80,000 NIS/month (Before the project 0)
Water Sources & supply condition	- Mecrot company - Local well (AL-yamoon well, Kferet well) - The residents collect rain water in storage tank in winter.	- Tamoon well: 240m3/h, Tubas well: 140 m3/h. In addition, in emergency, private wells can be used.	- Currently, we do not supply 24/7 hours to customers. Basically, supply hour is 1 day supply after 4 days stop by zone.	- Aqraba well - 3,200 m3/day water source for JSC (11 villages), out of which 27 % for Aqraba Municipality.
Nos. of customer	- Total population: 64,000 - Population covered: 44,000	- Total customers are 8,800 -	- 40,000 customers: -	- Population is 12,000. - Nos. of customers is 2,000.
Nos. of PPWM customer	- Current customers : 6,000 - 300 customer / year increase.	- 7,000 install PPWM. - In Tubas, 4,000 customers and 2,000 PPWM (Only Electromed), In Tamoon only Bayland. - Tubas (2,000), Tamoon (2,600), Aqaaba (1,500), Tayseer (600), Aqaba (50), Atoof (50), Wadi Al-Faraa (200)	- 1,450 (1390??). - Total of prepaid water meters are 1,293.(Residential 898 / Commercial 167 / Industrial 4 / Under constructions 4) - No PPWM in stock but we have 1,000 applicants who are waiting. We need fund.	- All customers have PPWM. - The number of PPWM customer increase about 50 /month.
Regular meters	- About: 40 (mosques, school)	- 1,800 regular meters.	- Still most of customers use regular meter.	- No regular meter.
Meter owner and location	- Customers pay for PPWM when apply but the ownership is JSC . - Installation at private premises or public domain, depending on the condition.	- Owner of meter shifted from Customer to JSC and JSC's responsibility is before meter and meter. Installation place should be entrance or outside of premises. It is better that the location of meter with box is outside.	- Ownership of PPWM is customer . -	- Meter owner is customer . - Meter is located at outside of private or entrance of premises depending on the condition. -
Type of PPWM introduced and warranty/maintenance contract	- Electromed: Turkey - Guarantee period by vendor: 10 years - Mechanical - The price of PPWM is USD140. - The maintenance contract comes with 10 years guarantee with vendors and costs 6USD/meter/year (6,000 meters = 36,000 USD/year). But JSC never paid it because the manufacture is a winner by this success. - Replacement of PPWM is free because JSC has such agreement with a maintenance company. - No regular calibration. When it is broken it will be checked by a maintenance company in Ajja. - Out of 6000 meters, 10~12 meter/month are needed repair. - The PPWM's two software used to works with some problems but not they are emerged and work well and management is easy. - The software is included with the PPWM. Test of ultrasonic PPWM - We don't use it but I installed one at my place to see its difference with regular PPWM. I learned that the regular PPWM was not counting 27% of my water consumption but the ultrasonic counted precisely. The regular ones don't count water consumption below some minimum amount. -	- Tamoon (volumetric PPWM), Aqaaba and Tayseer (velocity PPWM) - Tubas (velocity PPWM) (150 USD(500NIS)) - 2,600 Bayland and 2600 Electromed PPWM. - Electromed volumetric meter is 140 USD - Electromed mechanical meter is 130 USD - Electromed ultrasonic: 150 USD - Ultrasonic is more accurate. - Meter is one year warranty only. - The first month, 5 m3 is service. Software can be anything on calculation. - Major breakdown are butterfly and screen problem. JSC needs to replace. Meter life is more than 5 years or more. - - There is no maintenance contract with meter company. - If meter has to be replaced, cost is covered by 5NIS/month maintenance fee. - Meter maintenance is made by us. JSC hired on IT engineer. He can repair software of Electromed and butterfly replacement and screen change. He was training in Ajja maintenance center of Electromed and through OJT. Need support from meter company. - JSC use 2 softwares. -	- There are two types of PPWM in use in Nablus: - Initial PPWM in JICA project is Ningboo produced in China (SATOCO is local supplier) and the recent PPWM is Baylan produced in Turkey. - Ningbo from SadCo (The Chinese which is cheaper and has disadvantages). • For maintenance there is no annual fee up to now but from next year we need to pay. The software is not user friendly, doesn't allow additional functions for other purposes, but there are many unnecessary functions. The charge card gets messed up sometimes if by accident is touched on other meters, and all data lost. There is no thief protection. It is complex process and thief was increased. • Ningboo has many options to select in display but most of them are not used. • 9 years butterfly life, 3 years warranty, maintenance free. Within warranty, damaged meter is replaced by new one. • Ningboo may improve PPWM in next tender. - Baylan (Turkish) • It is more expensive as 150USD but good. It is purchased by Nablus municipality's budget. • First warranty will be 1 year and then after service maintenance contract will be agreed. - We have three softwares (1. Nignboo, 2. Baylan, and Mechanical). These data should be transfer to Nablus	- Bayland and Satko PPWM have been introduced. Both are volumetric meters. Meter has illegal connection protection devise. - Satko's meter price is 350 NIS. - Electricity PPM uses Satko. PPEM has been introduced since 2008. - Municipality purchased 300 meter but has software problem and returned them. To Satko installed memory and installed again. Guarantee is 5 year free maintenance. Satko has maintenance center???. - After 5 years maintenance period is expired, Municipality replace meter free using 3 NIS maintenance fee, if replace required. - Dewan software is used for municipality system. -

Item	JSC-JWV	JSC-Tubas	Nablus Municipality	Aqraba Municipality
			<p>municipal system. To transfer them, data transfer system (STS, SDK) is required. In tendering, data transfer condition will be stipulated.</p> <ul style="list-style-type: none"> - PPWM is installed in protection box. 2 room type is recommended. One room for Municipality only and the other is used by customer. This is also thief protection. The inside of box should be visible with wire mesh on top. - PPWM composed of 3 units: meter, software/server, and vending machine. These are separate cost. 	
House connection	<ul style="list-style-type: none"> - Water meter is installed by JSC. - Existing mechanical meter replacement is free. - 220 USD (first time as fix fee) + 950NIS (maintenance + connection) NIS for new connection. - First charge card comes with 5m3 for 30NIS. - Now PPWM is mandate and only option to be selected. PA campaign (brochure + house visit). - There are mechanical meters in public institution; school, mosques. (payment is made by MOE and MOR). - 	<ul style="list-style-type: none"> - Application of new connection: 30 NIS application fee and JSC will investigate main line and make house connection, go to the site, install. Meter installed and replaced by ourselves. Everything are monitored and implemented by ourselves. - An application for new connection is 30 NIS and connection (pipe, fitting, mater) 700 NIS without any fund. If fund is available, connection will be free. - Fixed maintenance fee (meter, fitting and service pipe) is 10 NIS/month but for PPWM customer, it is discounted to 5 NIS/month. This is used for replacement of PPWM after one year warranty. - Meter has options <ol style="list-style-type: none"> 1. 3 m3 for spar amount 2. 3 m3 as debt deduction 3. Fire mode 	<ul style="list-style-type: none"> - For Commercial and Industrial customers, force can be used but for domestic customers, we can't disconnect. - New connection of domestic customer is optional. - New connection of industry and commercial to PPWM is mandatory. - In replacement case people only pay for mechanical meter but can receive PPWM if they want. - Regular mechanical meter is 200 NIS and PPWM is 400NIS. New connection customer has to pay all cost but existing customer's replacement cost is free. - Buildings under construction must get PPWM during construction. After completion of construction they have an option to replace with mechanical. - In general, customers who have debt change PPWM to mechanical since they do not want to pay debt. - It's more common for rental homes to get PPWM because of the owners' interest. - No body so far asked for replacement from mechanical to PPWM so it means PPWM is not favorable one. - According to the law, electricity can cut connection if customer does not pay but water cannot cut. 	<ul style="list-style-type: none"> - Connection fee for new customer is 1,000 ~1,800 NIS including pipes and meter. - Meter and service pipe are procured and installed by Municipality. -
Public awareness campaign	<ul style="list-style-type: none"> - JSC never did public awareness campaign. Just we installed PPWM but before that people are aware of installation of PPWM by JSC through rumor or etc. 	<ul style="list-style-type: none"> - JSC started from public meeting. Municipality stakeholders and relevant institution meeting. All authority and decision maker were invited in public meeting. The information was shared with them. In vending station and bill payment section, JSC give PPWM campaign paper. Some customer change to PPWM. PA is required before, through and after the installation of PPWM. Last week, JSC implemented public meeting n PPWM and customer came to change to PPWM. - How promote to install PPWM; explained save water and save money, - There is no complaint on PPWM. 	<ul style="list-style-type: none"> - Awareness message is written in reverse side of water bill (invoice). 	<ul style="list-style-type: none"> - The Municipality implemented awareness campaign. It is simple like public meeting/talking.
Water tariff and debt recovery	<ul style="list-style-type: none"> - Same as before introduction of PPWM <ol style="list-style-type: none"> 1. 1-25m3 is 6NIS 2. 26-50m3 is 7NIS 3. 50 m3 and more is 10NIS - Customers with debt when apply for PPWM they need to first pay 1/3 of their debt amount as settlement and the rest will be paid every month/charge. - If the customer had debt, they do not satisfy with 	<ul style="list-style-type: none"> - 0~10 m3: 4 NIS - 10~20 m3: 5 NIS - 20~30 m3: 7 NIS - 30 m3~ : 10 NIS - 	<ul style="list-style-type: none"> - Favorable tariff for PPWM <ol style="list-style-type: none"> 1. 3.93 NIS/m3 (1~10) 2. Regular charge for mechanical meter is 4.2 NIS/m3; 7 % discount (PWA approved). 3. PPWM does not require deposit (200 NIS) but mechanical requires it. - The latest tariff was set in 2013 and now new tariff is requested for approval. - The mechanism of recovery of debt by PPWM: 200 	<ul style="list-style-type: none"> - 0~10 m3: 5 NIS/m3 - 10~20m3: 6 NIS/m3 - 20m3 ~ : 9 NIS/m3 - Commercial: 8 NIS/m3 - Pipeline and meter maintenance fee: 3 NIS/month/meter - If customer has debt (electricity and other municipal services), payment plan is offered through prepaid

Item	JSC-JWV	JSC-Tubas	Nablus Municipality	Aqraba Municipality
	PPWM; if they do not debt, they satisfy PPWM.		NIS charge (180 NIS is consumption and 20 NIS is debt recovery). Debt recovery depends on debt values: 50 ~ 150 NIS/ month for domestic and 1050 NIS/month for commercial.	system. They decide % of debt for payment by card.
Payment method (Vending station)	<ul style="list-style-type: none"> - 11 stations each village and 14 supermarkets. Almost 24 hour service is available. JSC has agreement with supermarket station. 2 NIS/charge paid by customer for charge fee at supermarket. 	<ul style="list-style-type: none"> - 6 vending stations in JSC, In Tubas only one vending station in Municipality office. It is not convenient to come there from remote area. JSC plan to use supermarket for vending station, which is almost 24 hours. - Customer can get summary of payment. - A card can keep 3 m3 in case of finishing of charge. 	<ul style="list-style-type: none"> - Only one vending machine is installed in municipal office which is not convenient for scatted PPWM users. 	<ul style="list-style-type: none"> - Payment by charge station in municipality office which is located in the center of city. Open at 8-2PM and 4-6PM. They now plant to open supermarket charge station to increase open hours. - Customer also uses electricity charge station. - Mosque and school is normal meter and charge is paid by Mistry of Finance.
Meter problems	<ul style="list-style-type: none"> - In general, PPWM are good and deficiency rate is about 1%. Sometimes the sensors get broken. - 2 batteries are inside. The life time will be 10 years but if they charge money more frequently the life time will be reduced (8 years or so). - Reasons for out of order is PPWM Calcification of the screwed part of PPWM (where the inflow pipe is screwed) - Meter air problem. Air valve is included in the PPWM????? So that not much air problem. It is rare. Accuracy change by air is not major. - If something wrong with meter and call to JSC, it will be fixed. JSC has a prompt problem solving system. - Spares parts stocked: Buttery, click, caps. 	<ul style="list-style-type: none"> - Mechanical meter has minimum flow (10~12L/h). If customer uses this flow rate in a month, it consume 7 m3/month. But ultrasonic can measure this flowrate. - Software is problem. We want to use SDK, which use any PPWM. Ankara in Turkey use same software and use any maker's PPWM. 	<ul style="list-style-type: none"> - Air problem in intermittent supply. If customers complain for air account we recommend them to buy ARV (air relieve valve) and attach to the meter. It's only 50NIS. 	<ul style="list-style-type: none"> - They said Satko is better. Bayland meter counts air. They installed air releasing valve. Air problem occurs in summer when pipe contain air due to intermittent supply. (This problem solution is JSC's responsibility but they cannot solve it. This is one of the reasons why we separate from JSC.)
Illegal use and penalty	<ul style="list-style-type: none"> - Meter has a censer to find thief. If this censer is tampered, penalty is 200 NIS in normal case. If there is more serious thief, committee is formed and decide how much of penalty depending on thief volume. 	<ul style="list-style-type: none"> - There are many cases. One example is a drilling of stop valve. Such illegal was found routine consumption check (less consumption in certain period and charge amount per charge (very low) and charge frequency. JSC staff has to monitor the database and meter indicators both of mechanical meter indicator and monitor of electrical part). In a case, mechanical meter indicate 6 m3 but electrical part indicates 600 m3. He paid 600 x 10 =6,000 m3. - Customer rotated galvanized meter box which is loosely equipped on wall and they steel water form gate valve. - JSC have to visit customer and check meter periodically, check billing frequency, charge amount one time, total charge comparing with assess amount of customer, etc in database, and find illegal case. - JSC has to deal with illegal connection and if found PPWM is installed to pay for water. 	<ul style="list-style-type: none"> - First penalty is 100 JD (500NIS) for domestic users and defer by customer type. Then estimate the volume stolen and charge it. Domestic 250 NIS, Industry 5,000 NIS. 	<ul style="list-style-type: none"> - No illegal connection.
Operation and maintenance	<ul style="list-style-type: none"> - The staff uses WhatsApp for good communication especially in emergency cases. - The staff also check PPWM every 6 months and get help of technical staff of JSC when the village is too big and they can't check all by themselves. The staff work regular hours from 8AM to 2:30PM. - Every 6 months, meter check is made by JSC. And they check database for abnormal consumption. 	<ul style="list-style-type: none"> - Extra meter readers were relocated to multifunction staff. meter reader for 10 days and technician for the rest of days (new house connection, collection management, etc.), 		<ul style="list-style-type: none"> - They check monthly consumption, find abnormal values, and check the meter of abnormal value. They also check water volume of main meter (source) and 5 branch main meters and compare corresponding bill consumption for illegal use or leakage. - The service is good response. 24 hour's phones service. - No complaints. If there is, the municipality solve quickly. The Municipality has trust with Customers and good communication.
Social case	<ul style="list-style-type: none"> - The Law stipulated that water tariff shall be reduced for poor people. But we have not exercised this even though the software has this function for calculation 	<ul style="list-style-type: none"> - They do not have any social case. But JSC recommend Ministry of Social Affair list social cases and some specific discount is considered like case of 		<ul style="list-style-type: none"> - 86 social cases (poor families). Water charge is free for these social cases. The municipality has such budget.

Item	JSC-JWV	JSC-Tubas	Nablus Municipality	Aqraba Municipality
Challenge encountered and encountering	<p>since MoLG do not show us who is poor. Also According the Law, all people have to pay for water.</p> <ul style="list-style-type: none"> - Some customers yet think why they should pay for water. Water should be free. Why do we need to pay for water and it is for granted. - Some customers didn't know how to deal with PPWM. It is new idea and people do not understand. - Cost too much. (Extra cost for employee, they believe) - Why we have to pay first and get service later? - More efforts from technical staff. Need orientation and PA and more awareness. Employees explained to household. - Revenue is increased but still cannot cover full cost but only cover O&M costs and salary. The operation cost is now covered by revenue from PPWM but they need fund for construction cost. 	<p>electricity.</p> <ul style="list-style-type: none"> - - Problem is in Tubas, where water supply service has made since 1965 and existing meter has to be replaced. In the other areas, introduction of PPWM with new water supply system development so that it is easy to accept and install. - In Tubas, customer has large debt (6 million NIS) with mechanical meter and there is much unaccounted water. Irrespective of illegal or legal, all water has to be accounted. At first, any drop of water including all mosque, school, municipalities, institution, in which mechanical meter is installed, should be accounted. Then the next step is payment. - At beginning, malfunction/inaccurate mechanical meters were found and changed to accurate mechanical meter in the first 2 years. Then NRW decreased from 45 % to 25%. - AfD introduced PPWM. Some people refused. There is no magic stick to install PPWM and use diplomatic way. If not paid, JSC bring it to court. - Strategy <ul style="list-style-type: none"> - 1. install PPWM to any new house connection - 2. Any mechanical meter doesn't work correctly, it is replaced with PPWM. - 3. For high consumption and large debt customers, find problems, install PPWM and compare the current bill with previous bill. Advise customer use less water than before. Otherwise, go to court. Strong enforcement. - If customer has debt, he wouldn't change to PPWM. At begging, when PPWM is installed, Customer is not asked about debt repayment. After 2, 3 months, they are asked to be paid by installment. If he rejected, go to court. Any customer he has large debt, take some % from each charge. 	<ul style="list-style-type: none"> - PPWM is expensive each costs 400NIS. We request grant. - We have a problem with refugee camps. - PPWM is so scattered over the city, which makes PPWM difficult to control and monitor even though they are located in GIS. Not enough staff. - - Fund for PPWM 	<ul style="list-style-type: none"> - No main challenge because the water supply condition is improved together with PPWM introduction. - Problem is meter counting air. - In August 2017, the municipality separated from JSC. Previous management by JSC is not good with customers JSC does not care customers. The Municipality care of and repair anytime and has good relationship with customers. - The meter connection with public meeting. The meter is checked monthly. - It snow in winter, when meter is broken by freeze. Awareness required protecting water meter in winter. -
Reason for success	<ul style="list-style-type: none"> - No extra money for customer (replacement cost was paid by provider). - 24 hour water supply. People knew water is available so they accepted PPWM easier. - 24 hour phone service for customer, use "What's App". Technical team works at night also. Response time is within about 5 minutes. - Water is cheaper, available, and good quality water. They pay for what they use. - 	<ul style="list-style-type: none"> - 	<ul style="list-style-type: none"> - It is too early to evaluate success. - We had very good experience in Aqraba. - 	<ul style="list-style-type: none"> - 24/7 days water supply service. - Good and responsive service of municipality. 24 hours phone service. They respond anytime and to any person. - The Municipality has trust with customers and good communication.
Recommendations	<ul style="list-style-type: none"> - Strategy is not introduction of PPWM for revenue increase but improve water supply. - You may not need public awareness. If you do it people will be against it. If you are weak or hesitant, people will attack you. - PA1 is good for the first model since it is new zone and people are high income and educated. They will easily understand introduction of PPWM. And it will be successful. He commented you have to make a successful case at first and expand it to other areas. To succeed, you need to improve water supply hours 	<ul style="list-style-type: none"> - Improvement cycle is important: <ol style="list-style-type: none"> 1. New resource development 2. Storage capacity expansion 3. Main line improvement 4. Install PPWM 5. Illegal use control 6. Rehabilitation 7. NRW control 8. Expansion - Introduction of PPWM start with influential people. Mayor, JSC manager, member of council, board 	<ul style="list-style-type: none"> - Make sure if there is water. - Focus on one area. Model area or small test area project for PPWM introduction are better than scattered area. - Make awareness. We did radio, Facebook, and some NGOs help. It took us 3-6 months of PR activities. - They said PA is the most important in Introduction of PPWM. They use social media, radio, and train meter reader and they educate the customers. - City council knows NGO, who have a lot of presentation in the city. But it is still not enough. 	<ul style="list-style-type: none"> - Cancel old network and install new network. Improve water supply conditions and introduction PPWM. -

Item	JSC-JWV	JSC-Tubas	Nablus Municipality	Aqraba Municipality
	<p>24/7. He proposed us to start from small area (Sabah Al Khir: 300 PPWM) in PA1, where you can supply 24/7. The municipality may have some funds to improve network in this area to improve water supply condition.</p> <ul style="list-style-type: none"> - Purpose is to improve water supply condition, but not to install PPWM and for the purpose, PPWM is installed. - He will assist the project for PA campaign in PA1. - He recommended volumetric PPWM, which is accurate but not velocity type. Also ultrasonic PPWM is more accurate. The price of both is not much different. - The difficult parts of Jenin for introduction of Jenin are: refugee camp and eastern part of Jenin, which is difficult, trouble maker and poor. 	<p>member, employees. Signal that we are going to start with us.</p> <ul style="list-style-type: none"> - All monitoring activities should be integrated - check water source, network, tank, customer meter, etc. and made by themselves - 	<ul style="list-style-type: none"> - PA dept. has 9 staff. They are ready to share us in public awareness activities. - Token system of payment like telephone would be good so customer don't need to come to pay centers or Municipality to charge. 	

Questionnaire for Non-revenue Water Management - Initial assessment (For Technician level)

THE PROJECT FOR STRENGTHENING THE CAPACITY OF WATER SERVICE
MANAGEMENT IN JENIN MUNICIPALITY

Time: **90 minutes**

Please answer all questions. Mark correct answer(s) with (✓) symbol or choose and write the numbers/letters as instructed in each question.

Section A: Leak, Water Pressure, and NRW in general

QA1: In NRW management, reference is usually made to IWA and DMA. Please write their full forms.

Full form of IWA is: _____

Full form of DMA is: _____

QA2: What are the main causes of leakage from water supply network?

- (a) Poor workmanship
- (b) Poor quality of materials
- (c) High pressure
- (d) All of the above

QA3: What happens to leakage when the water pressure is increased?

- (a) Leakage rate decreases
- (b) Leakage rate increases
- (c) There will be no change in leakage rate
- (d) I do not know

QA4: What is meant by 'visible' or 'surface' leak?

- (a) That leak which does not appear on the ground and needs sounding survey to find it
- (b) That leak from which water is appearing on the ground
- (c) None of the above

QA5: In which of the following types of pipe the leak sound travels farthest?

- (a) Polyethylene
- (b) PVC
- (c) Steel
- (d) Concrete

QA6: Why is it necessary to bury pipe to the proper depth?

- (a) To protect from extreme weather
- (b) To protect from external load
- (c) To protect from vandalism
- (d) All of the above
- (e) None of the above

QA7: What is the desirable water pressure in a distribution system?

- (a) 10 bar
- (b) less than 1 bar
- (c) about 2 bar
- (d) I don't know

QA8: What are the benefits of reducing NRW?

- (a) Save water (b) Increase revenue collection
 (c) Make better image of Jenin Municipality (d) All of the above
 (e) None of the above

QA9: If a system has a revenue water ratio of 65% what is its non-revenue water?

- (a) 20% (b) 35% (c) 50% (c) 100%




Section B: Tools/Equipment and their use




QB1: Which equipment is used for the tasks listed below? Please choose from the list of equipment.

Answer	Tasks	Equipment
	1: To measure water flow in pipes.	(A) اصل سمع A. Listening Bar
	2: To measure water pressure in pipes.	(B) جاز لئس فليث سرب B. Leak Noise Detector
	3: To mark the locations of leakage in order to repair efficiently.	(C) ش كوش ي دوي C. Boring Bar
	4: To listen if there is leakage noise by touching pipes directly.	(D) D. Ultrasonic Flow Meter
	5: To detect leakage occurring in buried pipes from ground.	(E) E. Pressure Logger
	6: To detect invisible manhole lids or gate valve lids.	(F) دهان احمر F. Spray Paint
	7: To confirm the locations of leakage by pin pointing.	(G) جاز تميدي مس ارال خطوط G. Metal Pipe Detector
	8: To detect buried metal pipes.	(H) جاز تميدي غطاء الم من اهل H. Metal Locator

QB2: What is the equipment in the photo? Please choose from the list and write the letter above the picture.


A: Electromagnetic flow meter	E: Listening Bar
B: Metal pipe detector	F: Leak Noise Detector
C: Ultrasonic flow meter	G: Boring Bar
D: Pressure Logger	H: Digital camera

QB2-1	QB2-2	QB2-3
		

QB2-4	QB2-5	QB2-6
		


QB3: Please answer according to the following photo.

Q: B3-1

Answer	Choices	What are they doing?
	A: Pipeline Sounding Survey B: Pinpoint Leakage C: Recording the Leakage D: Leakage and illegal use survey E: Pressure logger setting F: Repairing work G: Metal pipe detection	

Q: B3-2

Answer	Choices	What is he doing?


	<p>A: Pinpoint Leakage Survey B: Recording the Leakage C: Pipeline Sounding Survey D: Leakage and illegal use survey E: Pressure logger setting F: Repairing work G: Metal pipe detection</p>	
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QB3-3: Please answer according to the following photo.

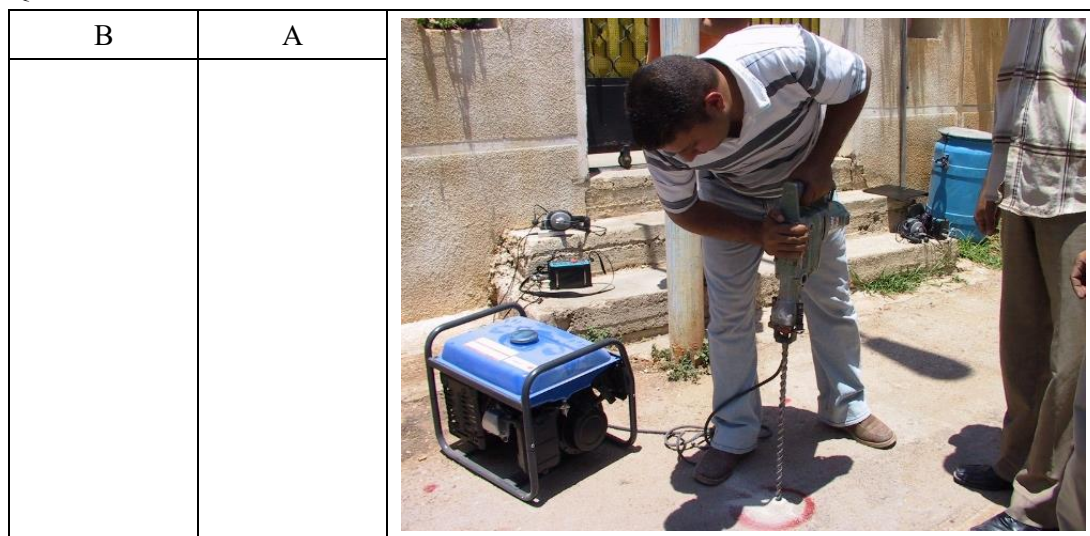
They are using A to do B.

B	A
<p>1: To listen if there is leakage noise by touching pipes directly. 2: To detect leakage occurring in buried pipes from ground. 3: To confirm the locations of leakage by pin pointing. 4: To measure water flow in pipes. 5: To measure the pressure in pipes. 6: To mark the locations of leakage in order to repair efficiently. 7: To detect buried metal pipes. 8: To detect invisible manhole lids or gate valve lids. 9: To record the locations of leakage and pipes.</p>	<p>1: Boring Bar 2: Generator & Power Drill 3: Leak Noise Detector 4: Illegal use survey 5: Pressure Logger 6: Metal Locator 7: Metal pipe detector 8: Ultrasonic Flow Meter 9: Listening Bar</p>

QB3-3-1

B	A	

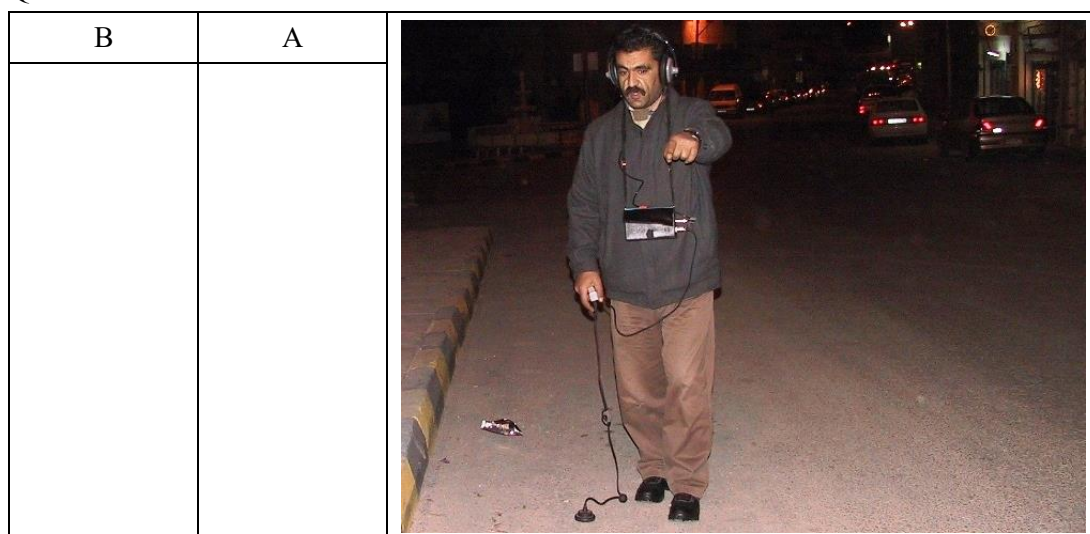
QB3-3-2




QB3-3-3






QB3-3-4



QB3-3-5

B	A	
		

QB4: Please circle the bad installation of ultrasonic flow meter's sensor.

1	2	3
		

QB5. For leakage surveys using sounding equipment

- (a) Lower water pressure is better (b) Day time is better than night time
(c) Higher water pressure is better (d) None of the above

QB6. Leakage survey using sounding equipment is mostly done at night because

- (a) Less noise at night time (b) Water pressure is generally high at night
(c) Both (a) and (b) (d) None of the above

QB7. During leakage survey, sound from water use by customers can better be avoided by

- (a) Listening near the water meter (b) Listening with ground microphone rather than listening stick
(c) Closing the valve near water meter (d) Asking the persons at house not to speak

QB8. Ultrasonic flowmeter doesn't work when

- (a) The pipe is not flowing full (b) Air bubbles are present in pipe

(c) Both (a) and (b)

(d) None of the above

QB9: Please mark your answer with (√) mark

B9-1	The mechanical listening bar requires batteries.	Correct	Incorrect
B9-2	With the Digital Listening Bar we can hear leak noise louder than the listening bar.	Correct	Incorrect
B9-3	The metal locator finds the metal covers of the valve that are buried underground.	Correct	Incorrect
B9-4	The metal locator can determine the size of the metal cover buried underground.	Correct	Incorrect
B9-5	The metal locator can measure the burial depth.	Correct	Incorrect
B9-6	The Metal Pipe Locator requires a transmitter and a receiver.	Correct	Incorrect
B9-7	The Metal Pipe Locator can measure the burial depth.	Correct	Incorrect
B9-8	During water stoppage, the Metal Pipe Locator cannot be used for detection.	Correct	Incorrect
B9-9	The water leakage survey is possible with the Leak Noise Detector (ground microphone) during water stoppage.	Correct	Incorrect
B9-10	The Leak Noise Detector (ground microphone) can be used for plastic pipes.	Correct	Incorrect
B9-11	When setting up ultrasonic flowmeter, it would be better to place the sensors near the bend on pipes.	Correct	Incorrect
B9-12	When setting up ultrasonic flowmeters, it is good to place the sensors either on top or bottom of the pipeline.	Correct	Incorrect

Section C: Water Meters and Pumps

QC1: Customer water meters in Jenin are mostly

- (a) Class A (b) Class B (c) Class C (d) Class D

QC2: Most accurate water meter among the listed below is:

- (a) Class A (b) Class B (c) Class C

QC3: Please circle which of the following factors **does not** cause meter inaccuracy.

- (a) Inaccurate installation (b) Poor maintenance (c) Meter deterioration due to age
 (d) Improper meter size, meter too big or too small (e) Illegal alteration or remodeling
 (f) Horizontal positioning of meter

QC4: What is the meaning of 'meter under-registration'?

- (a) The meter shows more volume of water than the actual
- (b) The meter shows less volume of water than the actual
- (c) The meter shows exact quantity of water

QC5: If a customer meter reading shows 92 m³ but the actual quantity of water is 100 m³, what is the % of meter under-registration?

- (a) 92%
- (b) 100%
- (c) 8%
- (d) 192%

QC6: What is the meaning of letter 'H' written on water meter dial?

- (a) The meter cannot be installed in horizontal position
- (b) The meter can only be installed in horizontal position
- (c) The meter can be installed in vertical position
- (d) The meter can be installed in any position



QC7: Please answer the value of meter reading in m³.

Answer: _____ m³



QC8: If downloaded flow data is 120m³/h, how many liters will be by one minute?

Answer	Choices
	A: 180 Littler
	B: 600 Littler
	C: 1200 Litter
	D: 2000 Litter

121	119.9
120	120.1
119.9	118.1

←

QC9: Please mark your answer with (√) mark

	Leakage survey, water balance, and MNF measurement		
C9-1	For sounding survey, the higher the water pressure, the louder will the leak noise be.	Correct	Incorrect
C9-2	The leak noise will be heard better on paved streets than on non-paved streets.	Correct	Incorrect
C9-3	By listening to the pipelines, blockage in the pipe can be found.	Correct	Incorrect
C9-4	Sounding survey is possible in any pipe type.	Correct	Incorrect
C9-5	Where there is a loud noise, there is always a large leak.	Correct	Incorrect
C9-6	For minimum night flow (MNF) measurement, the area should be completely isolated.	Correct	Incorrect
C9-7	The supplying of water can be stopped during the MNF measurement (the water supply pump can be stopped).	Correct	Incorrect
C9-8	The MNF level occurs during the time when the water is not used, which is usually at about 2 to 3 o'clock in the morning.	Correct	Incorrect
C9-9	For a water balance survey, all the subscriber meters within the area to be surveyed should be read.	Correct	Incorrect
C9-10	The water volume measured by a district meter (DM) includes the leaked water inside the DMA.	Correct	Incorrect

Your name: _____

Position: _____

The End!

Thank you!

The Project for Strengthening the Capacity of Water Service Management in Jenin Municipality**Interview Questionnaire for Capacity Assessment of Individual Members**

استببي اقلتي م قدرات لطقم

(The result of this questionnaire shall only be used for Capacity Assessment and not be shared with any other person not related. Your name will remain secret. Nobody will know whose answer is this.)

نتائج نتبين استببي استخدام التقييم لطقم قدراتك طول نتببم اط غير ذوي لالع قة على نتببج العال نتببم وضع على نتبين ولن يعرف احد من صاحب بة.

1. Position and working experience

1. المسمى الوظيفي والخدمة

- 1) منذ متى عملت في نظارة الياه؟ _____
- 2) منذ متى عملت في وظيفتك الحالية؟ _____
- 3) هل عملت في وظيفة اخرى سبقا (داخل البلدية)؟ _____
- 4) اذا كان ال جوابي ال سؤال لسبق عن عملك مسنة عملت في ال وظيفة _____؟
- 5) هل وظيفتك مؤقتة ام انت موظف نهبت؟ _____
- 6) ما هو مستوى تعليمك؟ _____

- 1) How long you are working in this Department? _____
- 2) How long you are working in this post? _____
- 3) Had you worked in any other position before this post? _____
- 4) If yes, for how many years? _____
- 5) Are you a temporary or permanent employee? _____
- 6) Your academic qualification: _____

2. What are the tasks you do every day (regular tasks) in normal situation? Please list 3-5 main tasks.

2. ما هي ال مهمات التي تتؤديها بشكل يومي في كل الاعيادي (الكتب 3-5 فيها).

- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____

3. What are the additional works you are required to do when there is any water emergency such as a pipe burst?

3. ما هي ال اعمال اضطرارية ال مطلوب فيك عملها عند حدوث وضع طاريي ينعقد قبل ال اه نحل في جاز خط م؟

- 1) _____
- 2) _____
- 3) _____

The Project for Strengthening the Capacity of Water Service Management in Jenin Municipality

4. When you are in vacation who takes care of your work?

4. من يقو وبتأية المالموكول ةاليك عخدم لتكوفري اجازة؟

5. Is anybody officially deputed to take care of your work in your absence?

5. هل يوجدنك ارسيا عك عخدم لتكوفري اجازة؟

6. What are the major technical challenges (problems) you face at your routine work? Please list 3-5 numbers.

6. ما هي التحديات والعقبات الةي يوري ةالتي تواجه هلي عملك الةيومي المصاا؟ ذكر 3-5 من هذالتحيات.

1) _____

2) _____

3) _____

4) _____

5) _____

7. How do you solve those challenges?

8. كيف تفق وبتأية عمل مع هذالتحيات والعقبات؟

1) _____

2) _____

3) _____

8. There may be some problems you cannot solve on your own. Approximately what fraction of problems you can solve on your own? Such as half or two-thirds etc.

8. من الكيفض المشارك الةي تتطع حل ه. هه هي ربة هذالمشارك الةي تتطع حل هلفينسك؟
الجاب: _____

Answer: _____

9. What are the three main reasons you cannot solve the problem?

9. ما هي ا بابال يوري ةالتي يتجل ك تتطع حل هذالمشارك؟

1) _____

2) _____

3) _____

The Project for Strengthening the Capacity of Water Service Management in Jenin Municipality

10. Do you want to improve Water and Wastewater Department? If so, what areas should be improved?

10. هل ترغب بتطوير نظارة المياه والصرف الصحي؟ ما هي المجالات التي ترغب بتطويرها؟

- 1) _____
- 2) _____
- 3) _____

11. Do you want to improve water supply conditions in the city? If so, how it should be improved? And what do you need to do?

11. هل ترغب بتطوير الوضع الحالي لخدمات المياه في المدينة؟ وكيف ينبغي تحسينها؟ وماذا تحتاجون للقيام بذلك؟

12. Please select 5 main issues of water supply in Jenin

12. من فضلكم قبا اختيار 5 امور تواج متزويد المياه في المدينة؟

مشاكل التوزيع في المدينة	مضخات قديمة جدا	قلة الاستثمار في البلدية للطواقم العاملة
عدم توفر قطع الصيانة والمعدات	تقني صعبة قطاع المياه	عدم رضا المواطنين عن وضع المياه
جودة المياه غير جيدة	اقتناء سعر شراء المياه من المصادر الخارجية	الوصف غير الشرعية
مصادر المياه شحيحة	كثافة الصيانة والتشغيل منخفضة	عدم قوة وشراكات في العدادات
تقني صعبة قطاع المياه	قلة الطواقم العاملة	عدم كفاءة شبكة المياه
عدم وجود خطة للصيانة والتشغيل	ادارة ضعيفة	تقني سعة كواب المياه
نقص المياه	الريثيق لييل	توجد خلل في العمل

Many water leaks	Old pump station	Less skill and technology of staff
Insufficient materials and equipment	Low tariff collection rate	Customers' dissatisfaction for water supply
Illegal connection	High cost of bulk water purchase	Bad water quality
Meter malfunction or inaccuracy	High operation and maintenance cost	Insufficient water source
Inadequate water supply network	Insufficient staff	Low water revenue
Low water tariff	Weak management	No operation and maintenance plan

The Project for Strengthening the Capacity of Water Service Management in Jenin Municipality

No motivation to work		Low salary		Water shortage	
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13. Have you taken any special training for the current job? If yes, what type and how long?
13. هل كنت قد أخذت أي تدريب خاص لوظيفتك؟ إذا كان الأمر كذلك، فما نوع التدريب ومدته.

14. What are the main motivating factors for you in this job?
14. ما هي العوامل التي تحفزك في عملك؟

15. Are you willing to learn new subjects and technologies related to your job?
15. هل ترغب بتعلم مهارات جديدة تتعلق بوظيفتك؟

16. How much time (how many hours) you can set aside (give to) every day for learning new things / doing additional tasks after completing your regular tasks?
16. كم من الوقت (بكم ساعات) يمكنك تخصيصه كل يوم للتعلم أو القيام بمهام إضافية بعد الانتهاء من عملك الروتيني؟

17. Are you familiar with the objective and scope of this (Capacity Strengthening) project?
17. هل أنت على دراية بأهداف وغايات مشروع تعزيز القدرات (التي هي)؟

18. Do you have any question related to this project?
18. هل لديك أي أسئلة تتعلق بهذا المشروع؟

The End!

شكراً جزيئاً على المشاركة
Thank you so much for your time and patience.

Questions for Engineer's LevelTime: **90 minutes****Please provide your answer in a separate answer sheet. Just write the question number and then answer. No need to copy the question.****Questions related to advanced knowledge on NRW**

- Q.1. Are you familiar with IWA water balance terminology? What are the main three components of NRW? (4)
- Q.2. IWA suggests main four components of measures to reduce real losses. Can you list these four components? (4)
- Q.3. 'Active leakage control' is one of the four components of real loss management. Can you explain the difference between an active and passive leakage control? (4)
- Q.4. Can you explain how 'Speed and quality of repairs' is important in reducing real loss? (4)
- Q.5. Are you familiar with the concept of Fixed and Variable Area Discharge (FAVAD)? If yes, what is the relation between pressure and leakage rate? Do you have any idea about the power coefficient (N1)? (5)
- Q.6. Why is it important to measure pressure at several locations including the Average Zonal Point and Inlet Point in MNF study? (5)
- Q.7. What are the benefits of establishing DMA? (5)
- Q.8. Can you give a practical example from Jenin of 'Unbilled authorized consumption'? (2)
- Q.9. There are two approaches in assessing NRW components, top-down and bottom-up. Do you know what these approaches are? (4)
- Q.10. Expressing NRW as percentage of system input sometimes gives misleading information. What are other better indicators of expressing NRW? (4)
- Q.11. Can you explain what is meant by the 'production cost' and 'selling price' of water? Is it good to have the average selling price of water lower than the production cost? Why yes or why no? (4)
- Q.12. Do you know what is meant by 'connection density'? Why is this important while expressing real loss in different terms? (4)
- Q.13. The Infrastructure Leakage Index (ILI) is the ratio of CARL/UARL. Do you know what is meant by CARL and UARL? (4)
- Q.14. UARL is calculated as, $UARL \text{ (liters/day)} = (18 \times L_m + 0.8 \times N_c + 25 \times L_p) \times P$. Do you know what L_p is? (2)

Questions related to DMA and conceptual analysis

- Q.15. What challenges you are going to face in selecting and establishing the first DMA? (4)
- Q.16. What kind of challenges you see for measuring Minimum Night Flow in the DMA? (4)
- Q.17. Why is it important to have not many inlets or outlets in a DMA? (3)
- Q.18. Do you think pressure management will be required in your DMA? (2)
- Q.19. How important do you think is the role of service connections in reducing NRW? Why? What are the major problems with service connections in Jenin? What is your suggestion to improve the situation? (5)

Q.20. 'Changing to continuous supply from intermittent is essential to achieve consistent low level of NRW'. Do you agree with this statement? Why and why not? (5)

Questions related to tools/equipment

Q.21. What are the main advantages and disadvantages of ultrasonic flowmeter over conventional mechanical meter? (5)

Q.22. Have you heard about any method of locating underground non-metallic pipe? (4)

Q.23. Have you heard about single and multi-channel data loggers? What is the main difference between these? (5)

Q.24. For older meters, what class of customer meters are generally used in Jenin? Class B or C? What is the main difference between Class B and C? (4)

Q.25. For newer meters, accuracy class is defined by the value of R. Do you know the meaning of R? What is the R value of customer meters generally used in Jenin? (4)

Name: _____

Position: _____

The End!

Thank you so much!