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Business Regulatory, Investment, and Trade Environment Program (BRITE)

GUIDE FOR CONDUCTING A TIME RELEASE STUDY - MOLDOVA CUSTOMS SERVICE

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CONTENTS

1. Introduction

This guide is designed to assist officers of the Moldovan Customs Service (MCS) to expand on and develop further the information initially gathered during the three Time Release Studies (TRS) undertaken by the BRITE project as a joint effort by MCS and USAID in 2013, 2014 and 2016.

It will help in the design, operation and analysis of any subsequent TRS by allowing the collection of comparative and also additional data for analysis.

This guide should be treated as an extension to and not as a substitute for the World Customs Organisations (WCO) "Guide to Measure the Time Required for the Release of Goods-Version 2" which was published in 2011 (WCO Guide).

This guide provides both an overview of the concepts behind the TRS methodology developed by the WCO and an extension to the information in the WCO Guide. The extra information is provided through additional supporting materials written generally in a Customs context to cover in greater depth some of the steps which are dealt with only briefly in the WCO Guide.

Further, the material in this guide can be used to enhance and inform the Customs Management Information System (MIS) beyond simply the next TRS. This can be achieved through analysing periodically the data contained in the UNIPASS and ASYCUDA databases and comparing the outcomes with the baseline data from the TRS.

The next chapter aims to provide a deeper understanding the logic applied in the development of a TRS Methodology as set out in the WCO Guide. This is done by using specific examples where appropriate from the Moldovan trade facilitation environment. The objective for this chapter is to expand on the information provided in some areas of the WCO guide and to encourage users to expand their use of the data developed in the TRS into other tactical and strategic areas of the customs MIS .

The third chapter covers process flowcharting. This is included because the WCO Guide encourages the use of process flowcharting to develop an initial understanding of the complex systems that the TRS will investigate like the import, export and transit procedures. This flowcharting is necessary in order to firstly, cohesively describe the information you have assembled about the system in a coherent fashion and, secondly, to highlight and understand what more needs to be identified before commencing the TRS.

Chapter four explains, with examples, some sampling techniques that can be applied to reduce the cost and complexity of future TRS activities. Such an approach is appropriate because analysis of the TRS from 2014 and 2015 allowed the statistical characteristics of the data to be analysed and understood. Further development in this area is important because the WCO Guide is generally written from the point of view of a first TRS project in a country in order to establish the baseline TRS data where little information is known about the nature of the systems being analysed.

Subsequent analysis has shown that many of the transactions investigated display a single sided normal distribution. With this information it should be possible to reduce the size of the sample required (although generally not the duration over which the sample is taken) for subsequent research and analysis in this area.
Finally, the guide provides the methodology, operational plan, flowcharts and forms developed for the 2016 TRS.

2. Understanding the Customs Time Release Study

This chapter provides an overview of the concepts behind the development of the TRS methodology. To do this, it firstly covers the discipline of performance measurement and management for which TRS is a very specific tool. It then explains the history of the TRS methodology and how it has been simplified over time.

The remainder of the chapter covers the purpose and phases of the customs time release study methodology. This emphasises that the TRS should not be a one-off event but rather a continuing periodic cycle where the cycles are not based exclusive on the calendar (that is performed every two, three or four years) but based on events. That is that they should be scheduled to measure the impact of major changes to procedures or legislation at a time shortly (about six months to allow for the learning curve) after the change has occurred.

The chapter then considers in detail each of the three phases of the TRS covered in the WCO Guide, namely:

- Phase One Preparation and Planning covering:
  - 2.5.1: The Working Group;
  - 2.5.2: Scope and Design for the Study;
  - 2.5.4: Planning the Methodology;1
  - 2.5.5: Developing the Detailed Plan;
  - 2.5.6: Sampling; 12
  - 2.5.7: Developing Information Collection Forms; and
  - 2.5.8: Pilot Run;
- 2.6: Phase Two: Data Collection and Recording;
- 2.7: Phase Three: Analysis, Conclusion and Recommendations covering:
  - 2.7.1: Verification of Data;
  - 2.7.2: Analysis of the Data; and
  - 2.7.3: Finalizing TRS Report and Press Release issue.

2.1: Performance Measurement and Management

This section explains the background from which TRS was developed. It is included to show that the same general methodology applied under the TRS can also be used for a wide range of other management, quality assurance and control reporting purposes and not just for establishing the speed at which imports, transits and exports move through the control and revenue collection system.

The TRS has developed as part of the engineering based discipline of performance management. The foundation concepts were originally developed more than one hundred years ago as “Time Studies” by Frederick Winslow Taylor a mechanical engineer who sought to improve industrial efficiency and described the processes and first outcomes in his book first published in 1911 and called “The Principles of Scientific Management”[1].

The concept he developed was to apply mechanical engineering principles to the work done on the factory floor. This concept later extended to analysis of processes in similar locations where there were a large number of complex procedures performed by multiple actors to

[1] This book remains in print today in several languages including English, German, French, Arabic, Japanese and Chinese.

produce a single outcome or multiple potentially competing outcomes (including border posts where customs, border police and other agencies all combine in a complex of objectives including protecting the national wellbeing, economy and revenue).

This early work was instrumental in the creation and development of a new branch of engineering which is now known as "industrial engineering" and under this discipline correct performance measurement requires systemic identification and measurement of all of the important functions in a system to ensure accuracy.

Following the full process of this disciplined methodology is essential because before you can improve any process you must examine the process to identify:

- What are the important parts of the procedure;
- What parts of the procedure can be measured;
- What parts of the procedure are common to all transactions;
- What parts of the analysis will vary by case or location.

To achieve this the most basic rules which must be followed in every case are:

- The performance measures developed must be simple to perform and easy to understand. Ambiguous or unduly complex systems of measurement will increase the likelihood that the steps are misunderstood or misapplied thereby increasing the risk of error.
    - As an example, when explaining how to measure the time taken to x-ray a truck the instructions developed must explain that the measurement period starts from the time the truck joins the X-ray queue and only ends when the truck is released after the x-rays have been checked. It is not simply the time taken to make the x-ray.
- Performance measures must be relevant. This means that while many things can be measured each measurement will take time and money to collect. So only those measurements which are needed should be collected.
    - As an example, because the TRS looks at time taken from a trade facilitation point of view we do not need to know in detail all of the different procedures covered by red, yellow, and green channel activity but only at how long processing in each channel takes and what percentage of transactions are directed down each lane.
- Performance measures may need to be adapted to recognise cases where the local situation varies from the initial plan or expectations.
    - As an example, at Chișinău 3-PVI Industrială trucks enter and leave through the same gate while at Chișinău 7-PVI Petricani they enter by one gate and leave by another gate not visible from the point of entry. This will impact both on the time taken for trucks to be processed and also on how the data is to be collected at each ICP.
- Performance measurement must be a cyclical process because things change with time.
    - As an example, the next TRS after that performed in 2016 should be performed a short time (say six months) after the single window system is fully implemented, or EU simplified procedures are fully implemented.

To accurately identify the essential events in the customs clearance process the WCO has developed, tested and improved the TRS methodology into a tailored performance management tool. It is designed specifically to measure the performance of trade facilitation and related border activities.

To do this the TRS measures the effectiveness of operational procedures carried out by customs and other regulatory actors in processing imports, exports and transit.

The TRS has been designed deliberately to evaluate processes from the trader's point of view. This is done to ensure that facilitation is targeted at minimising the dwell time for cargo where delays cannot be justified. It does not look directly at the level of compliance and enforcement applied by the various agencies[2] although the techniques of the TRS can also be validly applied to such analysis.

Because of its facilitation bias the TRS does not look at what exact tasks are performed by border police, customs or other border control agencies. Rather it looks only at the time taken between the start and finish of each of the various control procedures.

As a simple example in different context: When you go to the post office to mail a letter you do not need to know how the letter will be processed or transported but only how long it will take to deliver to the addressee.

Using the TRS methodology will produce accurate and consistent measurements. This means that the subsequent decisions to improve performance will also be well designed and implemented.

2.2: History of TRS

In 1994 the WCO's predecessor the Customs Cooperation Council (CCC) adopted the earliest form of TRS. This early methodology had been developed initially in Japan and the United States to resolve allegations about slow customs processing being used as a non-tariff barrier[3].

The system developed was subsequently adopted by the CCC as a standard and in this form it was used by several other countries, but by 1997 it was decided that this initial model was too complex for many countries to use properly and, consequently, a simpler method was developed and agreed to by the members of what was now the WCO.

The revised system was release in the initial WCO TRS Guide in 2001 and this Guide was subsequently updated in 2011. This is the guide referred to throughout this document as the WCO Guide. The guide is published in a large number of languages and this means that it is difficult to refer across languages to appropriate page numbers. For this reason, all references in this guide are made to paragraph numbers which are common across all languages.

The TRS concept is formally recognised beyond the customs environment as part of the World Trade Organisation's "Bali Package" of 2014, which includes the "Agreement on

[2] Although any major change in the levels of compliance or enforcement will impact on the trade facilitation times being measured. As an example, the move from general documentary examination of all import documents to risk managed examination will reduce the average clearance time for cargo although it might increase clearance times for specific high risk and non-compliant cargo.

[3] Such a non-tariff barrier would have been in breach of the General Agreement on Tariffs and Trade to which both countries were then signatories.

Trade Facilitation" that eventually will be implemented by all WTO members. Article 7(6) of the WTO Agreement on Trade Facilitation[4] states:

> ***Article 7: Release and Clearance of Goods***
> ***Paragraph 6: Establishment and Publication of Average Release Times***
>
> ***6.1. Members are encouraged to measure and publish their average release time of goods periodically and in a consistent manner, using tools such as, inter alia, the WCO Time Release Study. (FN6)***
>
> ***6.2. Members are encouraged to share with the Committee their experiences in measuring average release times, including methodologies used, bottlenecks identified, and any resulting effects on efficiency.***

It is also important to note footnote 6 of the Agreement, which is equally binding with the text of the article:

> ***(FN6) Each Member may determine the scope and methodology of such average release time measurement in accordance with its needs and capacity.***

2.3: The Purpose and Phases of the Customs Time Release Study

The objective of this section explains and provides an overview of the WCO Time Release Study (TRS) by following the overall format of the WCO guide to explain:

- The purpose of the TRS, and
- The three phases of TRS.

This information is covered in detail in the current WCO Guide at Paragraphs 49-98.

To achieve its objectives this section provides a step by step explanation of the processes set out in the WCO Guide. It also includes a series of four flowcharts. These flowcharts describe the processes used to carry out a full TRS that measures the clearance times for Customs and other agencies operating at a border post from a facilitation point of view.

The flowcharts in figures two to five of this section, while based on the WCO Guide, also cover some additional considerations useful to plans undertaken by the Working Group responsible for the TRS. These flowcharts show all of the steps taken for a TRS in a small landlocked Asian country in 2012 but using the version 1 WCO Guide so there are some small divergences from the updated procedures.

From a high level point of view the strategic purpose of the TRS is to provide a reliable way to achieve one or more of the following objectives:

- Establish a Baseline for the accurate measurement of Border Control Performance within clear and defined parameters;
- Subsequently, accurately and in a comparable way update the original Baseline as procedures or legislation are modernised;

[4] WTO reference number: (WT/MIN(13)/36 or WT/L/911)

- Identify and set achievable performance standards to measure the success of facilitation measures based on the TRS observations;
- Identify critical and high risk points for periodic re-assessment of performance;
- Integrate data reporting initially identified in the TRS into agency Management Information Systems (MIS) to provide an early warning on developing performance problems;
- Increased transparency by identifying and publicising the outcomes of the TRS to show the progress of facilitation;
- Encourage foreign direct investment by demonstrating the government's commitment to trade facilitation and business growth.

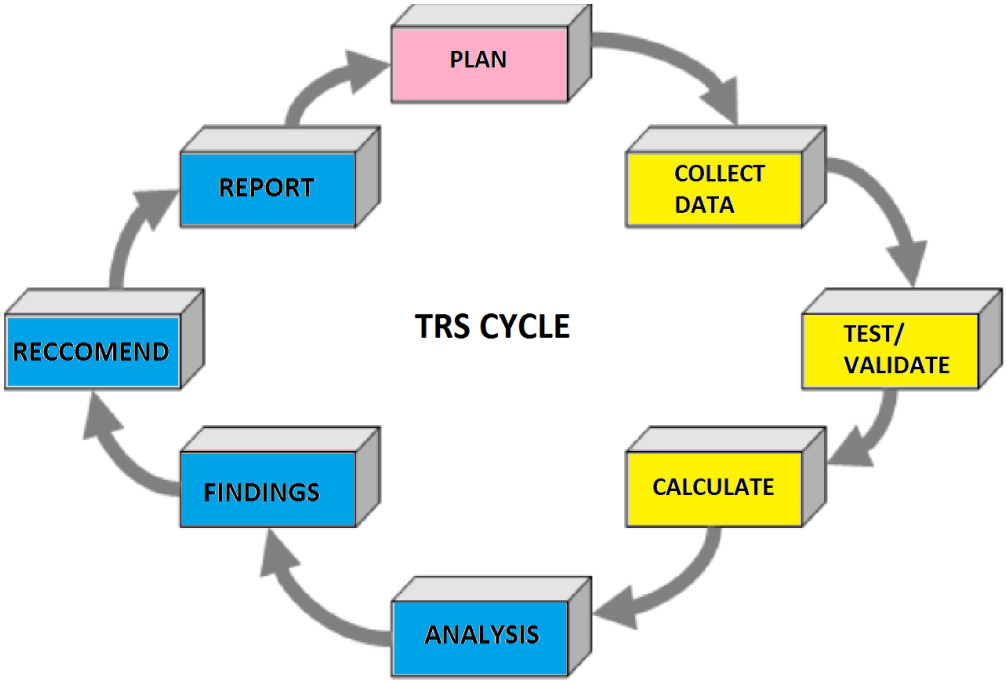
On a day-to-day administrative basis tactical use of the TRS in Trade Facilitation can be applied to:

- Identify and quantify existing and emerging bottlenecks affecting import, export and transit cargo clearance procedures;
- Assess new procedures for effectiveness after introduction and after allowing adequate time for bedding in of the new procedures;
- Establish baseline trade facilitation performance levels for subsequent MIS updating purposes;
- Identify general and specific cases for targeted improvement;
- Provide supporting evidence for requests for human, financial and technical resources and also provide after the fact proof that the investments were wisely used.

2.4: The TRS Cycle

According to the WCO the TRS Methodology should be seen as a continuing cycle which has three distinct phases. The cycle can also be broken down further into eight internal steps as shown below in figure one below.

Figure One: The TRS Cycle Overview

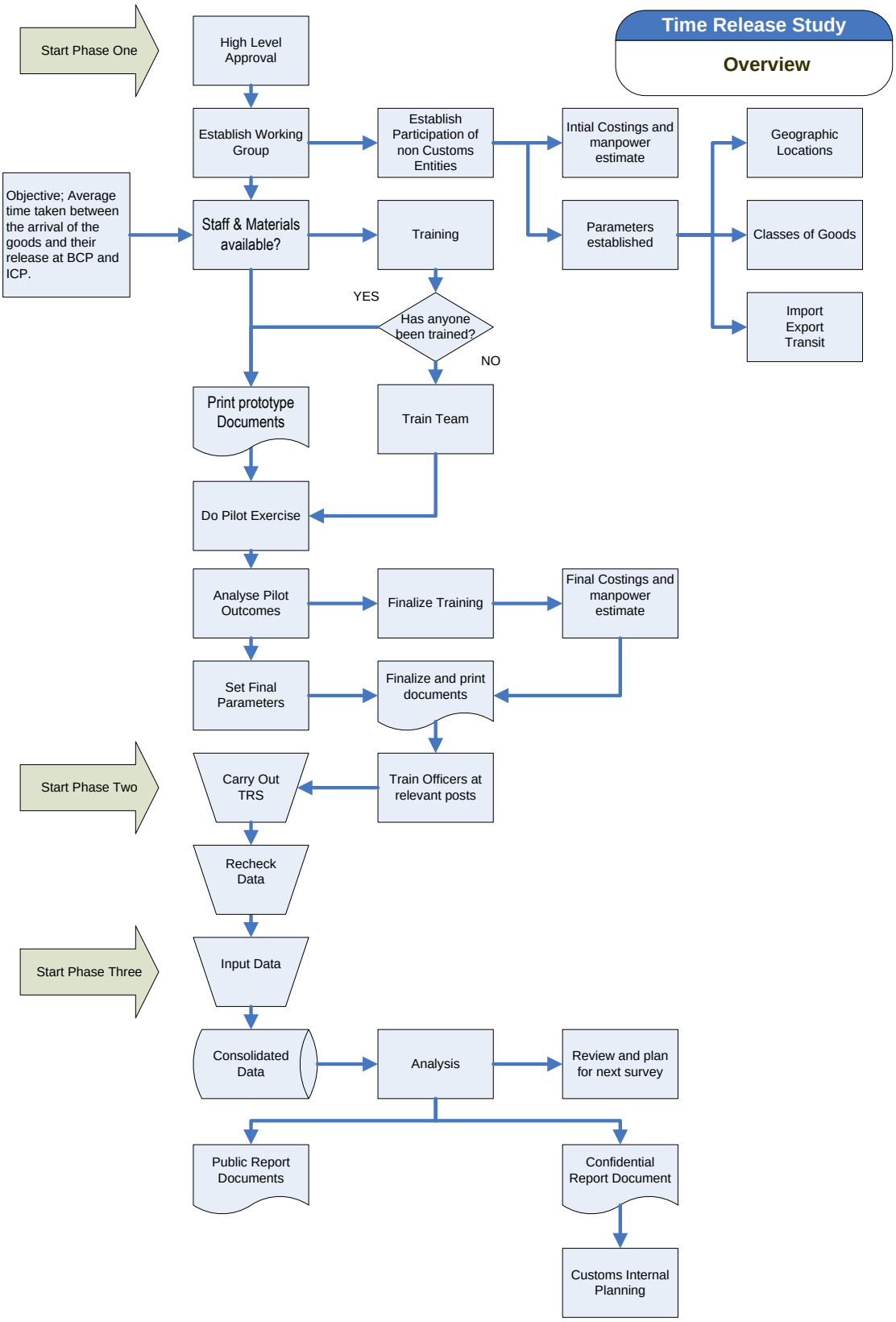


The figure above shows both the three phases and the eight steps in the TRS cycle. In the figure each of the three phases is a different colour. The phases are:

- Phase 1: The Preparation and Planning before the TRS actually occurs;
- Phase 2: Collect & Record Data during the TRS; and
- Phase 3: Analysis, Conclusions and Reporting on the data collected.

The TRS Cycle is explained in the WCO Guide at Paragraph 35 which also explains that the cycle should be reviewed and repeated periodically as systems are revised and updated.

Figure Two: Linear Process Map of TRS Overview



The repeated undertaking of a TRS, however, should not simply occur routinely (say, every second or third year). Rather it is generally better to undertake a new TRS cycle about six months after the completion of any major changes to the system.

This delay before commencing a TRS is essential because it will allow time for the new systems to be "bedded in" and to become fully operational. As an example in the WCO Guide in Appendix 8: National Practices, Section 3 Japan: the second figure shows that Japan has generally undertaken a new TRS only after there has been a major procedural update. These changes include:

- Implementation of a "One-Stop on-line service"; and
- Simplified Import Declaration and 1st Single Window.

Among the other reasons for undertaking a TRS in a series of cycles as opposed to simply undertaking a single TRS are to:

- Establish and recognise that the TRS is simply a component part of the ongoing continuous improvement process which is essential to trade facilitation (see WCO Guide Paragraphs 96-98 for more detail).
- Ensure changes, once they have been implemented, are still working correctly some time after their formal introduction.
- Identify new problems and bottlenecks as they arise and before they become too great.
- To test new procedures after they are implemented. (This should not be done too soon after implementation however).

Figure two sets out a more detailed linear example of the TRS. However, this figure fails to highlight the cyclical nature of the overall process.

2.5: TRS Phase One Preparation and Planning

Phase One of the TRS process covers preparation for the data collection and analysis procedures. It has a total of seven steps and is covered in the WCO Guide at Paragraphs 50-79.

The steps in phase one in the order in which they should be commenced are:

1. Establish a working group.
2. Determine the scope of the study.
3. Plan the methodology.
4. Develop detailed plan.
5. Select a sampling method.
6. Develop data collection forms.
7. Carry out Pilot/Test-Run

While the steps below should commence in this order, the process is recursive and it is not possible to finalise one step and then simply move on to the next. This is because as information is developed this will provide feedback into some of the earlier steps.

As an example: After completion of the last step which is: "7: Pilot/Test-Run" it will almost always be necessary to revise steps "4: Develop detailed plan" and "6: Develop data collection forms" based on the extra experience gained at that point.

Figure three below sets out the steps in Phase One in a linear format and each step is now considered separately.

2.5.1: The Working Group

The first essential step is the establishment of the Working Group (WG) which is covered in the WCO Guide at Para graph 51-54 and also in Appendix I.

Wherever possible, the WG should involve as members as many of the key stakeholders in the parts of the Supply Chain being measured as possible. However countering this inclusiveness the WG should not be made so large that it cannot make decisions quickly as the need arises.

As an example, if the next TRS is to occur after the implementation of the single window and expects to measure the impact of that facilitation measure the Working Group should definitely include representatives from the Border Police and also both the Veterinary and Phytosanitary Agencies. It should also consider inviting membership from the customs brokers and shippers associations to join the working group.

Effective involvement of all relevant stake holders serves to ensure that the outcomes of TRS have the best and most comprehensive information available. The wider knowledge base of a multi-agency working group could be more effectively used to identify bottlenecks in the border process, while simultaneously not being unduly confined to examining Customs procedures alone.

This wider base is important because the WG is responsible for preparation, planning and implementation of the project and this means that it must have amongst its members a broad enough background to understand both what needs to be measured and also what the outcomes reported will mean to all of the stakeholders.

Except for second and subsequent TRS where the target remains unchanged the WG will be obliged to develop and extend the general Scope and Design of the Study. If there have been any major procedural changes since the last TRS then the Scope and Design for the TRS should be reviewed in detail before any other action is taken by the WG.

2.5.2: Scope and Design for the Study

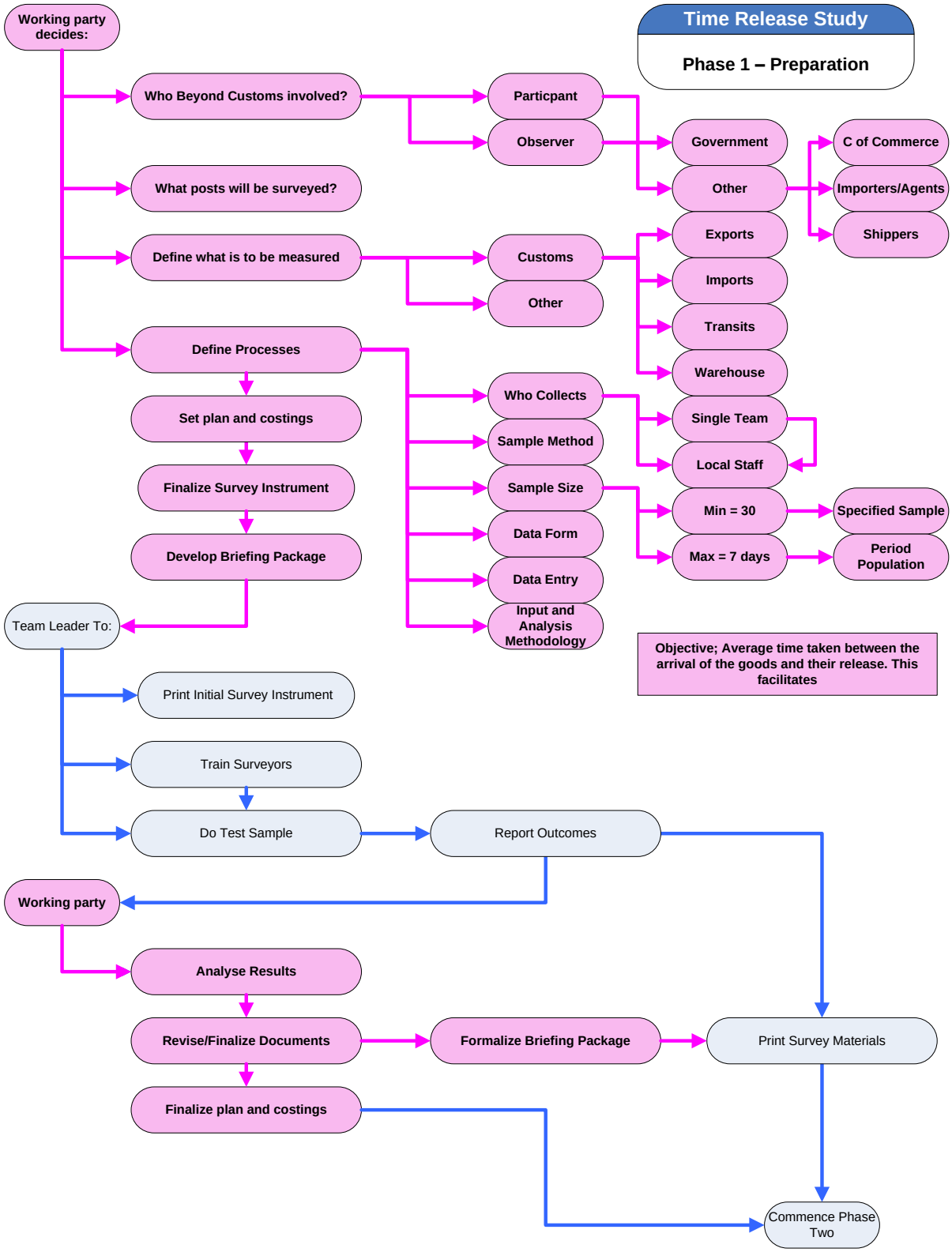
Establishing the Scope and Design for the Study is covered in WCO Guide at Paragraphs 55 - 56 and involves identifying, describing and agreeing the exact objectives and scope for the prospective TRS. This might be to:

- identify bottlenecks in the supply chain and/or constraints affecting Customs release;
- assessing newly introduced and modified techniques, procedures, technologies and infrastructure, or administrative changes;
- establishing a new baseline for trade facilitation performance measurement;
- identifying opportunities for trade facilitation improvements;
- estimating the country's approximate comparative position as a benchmark tool

Initial setting of the scope and objectives will then allow the WG to answer the following questions:

- Does the study involve customs only or should more parties in the supply chain be involved?
- Which locations will provide an adequate coverage of targets of the study?
    - For the most useful results it is advisable to choose those sites with a large volume of traffic and a wide variety of consignments.

Figure Three: Linear Process Map of TRS Phase One: Preparation



- Exactly which procedures are to be covered?
  - Will the study cover all import /export / transit activity or just specific transactions?
  - Will the study cover from arrival/report of cargo to removal from Customs control?
- What is the planned duration of the study?
  - The WCO recommends that a duration of seven days of data should be collected to allow for the impact of routine peaks and troughs in the volumes arriving.
  - The actual number of transactions captured and analysed maybe tailored once an acceptable baseline has been established.
- Will the study be conducted simultaneously or consecutively at the targeted sites?
- Will this TRS need to extend and compare with data collected from earlier TRS?

2.5.4: Planning and Methodology

The Planning and Methodology section of phase one is covered in the WCO Guide at Para 57. This is the point where the WG determines the following issues in order of importance:

- What is the exact kind of data to be collected;
- How will it be collected; and
- Who will collect it?
  Broadly speaking in Moldova for TRS purposes information sources identified fall into three classes namely:
  - **Live data**: This is where information is obtained by direct observations of field staff or through forms completed by inspectors. As an example the time taken for a truck to proceed through the x-ray process from the point where it joins the queue to the point where the operators and examiners are convinced that no risk of breach exists.
  - **Electronic Data**: Will be obtained from extraction reports of time stamps in the ASYCUDA and UNIPASS IT systems to indicate start and finish time for otherwise invisible processes. As an example it is not physically possible to observe the exact time that an electronic declaration is sent by a broker but this timestamp can be extracted from ASYCUDA.
  - **Paper data**: Requires the physical transcription of information from another source. As an example all ICP operators maintain physical inward and outward registers of trucks for their own billing purposes and this information will be copied and compiled for the TRS analysis.

- What sampling methods should be used?
  Statistical standards concerning both the sampling and the calculation methods must be adequate and adhered to if useful and reliable results are to be obtained. For this reason, comparisons of results from different Customs administrations are neither useful nor reliable since these studies can seldom be undertaken in identical conditions. The question of sampling is developed further in chapter three.

- Designing forms for data collection.

A series of standard forms were developed for the earlier TRS's in Moldova. They were reviewed and redesigned after the pilot process was completed for the 2016 TRS. These forms are included in the Annexes to this guide as part of the Operational Plan. For consistency these forms should be used as the base for subsequent TRS although they should also be tailored to recognise changes to procedures or for other reasons.

- Developing definitions of activities to ensure uniform implementation.
  In developing a series of definitions Appendix 3B of the WCO Guide provides an extensive list of suitable examples which can be tailored to meet local requirements. For the 2016 TRS the definitions are set out in the operational plan where they describe exactly what information is required at each point and how to measure it.

- Plans a pilot/test-run to ensure that the study can be done.

This aspect is covered in greater detail below.

2.5.5: Developing a Detailed Operational Plan

A Detailed Plan for all activities in the TRS should be written covering all the relevant items from Phase One which are listed in the WCO Guide at Paragraphs 58-69. Ideally the plan will cover most of the considerations listed below. It should be noted that many of these points were identified or decided earlier in phase one but they are now assembled and itemised in the detailed operational plan which nominates exactly and unambiguously:

- The Duration and Timing of the Study;
- The Geographical Scope;
- Types of Goods to be studied;
- Choice of Traffic for the study;
- Sampling Methodology;
- The Forms that will be used and how the data for them will be established:
  - Who will fill out the forms?
  - Who will collect and check the forms for completeness and accuracy?
  - How and when will the data be input?
- Plans for a Pilot or test run before final commitment.

In Annex A to this Guide is an Operational Plan which covers most of these factors.

It is better to develop a generic plan that is not overly detailed that can then be tailored to the needs of individual sites rather than trying to closely specify every factor once the pilot has been completed.

2.5.6: Sampling

The recommended initial sampling methodology for a TRS is covered in the WCO Guide at Paragraphs 70-74. The guide also recommends that after the initial TRS sampling has been completed and analysed the subsequent methods may be varied as the amount and quality of information improves.

For Initial Sampling the WCO recommend capture of the largest number of transactions practical for seven consecutive days. This will allow for the variability of business at the sites which will generally be busier on certain days of the week and at certain times of day.

As examples of the variation in demand the following factors need to be taken into account:

- All sites are generally not very busy over the weekend or on public holidays. This is because most cargo receiving points are not open on those days.
- Major religious holidays like Christmas/New Year and Easter, if they are in your country, will normally experience an increased flow of goods before and a pronounced drop in goods after the holiday season.
- Major holidays in major trading partners will also have an impact. Goods coming from Turkey will be interrupted over the Ramadan season. Most manufacturing plants in German speaking countries are closed during the month of August.
- Seasonal factors will also have an impact on perishable goods and other seasonal goods. The strawberry season is very short but a minor factor in overall trade. Comparatively, the demand for oil products for heating and lighting will rise by fifty percent when the cold weather of winter is expected.

The factors which increase data variation tend to increase the size of the sample required and restrict the periods where a TRS can be applied.

Conversely, once data has been collected and analysed in detail, if the results indicate homogenous samples then a smaller sized sample may be possible provided that it is selected randomly or by using one of the possible sampling methods covered later in this guide in chapter four.

As noted above, for TRS purposes, information sources in Moldova can be divided into three classes namely:

- **Live data**
- **Electronic Data**
- **Paper data**

When capturing Live and Paper data there is a real cost in time and money to each additional sample that is drawn and listed. For this reason, the sample taken should be the smallest one that will still provide reliable outcomes. There is a clear trade-off between reliability and cost in all such decisions.

Comparatively, for electronic data there is no real cost in extracting a sample that is larger than the minimum size required, and in some cases it may be just as easy to take data for the entire population as for a sample. However the use of large data sets may require more specialised handling of the material to create meaningful outcomes.

2.5.7: Developing Information Collection Forms

The development of Information Collection Forms is covered in the WCO Guide at Paragraphs 75-78 and this can be done once the key processes are identified.

In designing data Collection Forms the question of gathering additional information should always be considered.

The information Collection forms developed for the 2016 TRS are included in the Operational Plan which is set out in Annex A. These were broadly based on the forms developed for the earlier TRS so that a direct comparison of outcomes would be possible.

However, many of the forms were extended both in number and detail to take account of new aspects of trade facilitation under customs control such as the implementation of red/yellow/green/blue channel risk management.

2.5.8: Pilot Run

Once the planning and methodology, including the questionnaire, form and the guidelines, have been completed and the personnel assigned to collect and record the data have been briefed, a pilot-run should be conducted before any major effort is invested in the formal collection of data.

This is because it is important to ascertain that the data collection can be done exactly as prescribed and that it will work in that format. It will also provide the opportunity to identify and remedy any problems that might be encountered due to a lack of understanding by the personnel collecting and recording the data.

Especially important as part of the pilot is that it will also establish if the plan is actually safe or needs to be redesigned to prevent injury and/or congestion.

The pilot-run should be carried out for a half day at each class of targeted site. This must be done so that everyone involved in the study will understand how to resolve any problems that might be encountered.

It is also a good idea to carry out the pilot on one of the less busy days of the week to allow for the delays in procedures that the pilot may inadvertently cause during what is essentially a learning process for everyone involved.

The pilot will help to ensure that the actual study, when carried out, will be completed as smoothly as possible. A pilot run is essential before commencing the data collection processes in order to:

- Test the overall feasibility of the operational plan.
- Review outcomes of the pilot for:
  - Data quality and completeness.
  - Potential data triangulation.
  - Problems that need to be to addressed and solved.
- Review and finalize the pilot plan to create the final operational plan.

2.6: Phase Two: Data Collection and Recording

Phase Two of the TRS process covers the physical collection and recording of the data that was identified and specified in Phase One. It involves the collection and recording of data on the pre-designed forms and the collection of reports requested in data system including ASYCUDA and UNIPASS. Figure Three below provides a step by step analysis of phase two.

The WCO Guide in Paragraphs 80-82 provides advice on:

- The methodology for physical collection of data using data collection forms;
- The operation of the survey process (staffing and travel); and
- Distribution and collection of "paperwork" at sites involved.

It advises that the data which has to be collected physically through formal observations should be collected first.

Data that is recorded routinely in either manual or automated systems may be collected later because it does not lose any value if it is not collected as "live" data.

Specifically, the WCO Guide advises that for customs administrations like the MCS that use automated clearance systems the plan should use these existing systems to capture the "time stamps" at each step in the clearance process where such a record exists.

Before commencing the data collection it is essential to:

- Arrange appropriate training or briefings for all staff and other parties involved, where necessary, in advance of the TRS commencing;
- Confirm the processes and the parties responsible for collection & input of the data when data collection commences;
- Recheck and re-identify all the processes and records involved with the people involved just before data collection commences to ensure that what is being collected is what you really want to collect.

Only then can the distribution of the data collection forms commence with an assurance that the data collected will be valid.

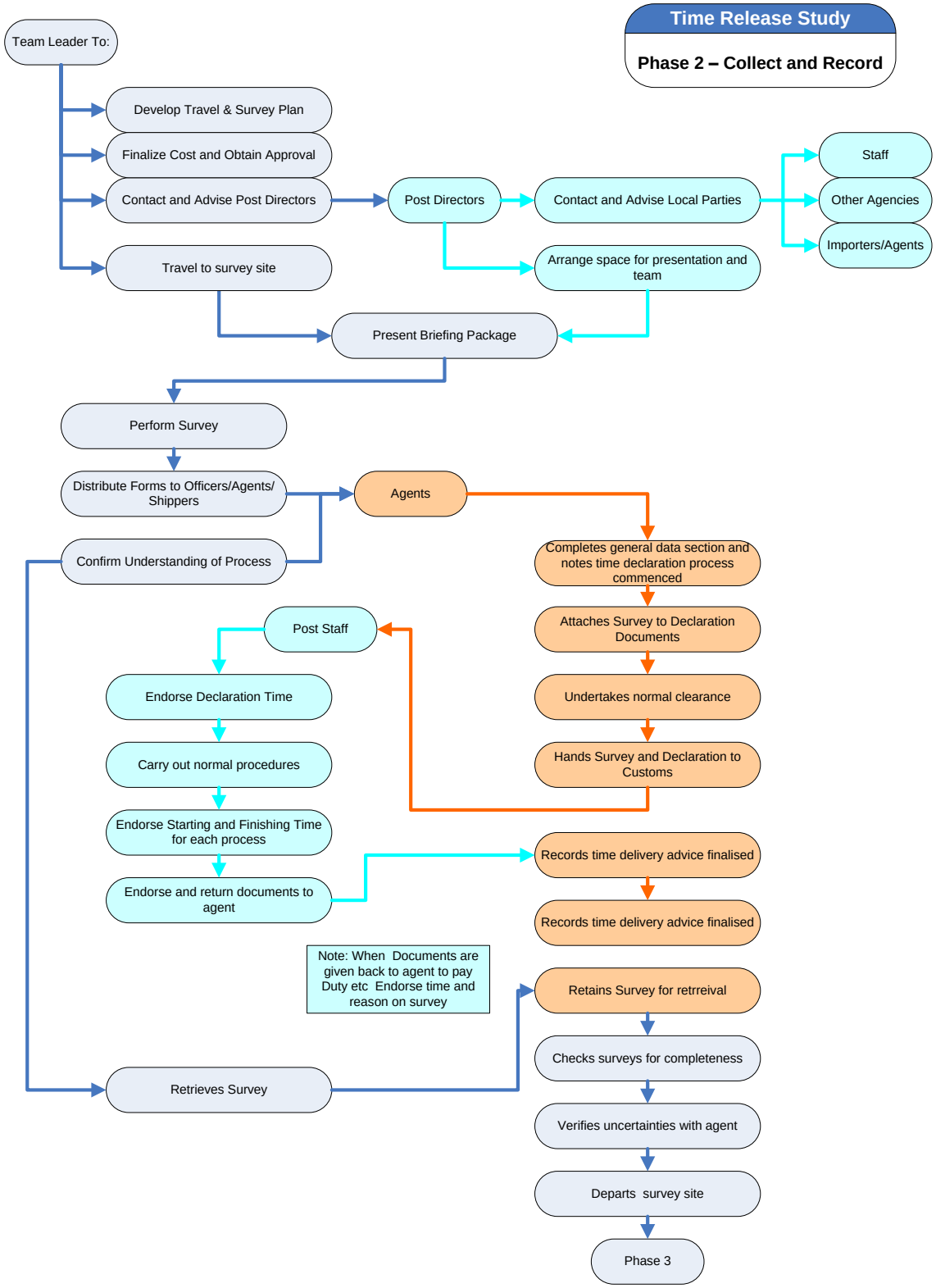
Subsequently during data collection period it is essential to:

- Record any unusual event or accident that may affect the sample such as traffic accidents, system outage or powered blackouts that affect processes.
- Wherever possible designate staff other than those who are directly involved in customs clearance to fill in the documents. This should only be done where it is practical and does not cause undue congestion or delay to the process being measured.
- Distribute and collect the forms as appropriate at least every few hours throughout each day.
- Confirm all necessary data is being recorded correctly each day.

Finally, before analysis commences check that the correct inputs have been made. To achieve this:

- Ensure all data collection forms are returned.
- Check/Verify raw data in every form for completeness, accuracy & quality.
- Set aside data collection forms with errors for later verification.
- Set aside incomplete forms for further examination.
    - Data with errors and incomplete forms may still be usable provided that the errors and missing information is not significant.
    - Check to see if any of the missing data to complete the forms can be extracted from ASYCUDA or UNIPASS.
- Be aware of limitations of Excel for data processing. This is covered later in chapter five of this guide.

Figure Four: Linear Process Map of TRS Phase Two: Collect and Record



2.7: Phase Three: Analysis, Conclusion and Recommendations

Phase Three covers analysis, the subsequent drawing of conclusions and the final making of recommendations arising from the data collected in the TRS. This is covered by the WCO Guide in Paragraphs 83-96 and is also set out in a linear format in figure five below. This phase involves the following steps:

- Verification of data;
- Analysis of the Data;
- Final Report and publication;
- Recommendations for change.

2.7.1: Verification of Data

It is important to note that any analysis using raw data can only be accurate if all the data that is captured is of a high quality. If data has been entered with errors or in different methods across the sample from the specified parameters, this will distort the results of the analysis.

Therefore, it is essential to verify the quality of the data by ensuring that it is captured accurately. This can be done by verifying the data, if possible, for all the transactions, before analysing it and, if possible, this process should start while the data is still being collected.

By doing this it will be possible to rectify any problems in the data collection process at the earliest time possible and thereby improve the collection quality of all subsequent data.

2.7.2: Analysis of the Data

As part of the analysis of the verified data:

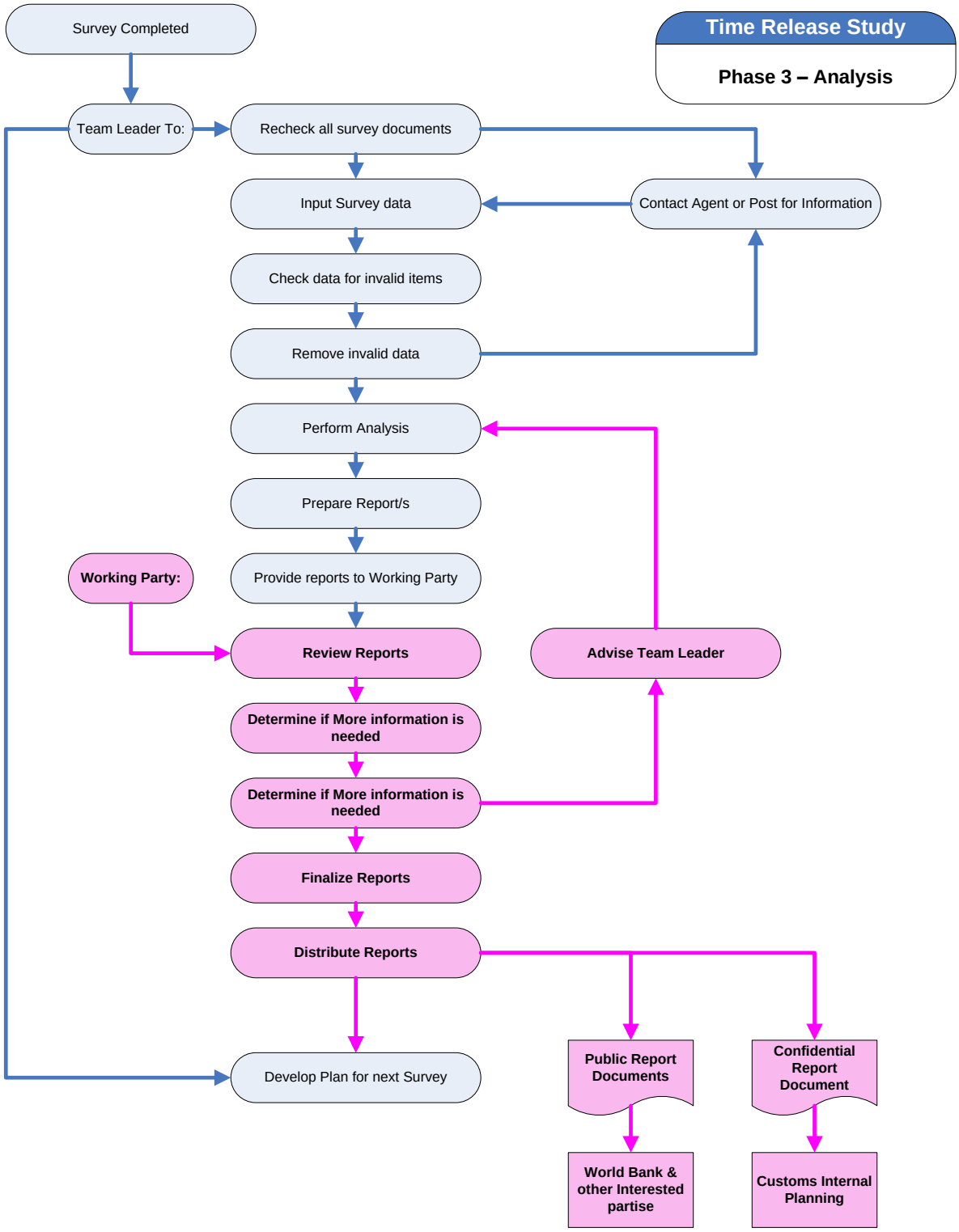
- Try and identify initial approximate outcomes as early as possible in the analysis. These can then be rechecked for validity and adjusted as more data becomes available.
- Follow up the initial results with stakeholders and participants to validate findings and identify reasons for any unusual factors identified.
- Undertake separate analysis of IT and manual procedures before trying to combine them.
- Work from the macro level toward the micro level. Calculate the average time taken for all goods first and then:
    - Calculate combinations and variable factors (red/yellow/green/blue).
- Determine whether the results meet the needs of the key stakeholders?
- Establish if the results suggest possible improvement measures?
- Finally, use the analyse results to develop a draft future Action Plan for consideration by the stakeholders.

2.7.3: Finalizing TRS Report and Press Release

Standard documents to use as a basis for a draft final report and draft press release are available in the WCO Guide:

- Appendix 5 Model Final Report Format.
- Appendix 6 Model Press Release.

Figure Five: Linear Process Map of TRS Phase Three: Collect and Record



3. Flowcharting

The processes that need to be identified and documented in preparation for the data collection in a TRS are complex. Also, they are generally provided from a number of field experts working both in government agencies (including police and customs) and in the private sector (including brokers and transport agencies).

The diversity of these data sources means that each person involved will see and describe the system from their own point of view. Consequently there may be some conflict amongst the initial explanations. This can generally be clarified by later re-confirmations.

There may also be important information left out of these explanations. The information left out is most often not deliberate but remains unsaid simply because "everyone knows that…"

For those reasons when developing a TRS all the key procedures must be identified and charted at the earliest possible point. Therefore the principles of process mapping as a form of flowcharting are an essential skill for developing a TRS.

This is because by using flowcharts it is possible to know and to describe:

- What is done where and when it is being done;
- Who is responsible for each significant process;
- What are the key data control points that will provide useful data for the TRS analysis;
- What has changed since last time this process was investigated[5];
    - In Moldova, this last question is very important with the ongoing Customs Modernization program where a number of facilitation initiatives are planned.
- Match the real processes seen in the field to the available data set and thereby also identify gaps in the data;

Based on a walkthrough of the systems and development of the resulting flowcharts identify key data collection points to establish:

- Have any key points changed location or process since last time they were investigated?
- What is different at each location which will present problems for the generic operational plan?
- Will it be necessary to re-develop the data collection form(s)?

3.1. Process Flowcharting.

This section looks at process flow charts. These are charts that describe only the physical movement or transformation of goods. In the case of the TRS they describe the physical movement of trucks, and the documents (both electronic and paper) that explain what is in those trucks.

[5] If a follow up TRS is being undertaken to investigate the impact of changes to the law or procedures then it is critical to identify where these changes have occurred and how that will impact on the data collection process. As an example the change in 2016 in export procedures where almost all requirements for exports to be processed at ICPs meant that an entire section of the previous TRS was no longer required.

The symbols used in any process flow chart may be simple "boxes" labelled with each process, or by use more pictorial symbols. The choice of symbol is fairly flexible, unlike documentary flow charting, where the correct standard symbols must always be used.

In the case of the 2016 TRS flowcharts which are in the Annex to this Guide the basic symbol used for the key processes identified are numbered circles.

Basic principles which should be applied for every flow chart are:

- Label every chart so that its purpose is clear;
- Name the author for future reference and put a date on the chart;
- Use numbered footnotes to keep the chart area simpler;
- Use abbreviations to keep the chart uncluttered but explain the abbreviations in the footnotes;
- Keep the chart clear by planning ahead where all the major features will go;
- Prepare overviews and drafts to organize the layout before commencing the final chart;
- Use several simple charts and not a single overly complex chart with too much information.
- Use the technique called "horizontal charting" which requires a horizontal flow between sections to:
    - Keep flow lines as short as possible;
    - Avoid long meandering lines; and remember that
    - Flow lines should never cross or be left hanging.

4. Sampling Techniques for TRS

This chapter describes five sampling techniques that can be used in a TRS and similar activities. It covers:

- Sampling Definitions;
- Sample Selection Techniques;
- Defining the Population and Sample; and
- Choosing a Sampling Method.

The five sampling methodologies explained in order of increasing complexity and decreasing reliability are:

1. Simple Random Sampling;
2. Systematic Selection Sampling;
3. Block and Cluster Sampling;
4. Stratified Selection Sampling; and
5. Haphazard Sampling.

For TRS normally the first two Simple Random and Systematic Selection Sampling are most often used.

Block/Cluster and Stratified Selection Sampling are used only in complex analysis if a full TRS is not required, too expensive or too slow but analysis of specific data is important.

As an example:
Block/Cluster and Stratified Selection can be used to compare ASYCUDA data extractions of the average time taken for export processing and the average time taken for exports where x-ray checks are mandatory to see if there was a significant difference.

Haphazard Sampling is only a "backup" when all other methodologies are impractical.

Random and systematic sampling can use a smaller and more cost effective data set analysis in the future because the TRS's undertaken to date confirm the characteristics of the overall population of shipments reviewed.

TRS data in several independent classes[6] are all distributed "normally". That is that the majority of the transaction times are grouped together around one point and then the frequency of transactions reduces initially quite steeply and then more gradually as the time

[6] Independent transactions are ones where one transaction under review does not affect the other transaction under review.
As an example the time taken to X-ray a truck is clearly affected by the nature of the load but it is not affected (independent) by the customs broker used.

Transactions analysed and found to have normal distributions include:

- The time taken to process a T1 declaration at a BCP;
- The time taken for a broker to analyse documents and prepare a declaration; and
- The Time it takes to distribute, allocate and validate declarations at ICPs.

for transactions got longer and longer. This produces a “Normal Distribution” or “Bell Curve” as illustrated below in Figure One.

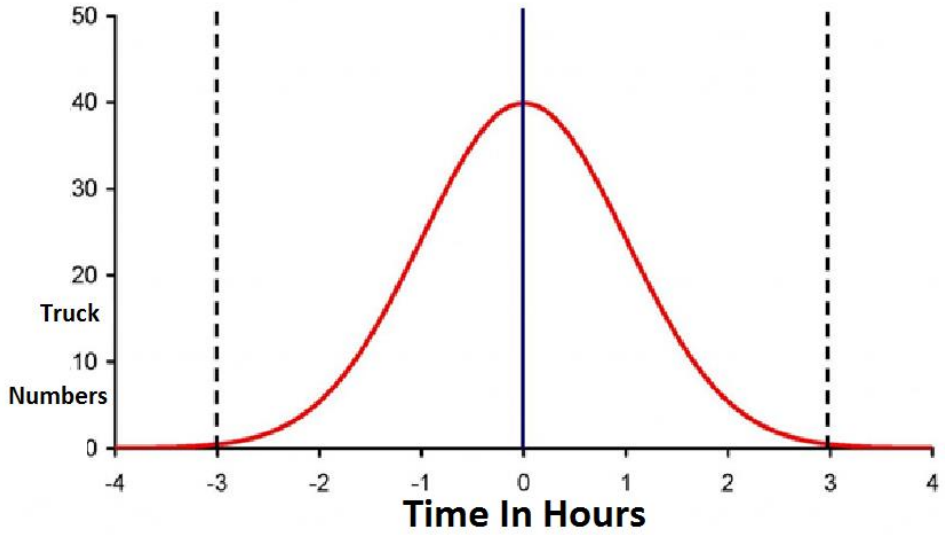


Figure One: A simple Bell Curve or Normal Distribution.

However, for a TRS it is not possible to process cargo in the negative time periods of -1 or -2 hours as shown in figure one. Consequently only the right hand part of the “bell curve” in figure one is relevant to the TRS. This is as shown in Figure Two below.

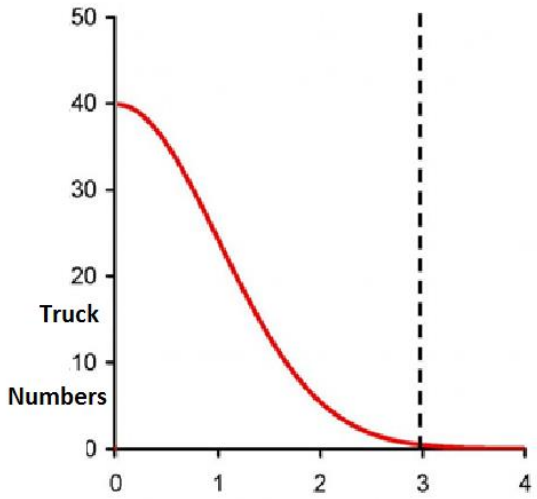


Figure Two: A One-sided Bell Curve

For comparison with Figure Two a specific example is used from the 2014 TRS in figure three below.

This figure shows the time taken for brokers to prepare a declaration and send it in ASYCUDA. The shape is clearly similar to the half “bell curve” in figure two shaped like

half a bell because there is a cut off at zero minutes. It is of course impossible for a declaration to be prepared in minus minutes.

These outcomes are in line with the situation observed for analysis of trade data in other countries.

This result is useful because it means that the sampling techniques explained below to reduce sample sizes are valid. Consequently it is possible to either increase the probability that the assessment is accurate or to reduce the size and cost of gathering the sample required for analysis.

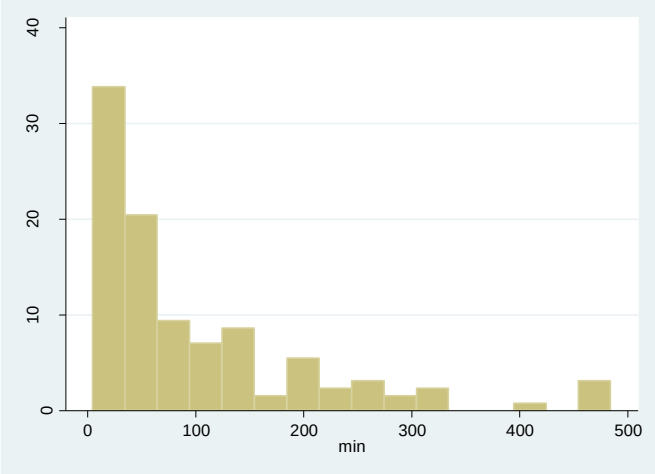


Figure Three: Processing declaration and upload into ASYCUDA TRS 2014

Minimising the sample size is important if there is a cost to physically collecting data. It does not matter if this done by observing and timing actions or converting paper records to electronic data, it is cost effective to reduce the sample size using the methodologies described below. The sample remains representative of the population under study.

However when the sample size is reduced it remains good practice to draw the sample over a full seven day week. This ensures an equal probability that data will be captured from busy days (Monday and Friday) and slower days (Weekend). It is also good practice to gather data in "normal" trading periods. Seasonally busy periods (before Easter and Christmas) and seasonally low demand (just after Easter and Christmas and other significant holidays) should be avoided.

4.1. Sampling Definitions

Sampling applies specific selection and testing procedures (Where? What? For how long?) to examine less than 100% of the items contained in the population and make a statement about that population from the sample.

As an example: "For a randomly selected sample of 200 export transactions in the month of May the average x-ray processing time was twenty five minutes."

Sampling technique is important for analysis of a large BCPs or nation-wide analysis. The correct techniques allow officers to get adequate evidence about the population more economically and from the smallest sample which will provide a reliable result.

However, first some definitions of the terms used in this chapter:

Population: The entire pool of information from which a sample is drawn. The information in the sample allows you describe the larger population. Researchers gather information from a sample because of the difficulty of studying the entire population if it is large.

An example of a population is: "The set of all import vehicles for the month of November".

Sample: In statistics, a sample refers to a set of observations drawn from a population in a particular way. The use of samples for research is necessary if it is impractical to study the whole population because of its size or accessibility.

As an example: It would be very time consuming to measure and record the average unloading time for all cargo arriving in Moldova. Alternatively we could measure a sample of the trucks arriving as they are unloaded and then from this, estimate the average time taken.

Sampling Unit: Any individual transactions or items that constitute part of the entire population.

As an example: In a TRS the sampling unit may be a single truck or a declaration depending on the circumstances.

Homogeneous and heterogeneous populations: A homogeneous population is one where all individuals are quite similar. Comparatively a heterogeneous population is one containing various sub-populations of different types.

For a homogeneous population a small sample size will produce a useful result but a much larger sample is needed for a less homogeneous population.

As an example: The population of all bulk fuel oil imports is a more homogeneous population than the population of all food imports. This is because bulk fuel oil is mostly transported in tankers which are all handled in a similar way. Comparatively, food will be transported in freezer, chiller, general cargo plus dry and liquid bulk loadings. Each of these may require different treatment procedures.

Judgemental sampling: This occurs when a researcher relies on his or her own judgement to choose sample members in the study. Judgement sampling is a non-probability method where the sample is chosen by deliberately using the judgement of the researcher.

As an example: See the Haphazard Sampling method described later in this chapter.

Probability sampling: is any method of sampling that utilizes a form of random selection to reduce the impact of judgemental sampling. Accurate random selection needs a process or procedure to assure that every sampling unit in the population has equal chance of being chosen.

As an example: See the methodology described for randomly selecting documents in subsection 4.4.1 Random Sample below.

Normal distribution: Normal distributions are denser (have the majority of the sample items) in the centre of the distribution and less dense in the tail or tails.

As examples: see figures one and two above.

Confidence Level, Confidence Interval and Interval Estimate are related terms which are explained together:

Confidence level: normally expressed as a percentage is the probability that the value of a targeted parameter (i.e.: "time taken to process a green line declaration") falls within a specified range of values (i.e.: The average time taken to process a green line declaration at this BCP is sixteen minutes.")

Confidence interval (also called margin of error): is a measure of the probability that a population parameter will fall between two set values estimated from the sample.

(i.e.: I am 95% confident that any green line declaration at this BCP will take between ten and twenty minutes to process.")

Interval estimate: Is defined by two numbers, between which a population parameter is said to lie.

(i.e.: I am 95% confident that any green line declaration at this BCP will take between ten and twenty minutes to process.")

The three concepts are explained by example in Section 4.2 below

No matter how large the sample you cannot be absolutely confident that the result will be the same each time it is drawn. Each attempt at randomly selecting from the same population may produce a different interval estimate.

- For the same sample described above you now randomly draw a second sample of 500.
- The new sample shows a range of times between 28 minutes and 77 minutes with an average of 51 minutes.
- You can still be 99% confident that the average time calculated for this sample will be the same as that if I averaged the entire population of 2000 transactions.

For any normal distribution if we used the same sampling method to select different samples and computed an interval estimate for each sample, we would expect the true population parameter to fall within the interval estimates for 95% of the sample sets. That is a **Confidence Interval** of 100 -95% or 5% shown in figure four[7].

[7] As a convention the Confidence Interval is expressed as 100 -95 = 5% rather than as 95%.

4.2. Sample Selection Techniques

There are many methods for extracting a *sample* from a full set of records (the population), but the aim should be to make the sample as random and unbiased as possible. But there is a trade-off between costs and benefits. Often a very good random selection is more costly in time and manpower. Consequently a less precise technique should be used where more precise techniques are not be cost effective.

Figure four shows how for random sampling increasing confidence may double the sample size.

Confidence Level	Confidence Interval	Sample Size
99%	5%	500
95%	5%	323
90%	5%	240
80%	5%	152
99%	10%	154
95%	10%	92
90%	10%	66
80%	10%	41

Figure Four: Confidence Levels and Intervals for selected sample sizes of a Normal Distribution.

As an example:

- Figure four shows comparatively for a population of 2000 trucks or declarations the sample sizes needed at various confidence levels and intervals.
- I want to be 99 percent confident that my sample describes the population.
- I check figure four below and this shows that to achieve a 99 percent **confidence level** a sample of 500 is required.
- From the population of 2000 I draw a random sample of 500.
- The sample shows a range of times between 25 minutes and 75 minutes this is the **interval estimate**.
- I can be 99% confident that the average time calculated for the sample will be the same as that if I averaged the entire population of 2000 transactions.
- That is I can be 99% certain that the conclusions I draw about the sample will be correct for the whole population.
- If I used a smaller sample of 41 randomly selected samples then I can only have an 80 percent confidence level that the sample describes the population.

Most TRS transactions are normally distributed so the sample selection methods that should be considered in order of reliability are: random selection (subsection 4.4.1), systematic selection (subsection 4.4.2), and measurement approaches to the extraction of samples through block and cluster sampling (section 4.4.3).

The other methodologies described will not be used except in special cases where stratified sampling (section 4.4.4) is used to target areas where the situation is disputed[8] or an answer is required quickly.

4.3 Defining the Population and Sample

In a TRS the sampling unit may be a truck or a declaration depending on the circumstances. The objective defines the population. The population is the set of data from which the officer wishes to sample. The items which make up the population are the sampling units. A **sampling unit** is any individual transaction or items that constitute part of the entire population.

You must also have a clear idea of the period of interest because extrapolation of sample results only applies to the period covered by the sample.

As an example, the sampling unit might be more clearly define as: "Any import declaration for food products made at the Chișinău 3-PVI Industrială ICP during the week commencing 1 May 2016."

How the sampling unit is defined varies with the circumstances and is affected by the:

- size of the population;
- objectives of the test; and
- the way that the documents are available/stored (paper or electronic).

4.4 Choosing a Sampling Method

The most frequently used sampling techniques are:

- random number sampling;
- systematic sampling;
- measurement technique sampling;
- block/cluster sampling; and
- haphazard sampling.

They are discussed in order on increasing complexity and reducing accuracy for any given sample size (i.e. a random sample of 200 will be more accurate than a systematic sample of 200 from the same population). The information in this section is summarised in figure six.

[8] As an example: If shippers subject to compulsory X-ray complain about delays it is possible to uses stratified sampling to compare times for specific similar classes of X-rayed and similar non-X-rayed transactions.

4.4.1 Random Sample

In a random sample every item in the population has an equal chance of being selected. Random number selection is easier when the items in the population are numbered consecutively.

As an example: Random sampling is used to extract data from a paper register of trucks inward and outward held by an ICP operator for charging parking/demurrage fees by the following steps:

- Establish if there are more trucks arriving during the week than the number for the sample.
- Establish the size of the sample based on the required confidence level.
- Use a table or computer-based random numbers to select items from the population.
    - If an officer has access to a random number tables, a computer with Excel, or a digital phone then use this to obtain the random numbers required.
    - In Excel you can enter the start and end sequential numbers and the size of the sample required. Excel provides a list of the random numbers sorted sequentially.
    - How to generate a random number table in Excel is shown in the next chapter.

Worked example:

- An officer wants a random sample of 20 from a population of 800 trucks.
- The information is recorded in a register in the ICP office for billing purposes.
- The information is in a numerical sequence starting with 001 and ending with 800.
- A table of random numbers containing columns and rows of randomly generated digits is shown in figure five. This table is used for this example.

Start by establishing a link between the table of random numbers and the population.

- There are three digits in the reference numbers (001-800), so use the last three digits (or the first three digits) in the table.
- Only consider numbers between 001 and 800.

6767	125	7936	2894
2782	7091	4297	456
8050	2858	2544	6581
1488	1023	6543	7547
6771	9975	9357	963
4058	8270	3216	3996
9387	6783	4143	4175
1652	9984	1285	3266
4026	4152	3990	6590
3946	9010	4040	79

Figure Five: Random Number Table.

- Select a starting number from the table at random to set the first row and column.
- One method is to take the column and row numbers from a randomly selected banknote.
- If the first two numbers on a banknote are 13 that is column 1 row 3.
- This means the starting number is 8050 (highlighted above).
- The first document selected for the sample after their first un-needed digit is discarded (8)050 will be in line 50 of the register.
- The officer will move down the Random Number Table column until the bottom.
- This will give the next few line numbers as (1)488 and (6)771 and so on until sufficient numbers below 800 were obtained.
- Numbers above 800 are discarded.

These numbers would correspond directly to the numbers in the register, and thus the sample selected would comprise the register lines with these numbers. This would supply a statistically valid randomly selected sample for further analysis.

4.4.2. Systematic Selection

Systematic selection with a random starting point is easier than simple random sampling when documents are filed in cabinets rather than registers. Here what is needed then is a fairly accurate estimate of the population. This estimate need not be absolutely accurate. “About 550” is as valid as “Exactly 548” in most cases.

The officer calculates a sampling interval (*i*) by dividing the total number of items in the population by the sample size and rounding down any remainder.

As an example:

- A broker keeps a work time sheet in the file with the declaration papers for each declaration. The files are stored in alphabetically by client in cabinets.
- The agent knows he completed about 550 declarations during the sample period and the officer needs a sample of fifty transactions.
- The sampling interval calculated is (i) = 550/50 = 11.
- The officer next selects a random number between 1 and the sampling interval i as a starting point.
- The sample then selects every (i)th item.
- As an example, using a banknote as above where the first two numbers on the banknote are 30 then the starting number (less than 11) would be 3.
- Then from the randomly selected starting point of the third file select every 11th item.

When the sampling units are stored in filing cabinets or on ledger cards random numbers are required only to designate the starting point. The items in the population do not need to be numbered consecutively. The object of the random start is to ensure that no bias creeps in to sample selection. Each member of the population must have an equal chance of selection.

WARNING: Take care that the interval *i* does not accidently correspond to some trend in the

work sampled. If it does, the sample may not be representative (that is, it may not be a random selection). This technique relies on: assured random entry, and assured random distribution of the population.

As an example;

- If there are eight examining officers processing declarations at an ICP;
- Every eighth declaration is given to the same officer.

In this case there is a clear pattern. It is possible that a sample, if it was selected systematically, would not pick transactions at random. It is possible that every item in the sample is processed by the same person. We would select most of their work and none by anyone else.

4.4.3. Block and Cluster Sampling

Block sampling is useful if transactions are physically observed but it is not cost effective to spend a very long time observing the processes. Observations are broken into blocks throughout the period of review.

As an example: It is not practical to have a person sitting next to an x-ray machine all day and night for every day and night for the seven days of a TRS and randomly recording truck timings.

Rather block sampling is used. This requires the random selection of time periods in a sequence related to the overall time period. The sequence might include blocks of all trucks arriving at the X-ray facility on Monday between 8 and 10 in the morning and all trucks arriving on Thursday and Saturday afternoons.

It is important to ensure that the blocks are selected randomly across the whole period reviewed. In this example it could be done by dividing the whole TRS period into a number of approximately equal value segments (i.e. by time or number of trucks) and then randomly selecting from this until a sufficiently large sample is selected.

As an example

- Assume the facility is open 8am to 8pm every day.
- Each of the seven days of the TRS might be divided into three sections being morning, afternoon and evening.
- Each segment (Monday Morning, Tuesday Evening, etc…) is written on a piece of paper.
- The papers are then selected randomly until enough samples are selected.
- This sets the pattern for observations.

While relatively inexpensive to carry out this technique it can be dangerous if, e.g., an officer conducts a review of established TRS performance at routine periods like every three months and that review only selects the last week of the period's transactions to test. The four blocks over one year would provide a biased sample. They would not representative of the entire year.

Cluster sampling is a variation on block sampling that permits the selection of more than one item at a time when extracting the sample. It involves selecting groups of items, rather

than individual items, at randomly selected points in the population. The officer may select a number of blocks of items from the period under consideration, so that there is a reasonable coverage of the period.

This type of sample selection reduces the time needed for selection because the officer only needs to find a small number of entry points, and selects "everything" near this entry point.

Cluster sample selection must be used with caution as it is more likely to produce a biased sample if not properly used.

As an example, an officer may want to observe seven groups each made up of five consecutive trucks as they go through the x-ray procedure. He/she must start each group with a randomly selected time and date and watch and record data as each truck was processed. This may provide a reasonable sample but only if the five periods were randomly distributed over the whole period under review.

If the officer were to select, only 50 consecutive trucks being x-rayed on a randomly selected day this would not be representative of the overall period's processing.

In the examples for **block** and **cluster** sampling described above, the principal difference is in the number of trucks and time taken for the sample. For block sampling, when the observations commence the sampling period is known but the number of trucks is unknown. Comparatively, for cluster sampling, the number of trucks is known but not how long it will take to observe and report on them.

4.4.4 Stratified Selection

Stratified selection involves subdividing a population into homogeneous groups, called strata, and then selecting separate samples for each strata using random or systematic techniques.

This system avoids numerical bias problems where the number of high value or risk transactions are overwhelmed by the less valuable or less important transactions in the sample. This is because the sampling procedures described above will only include a small number of the critical sample items and might contain none at all.

As an example:

An officer may want to divide declarations to be tested into two strata to see if different types of goods are processed in the same time frame. Suppose that the areas of interest are:

- High duty value items such as alcohol or tobacco (type 1); and
- Other items with a lower duty or risk value (type 2).
- It is known that type (1) high value goods represent only five percent of all transactions.

This means that in a randomly selected sample of 30 transactions it is unlikely that more than two of the sample will be high risk goods (30 x 5% = 1.5).

To get a useful sample the officer draws two separate samples. One for each group. Each sample is of proportional or equal size so that reasonable comparisons can be made. That

might be 20 samples of type (1) and 50 samples of type (2) goods all drawn from the same population.

The advantage of stratified sampling is that it produces comparable sub-populations. Each sub population is more homogeneous decreasing the sample size required. This is because a small sample of a homogeneous population is likely to produce a reasonably representative sample. A larger sample size is needed from a diverse population to provide an equally representative sample.

As an example: The population of all tanker fuel oil imports is a more homogeneous population than the population of all food imports. This is because bulk oil is always transported in tankers and these are all handled in a similar way. Comparatively food will be transported in freezer, chiller, general cargo and bulk loadings which may all require different treatment procedures.

4.4.5. Haphazard Sampling

Haphazard or Judgemental selection is used in selecting samples or records which have no real order or pattern to them. In this case, the officers will be attempting to pluck records at random from the population using their own discretion or expertise.

This process is only valid in circumstances where none of the other techniques will provide a reasonable solution. It should be noted that this technique will probably introduce the officer's unconscious biases into the sample selection process.

In most circumstances this may not be a problem, but this technique should be avoided if other reasonable techniques will work.

4.4.6. Summary

This chapter summarises the sampling techniques described above that can be used in future TRS programs, and describes the most effective ways to carry out sample testing before undertaking an analytical review of data.

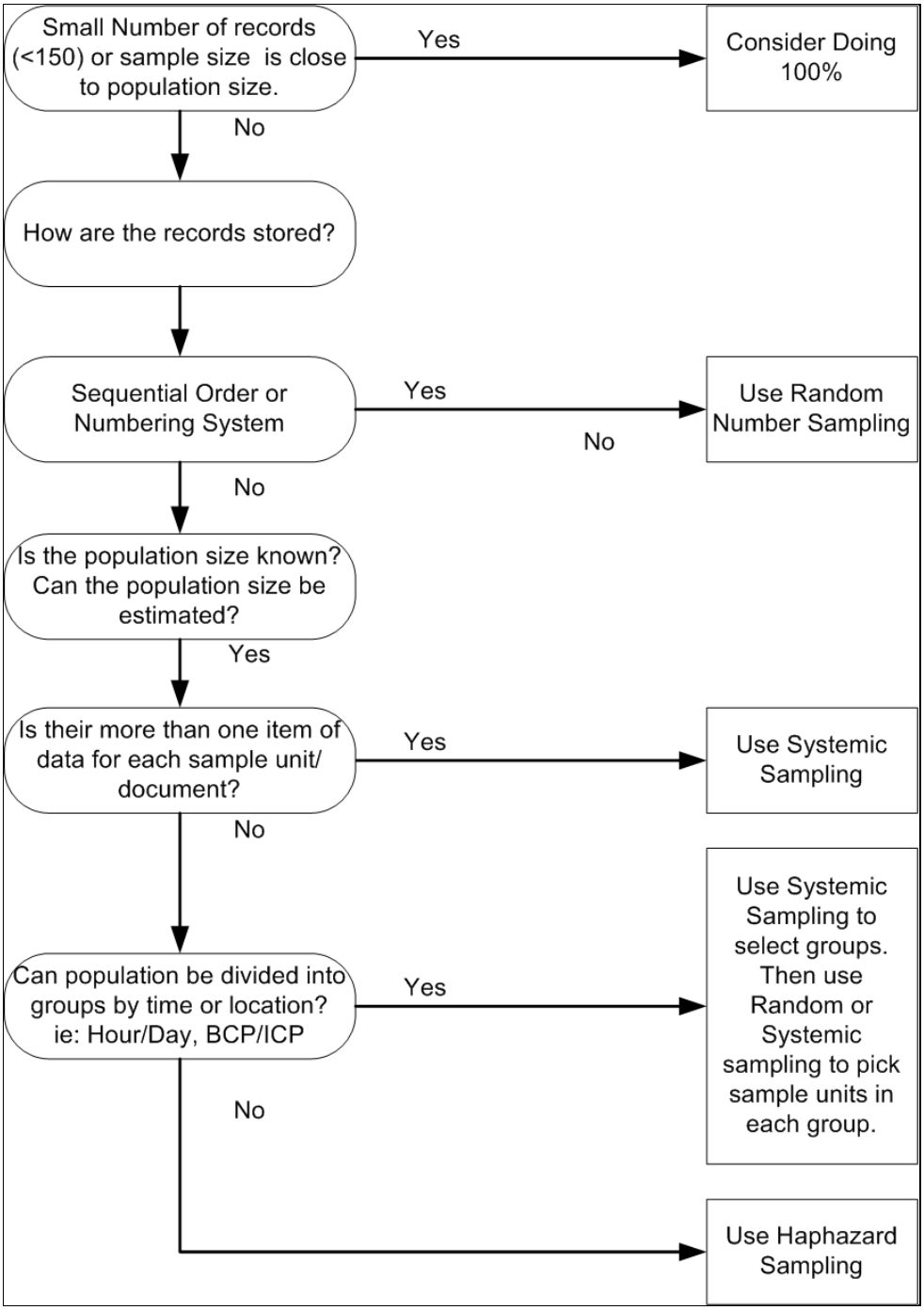


Figure Six: Sampling Methodology Options

Figure six summarises the sampling options for a range of populations that may exist during a TRS but normally either Simple Random or Systematic Selection Sampling will be the best methodology to use.

Block/Cluster and Stratified Selection Sampling are only used in complex cases where a full TRS is not required but rapid analysis of specific data is important.

Haphazard Sampling is a simply a "backup" methodology which is useful only when all other methodologies are impractical.

ANNEXES

Annex A. Operational Plan for ICPs and BCPs

This plan was developed as an overall procedural guide for the upcoming Time Release Study (TRS). It provides generic advice based on what was observed at a limited number of Border and Internal Customs Posts (BCP and ICP) and so cannot address all eventualities.

The operational plan has two parts:

Part A sets out in a generic format the suggested procedures for physical data collection at BCPs and ICPs.

Part B sets out details of proposed data extractions required from ASYCUDA and UNIPASS.

An Annex provides copies of all the forms referred to in Part A of the plan.

Part A: Physical Data Collection

This plan is a generic guide for physical data collection at BCPs and ICPs. It may need to be adapted at various points to take account of geographical and other factors.

At all times remain in a safe location and do not block or interfere with traffic flows. This is both for your own safety and to ensure that you do not affect the timing process with your presence.

Firstly and well before commencing any activity (at least seven days) ensure that you have made contact with the officer in charge at each location and that he/she is aware of what is being planned. Ask him/her to give you a short tour of the site and introduce you to other key stakeholders before commencing the TRS.

On the day work commences allow time to meet with the contact officer before starting work. Allow time for a short tour of the site and opportunities to introduce you to other key stakeholders before commencing the TRS.

It may be necessary at this point to make appointments to consult later with representatives of specific agencies and customs brokers so that data collection can be coordinated and does not interfere with official business.

Before commencing on each work day ensure that:

- The contact officer at the site is aware of your presence and that all relevant agencies have been informed of what you will be doing that day.
- Where customs or other staff are expected to do something (i.e. fill-out or endorse forms) they know what is expected of them. This will most likely include providing blank copies of forms and explanations of how to complete them.
- All clocks or watches should be set to the correct time before starting and may be updated later in the day if the need arises.

Generic locations for BCP Observation sites are as follows:

A: Entrance or Exit to/from Moldova

1: To measure time taken at Police and Weighbridge for Inbound Trucks.

- Use Form 1.
- Cross out "**Exit From Moldova"** next to the date on the top section of the Form 1.

- When the truck enters the gate record the plate number in column A and time in column B
- When a truck stops inside the customs control area record the time in column C.
- If the driver goes to the police office directly put a P in column D and record the time he returns to his truck in column G.
- If the driver waits to go through the weighbridge first put a W in column F and record the time he moves his truck away from the weighbridge in column E.
- Complete the other timing spaces as appropriate.
- Empty trucks do not have to use the weighbridge so count them by putting an X in column D.

2: To measure the time taken for customs to process each truck inward or outward.

- Use Form 2
- Give the forms in bulk to the Declaration Assigning Inspectors before starting.
- Explain to the Declaration Assigning Inspectors what you want them to do (see below).
- Then explain to the Examination Officers what you want them to do (see below)

The procedure for the Declaration Assigning Inspectors is as follows:

1. When a truck driver or customs broker provides documents to the Declaration Assigning Inspector the Inspector will put the time and date on the top of the form based on the time shown on her/his computer screen.
2. The Inspector will then tick the appropriate boxes to describe the shipment.
3. The form will move with the declaration documents.

The procedure for the Examining Officer is as follows:

1. When all examinations are completed the Examining Officer examining the documents will write the time the truck is finalised on the bottom of the form based on the time shown on her/his computer screen.
2. He/she will then keep the forms for later collection.

- Periodically collect all the forms from the Customs Inspectors and check that they are complete.

3: To measure the time taken for Bank and SPS processing.

Note: This measure is only used for (SPS) Veterinary and Phytosanitary processes at ICPs. At ICPS the Bank time is not measured.

Locate in a convenient position to observe bank and/or SPS service windows or entry doors.

- Use Form 3.
- As a truck driver or agent approaches one of the windows or doors to access the services of the Bank or Veterinary or Phytosanitary services.
- Record the time that they join the queue or if there is no queue when they arrive at the window or door as appropriate in the relevant column of the recording form. That is
    - For the bank column A
    - For the Veterinary column B
    - For the Phytosanitary column C

- Also Record the time that they leave the queue in the relevant column of the recording form. That is
    - For the bank column B
    - For the Veterinary column D
    - For the Phytosanitary column F

4: To measure time taken at Weighbridge and Police for Exit.

- Use Form 1.
- Cross out **Entrance to Moldova** on your form.
- When the truck enters the gate record the plate number in column A and time in column B
- When a truck stops inside the customs control area record the time in column C.
- If the driver goes to the police office directly put a P in column D and record the time he returns to his truck in column G.
- If the driver waits to go through the weighbridge first put a W in column F and record the time he moves his truck away from the weighbridge in column E.
- Complete the other timing spaces as appropriate.

5: To measure time taken at the X-ray Scanner.

- Use Form 4.
- For any trucks sent to the X-ray record the truck plate in column A and the time that they stop near the X-ray building in column B.
- Record the time the truck moves into the X-ray building in column C.
- Record the time the truck leaves the X-ray area in column D.

For ICP

1: The total time for trucks in and out will be calculated by using the paper records in the gate register of the ICP. For the 2016 TRS, the sample was two weeks of activity prior to the beginning of the TRS and two weeks from the same period the year prior.

2: The total time for brokers to prepare declarations will be calculated in consultation with a number of brokers who will provide a list of declaration start and finish times from their records.

- Use Form 6.
- Consult with the broker and establish if it more convenient to leave blank forms with the broker for completion by the broker and later pick-up of if the broker prefers to dictate the information to you from their records.
- Collect data accordingly on a daily basis throughout the TRS.

3: To measure the time taken for customs to process each truck.

- Use form 5
- Give the forms in bulk to the Declaration Assigning Inspectors before starting.
- Explain to the Declaration Assigning Inspectors what you want them to do (see below).
- Then explain to the Examination Officers what you want them to do (see below)

The procedure for the Declaration Assigning Inspectors is as follows:

1. When a truck driver or customs broker provides documents to the Declaration Assigning Inspector the Inspector will put the time and date on the top of the form based on the time shown on her/his computer screen.
2. The Inspector will then tick the appropriate boxes to describe the shipment.
3. The form will move with the declaration documents.

The procedure for the Examining Officer is as follows:

3. When all examinations are completed the Examining Officer examining the documents will write the time the truck is finalised on the bottom of the form based on the time shown her/his computer screen.
4. He/she will then keep the forms for later collection.

- Periodically collect all the forms from the Customs Inspectors and check that they are complete.

Part B: Electronic Data Collection

Set out below is a list of required fields for each Data Extraction to complete the TRS.

There are five extractions listed - two each for imports and exports at the BCPs and a single extraction for the ICPs.

The date ranges for extractions and the sites for extraction will be provided once a timeframe has been established for physical data collection.

All time and date data placed into excel should be formatted as follows:

- It must show time and date as separate but consecutive fields (i.e.DD-MMM-YY and HH:MM).
- The default ASYCUDA single field format which is "2009-06-17 00:00:00.0" should only be included as an additional field and not as a substitute for the two fields listed above.
- Inclusion of data in seconds is not essential.

Extraction A1: UNIPASS for data from the selected BCPs for trucks coming into Moldova over a nominated range of dates.

1. BCP Name
2. Date
3. Truck Number
4. Time Truck is at Police
5. Time Truck is at Weighbridge

Extraction A2: ASYCUDA for data from the selected BCPs for trucks coming into Moldova over a nominated range of dates.

1. BCP Name
2. Date
3. Truck Number
4. Declaration Number
5. Time declaration made into ASYCUDA by Broker
6. Transit Y/N
7. Time truck entered into ASYCUDA when examination process commences
8. Initial RGB Classification allocated
9. Examination Ends (exam process finalised)

Extraction B1: ASYCUDA for data from the selected ICPs for trucks entering an ICP over a nominated range of dates.

1. ICP Name/Code number
2. Date
3. Truck Number
4. Declaration number
5. Number of Articles
6. Time declaration made into ASYCUDA by Broker
7. Time Truck entered into ASYCUDA when examination process commences
8. Transit Y/N

9. Initial RYGB Classification
10. Examination Ends (exam process finalised)

Extraction C1: UNIPASS or ASYCUDA data from the selected BCPs for trucks departing from Moldova over a nominated range of dates.

1. BCP Name
2. Date
3. Truck Number
4. Truck Time at Police
5. Truck Time at Weighbridge

Extraction C2: ASYCUDA data from the selected BCPs for trucks departing from Moldova over a nominated range of dates.

1. BCP Name
2. Date
3. Truck Number
4. Declaration number
5. Number of Articles
6. Time declaration made into ASYCUDA by Broker
7. Time Truck entered into ASYCUDA when examination process commences
8. Transit Y/N
9. Initial RYGB Classification
10. Examination Ends (exam process finalised)

Annex B: Copies of forms.

Form 1: To measure time taken at Police and Weighbridge.

LOCATION: _____ DATE: ____ / ___ / _____, Entrance to Moldova/Exit from Moldova

Indicate times below:

A Plate Number	B Truck at Gate	C Truck stops.	D Weighbridge In	E Weighbridge Out	F To Police	G From Police	Comments

Form 2: To measure the time taken for customs to process each truck at a BCP.

LOCATION:_____ DATE:_____

Use a separate form for each truck.

Truck Number	Start Time and Date. _____ : ____ , _____ / ____ / _____
Loaded	**YES** ☐ **NO** ☐
INBOUND	**OUTBOUND**
Type of declaration:	**Type of declaration:**
Electronic import ☐	Electronic Export ☐
T1 ☐	T1 ☐
TIR ☐	TIR ☐
Import ☐	Export ☐
AEO Status ☐	AEO Status ☐
Additional inspections: ☐	**Additional inspections:**
X-Ray ☐	X-Ray ☐
Phyto-sanitary ☐	Phyto-sanitary ☐
Veterinary ☐	Veterinary ☐
Corridor (if not applicable, leave blank)	
Red ☐	Red ☐
Yellow ☐	Yellow ☐
Green ☐	Green ☐
Blue ☐	Blue ☐
(filled by the Inspector Examination)	
Date: _____ / ____ / _____	End Time ____ : ____

Form 3: To Measure times for non-customs activities.

LOCATION: _____ DATE: ____ / ___ / _____,

Indicate times below:

A Bank Joins queue or approaches window	B Bank Leaves window	C Veterinary Joins queue or approaches window	D Veterinary Leaves window	E Phytosanitary Joins queue or approaches window	F Phytosanitary Leaves window	Comments

Form 4: To measure time taken at X-ray at BCP.

LOCATION: _____ DATE: ____ / ___ / _____,

Indicate times below:

A Plate Number	B Joins X-ray Queue	C To X-ray	D From X-Ray	Comments

Form 5: To measure the time taken for customs to process each truck at ICP.

LOCATION:_____ DATE: ____ / ___ / _____,

Entrance to Moldova/Exit from Moldova

Truck Number	Start Time and Date. ___ : ___ , ___ /___ / _____
Loaded	**YES** ☐ **NO** ☐
INBOUND	
Type of declaration:	
Import ☐	
T1 ☐	
TIR ☐	
Electronic import ☐	
AEO Status ☐	
Additional inspections:	
X-Ray ☐	
Phyto-sanitary ☐	
Veterinary ☐	
Corridor (if not applicable, leave blank)	
Red ☐	
Yellow ☐	
Green ☐	
Blue ☐	
(filled by the Inspector Examination)	
Date: _____ / ____ / _____	End Time ____ : ____

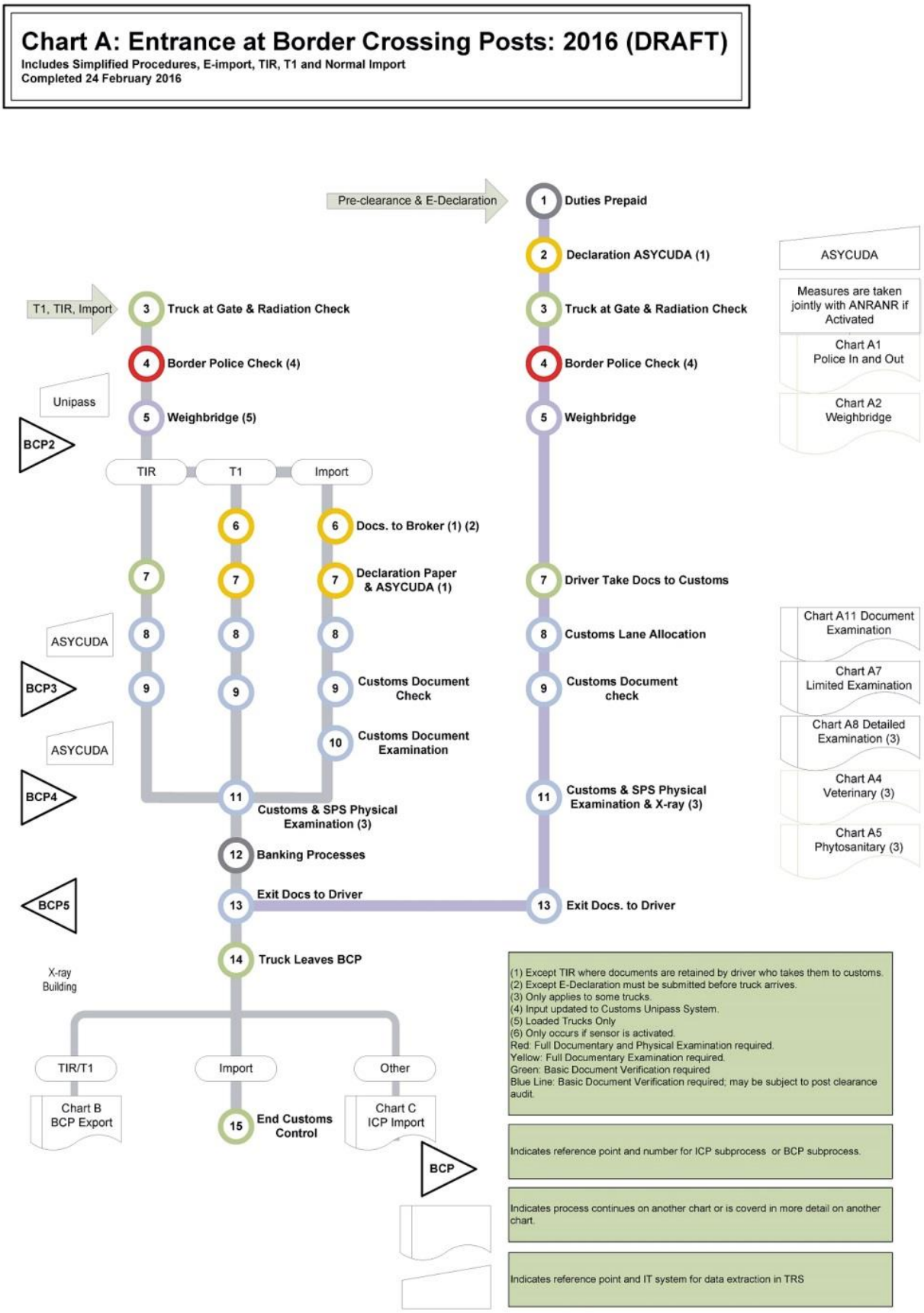
Form 6: To measure the total time for brokers to prepare declarations

LOCATION: _____ DATE: ____ / ___ / _____,

Indicate times below:

A Declaration Number	B Articles in Declaration	C Prepaid Duty Y/N	D Electronic Declaration Y/N	E Time Documents Received by Broker	F Time Compilation Commenced	G Time Sent in ASYCUDA	Comments

Annex C. Flowcharts BCP



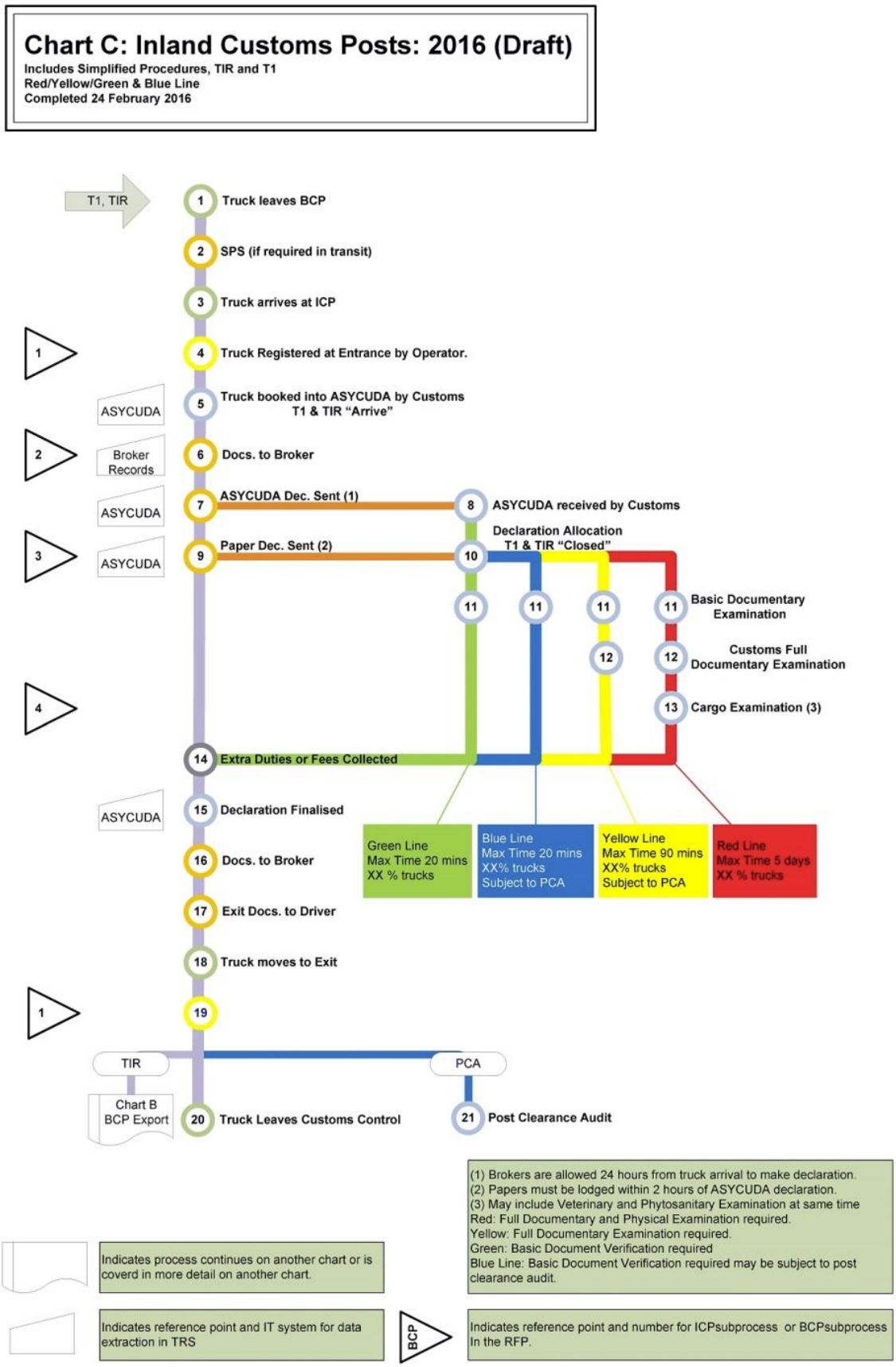


Chart C: Inland Customs Posts: 2016 (Draft)
Includes Simplified Procedures, TIR and T1
Red/Yellow/Green & Blue Line
Completed 24 February 2016
T1, TIR
1 Truck leaves BCP
2 SPS (if required in transit)
3 Truck arrives at ICP
1
4 Truck Registered at Entrance by Operator.
ASYCUDA
5 Truck booked into ASYCUDA by Customs T1 & TIR "Arrive"
2
Broker Records
6 Docs. to Broker
ASYCUDA
7 ASYCUDA Dec. Sent (1)
8 ASYCUDA received by Customs
3
ASYCUDA
9 Paper Dec. Sent (2)
Declaration Allocation T1 & TIR "Closed"
10
11 11 11 11 Basic Documentary Examination
12 12 Customs Full Documentary Examination
4
13 Cargo Examination (3)
14 Extra Duties or Fees Collected
ASYCUDA
15 Declaration Finalised
Green Line Max Time 20 mins XX % trucks
Blue Line Max Time 20 mins XX% trucks Subject to PCA
Yellow Line Max Time 90 mins XX% trucks Subject to PCA
Red Line Max Time 5 days XX % trucks
16 Docs. to Broker
17 Exit Docs. to Driver
18 Truck moves to Exit
1
19
TIR
PCA
Chart B BCP Export
20 Truck Leaves Customs Control
21 Post Clearance Audit
(1) Brokers are allowed 24 hours from truck arrival to make declaration.
(2) Papers must be lodged within 2 hours of ASYCUDA declaration.
(3) May include Veterinary and Phytosanitary Examination at same time
Red: Full Documentary and Physical Examination required.
Yellow: Full Documentary Examination required.
Green: Basic Document Verification required
Blue Line: Basic Document Verification required may be subject to post clearance audit.
Indicates process continues on another chart or is coverd in more detail on another chart.
Indicates reference point and IT system for data extraction in TRS
BCP
Indicates reference point and number for ICPsubprocess or BCPsubprocess In the RFP.

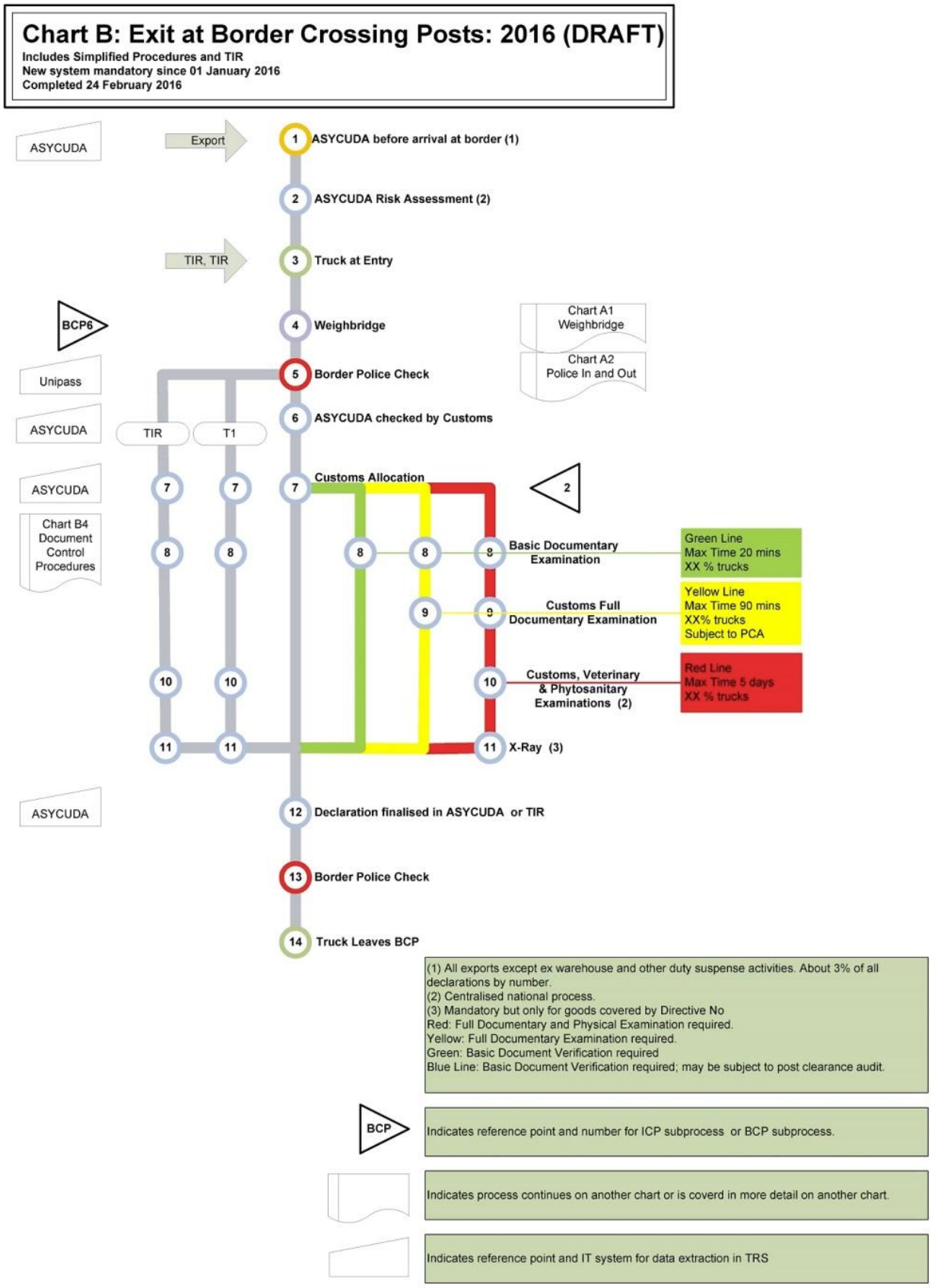


Chart B: Exit at Border Crossing Posts: 2016 (DRAFT)
Includes Simplified Procedures and TIR
New system mandatory since 01 January 2016
Completed 24 February 2016
ASYCUDA
Export
1 ASYCUDA before arrival at border (1)
2 ASYCUDA Risk Assessment (2)
TIR, TIR
3 Truck at Entry
BCP6
4 Weighbridge
Chart A1 Weighbridge
Chart A2 Police In and Out
Unipass
5 Border Police Check
ASYCUDA
6 ASYCUDA checked by Customs
TIR
T1
ASYCUDA
7 Customs Allocation
2
Chart B4 Document Control Procedures
8 Basic Documentary Examination
Green Line
Max Time 20 mins
XX % trucks
9 Customs Full Documentary Examination
Yellow Line
Max Time 90 mins
XX% trucks
Subject to PCA
10 Customs, Veterinary & Phytosanitary Examinations (2)
Red Line
Max Time 5 days
XX % trucks
11 X-Ray (3)
ASYCUDA
12 Declaration finalised in ASYCUDA or TIR
13 Border Police Check
14 Truck Leaves BCP
(1) All exports except ex warehouse and other duty suspense activities. About 3% of all declarations by number.
(2) Centralised national process.
(3) Mandatory but only for goods covered by Directive No
Red: Full Documentary and Physical Examination required.
Yellow: Full Documentary Examination required.
Green: Basic Document Verification required
Blue Line: Basic Document Verification required; may be subject to post clearance audit.
BCP
Indicates reference point and number for ICP subprocess or BCP subprocess.
Indicates process continues on another chart or is coverd in more detail on another chart.
Indicates reference point and IT system for data extraction in TRS

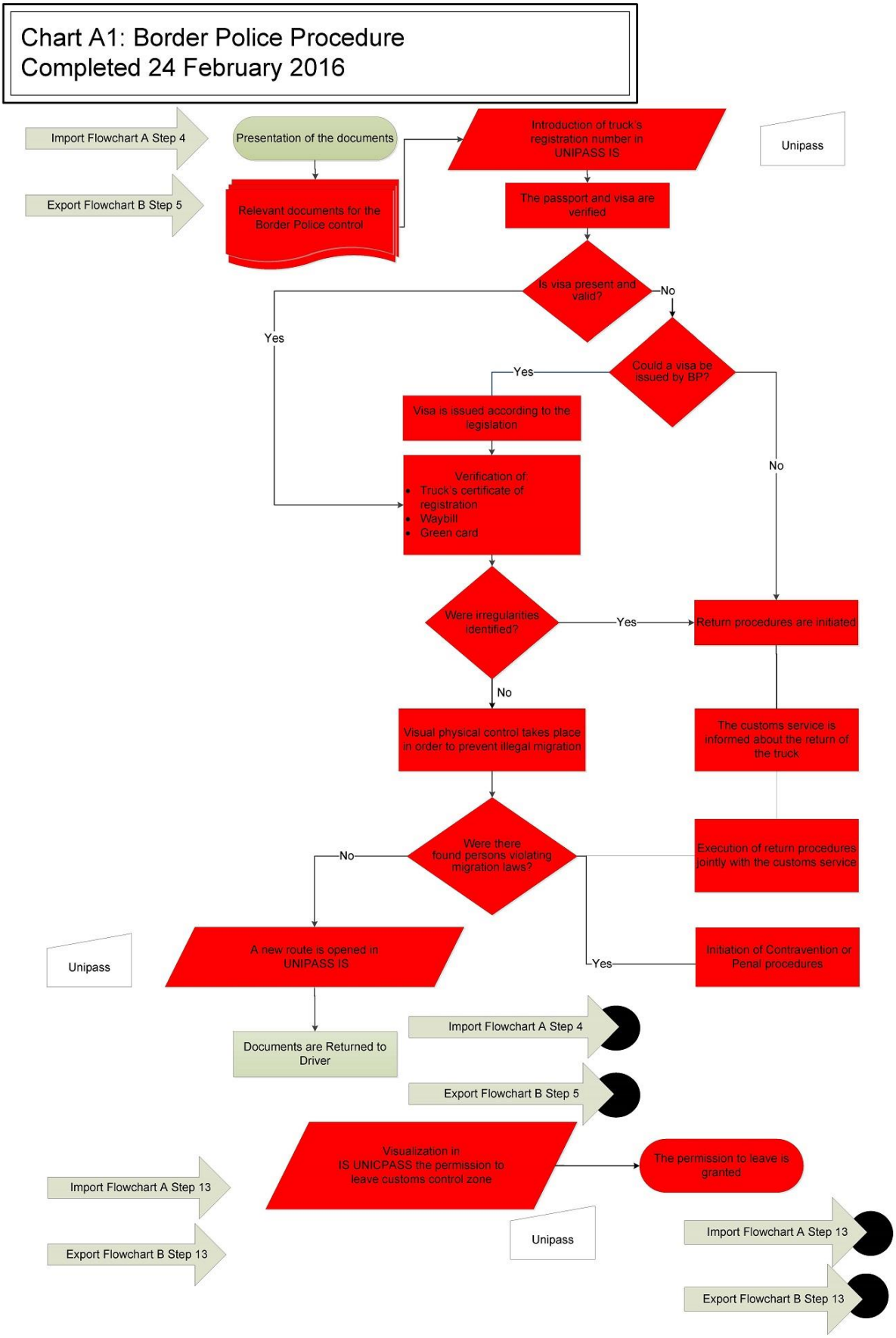


Chart A1: Border Police Procedure
Completed 24 February 2016
Import Flowchart A Step 4
Export Flowchart B Step 5
Presentation of the documents
Relevant documents for the Border Police control
Introduction of truck's registration number in UNIPASS IS
Unipass
The passport and visa are verified
Is visa present and valid?
No
Yes
Could a visa be issued by BP?
Yes
No
Visa is issued according to the legislation
Verification of:
Truck's certificate of registration
Waybill
Green card
Were irregularities identified?
Yes
Return procedures are initiated
No
Visual physical control takes place in order to prevent illegal migration
The customs service is informed about the return of the truck
Were there found persons violating migration laws?
No
Execution of return procedures jointly with the customs service
Unipass
A new route is opened in UNIPASS IS
Yes
Initiation of Contravention or Penal procedures
Import Flowchart A Step 4
Documents are Returned to Driver
Export Flowchart B Step 5
Visualization in IS UNICPASS the permission to leave customs control zone
The permission to leave is granted
Import Flowchart A Step 13
Export Flowchart B Step 13
Unipass
Import Flowchart A Step 13
Export Flowchart B Step 13

Chart A2: Weighbridge Procedure
Completed 24 February 2016

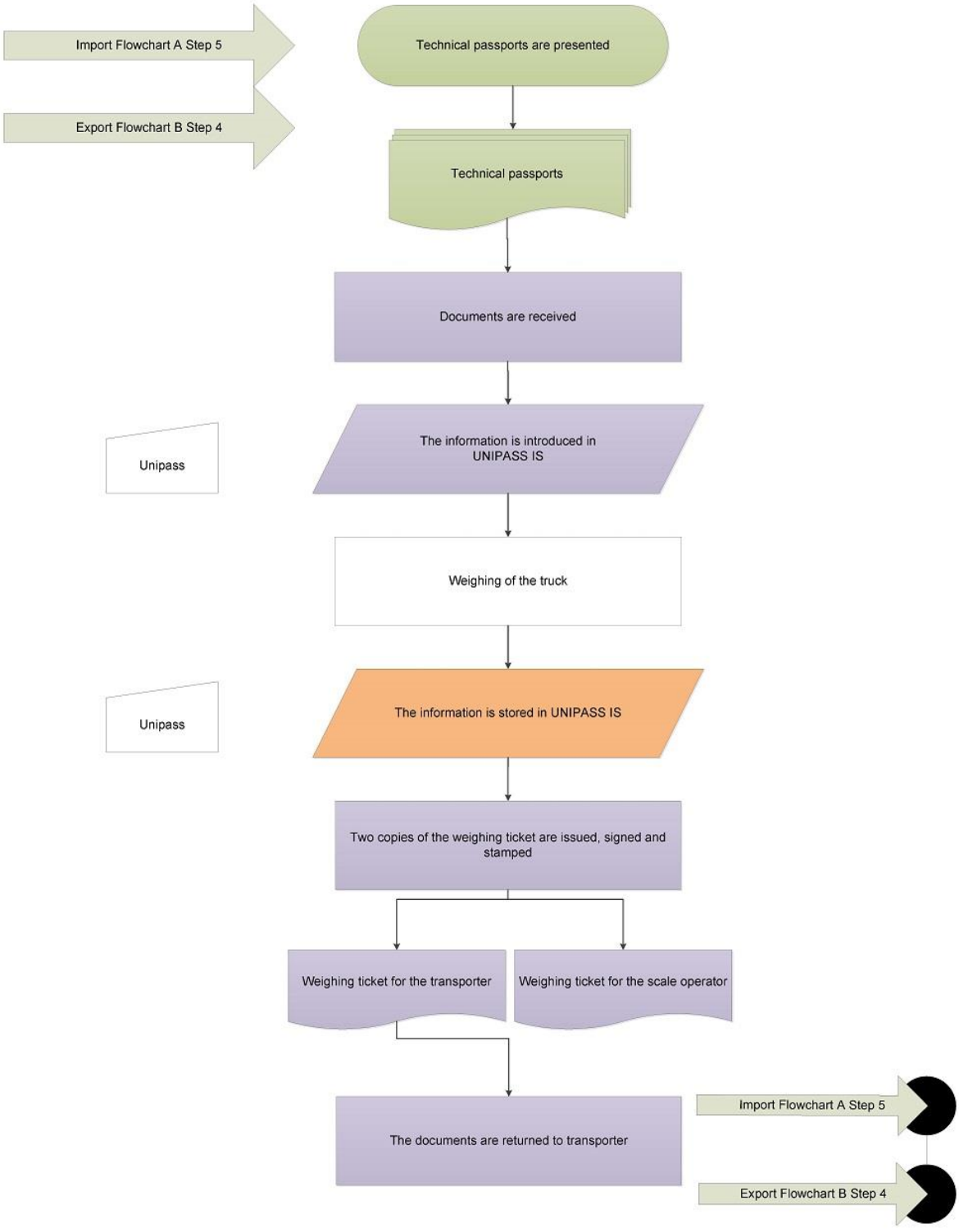


Chart A4: Border Veterinary Control
Obsolete Process removed as part of facilitation process
Completed 24 February 2016

Chart A5: Import Phytosanitary Processes: Completed 24 February 2016

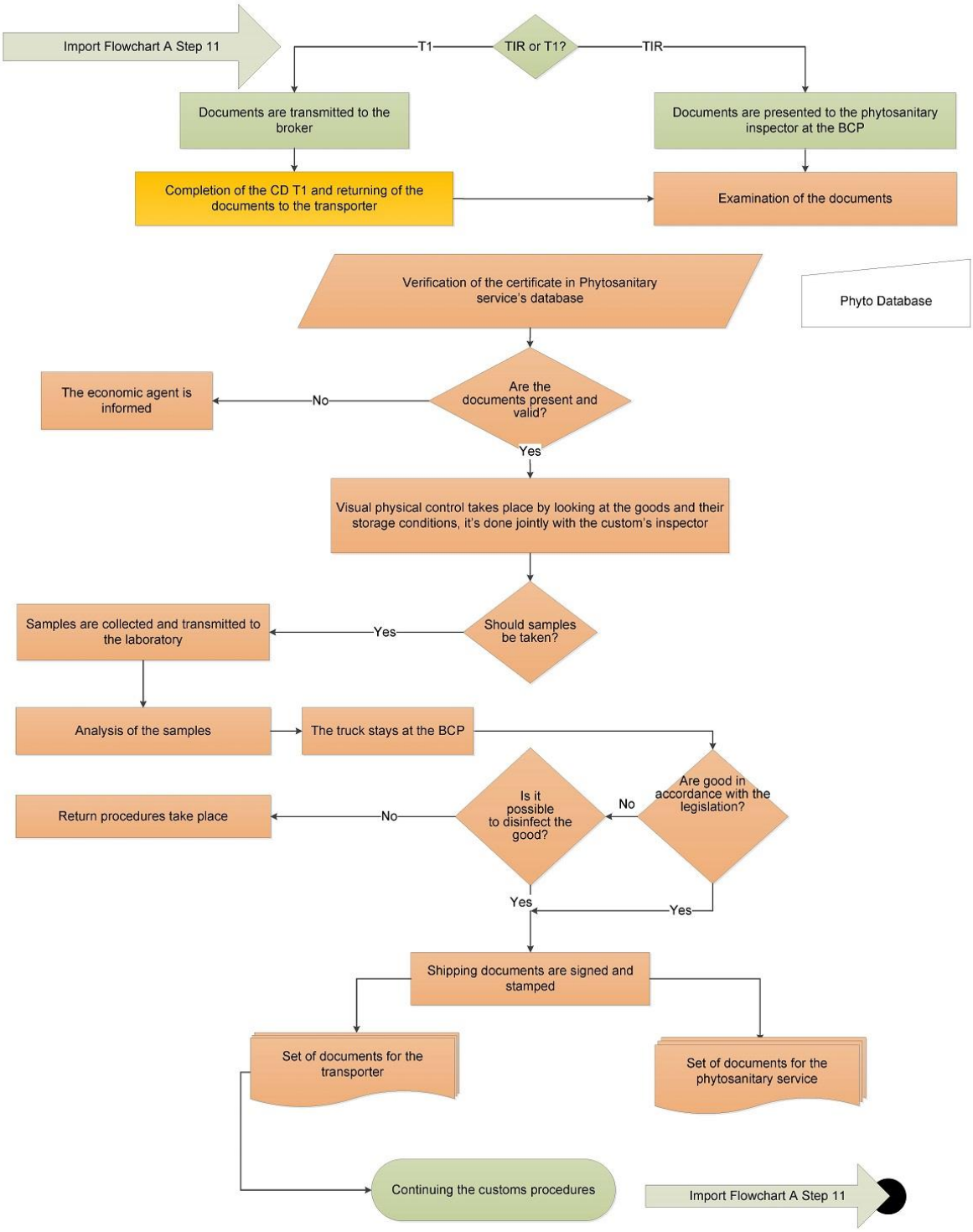


Chart A6: Border Customs Posts:
Initial Declaration Processes
Completed 24 February 2016

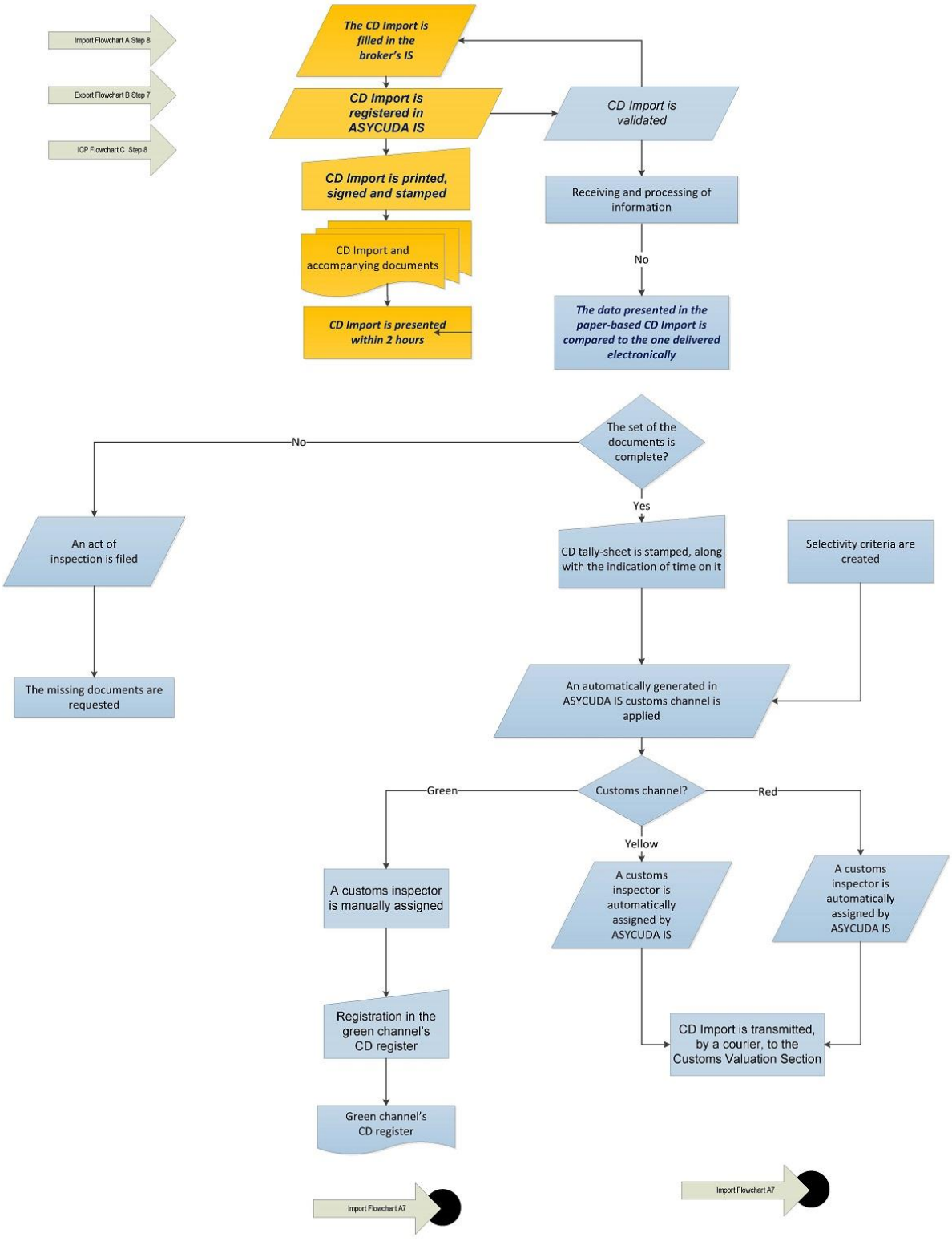


Chart A7: Border Customs Posts:
Valuation Review Process
Completed 24 February 2016

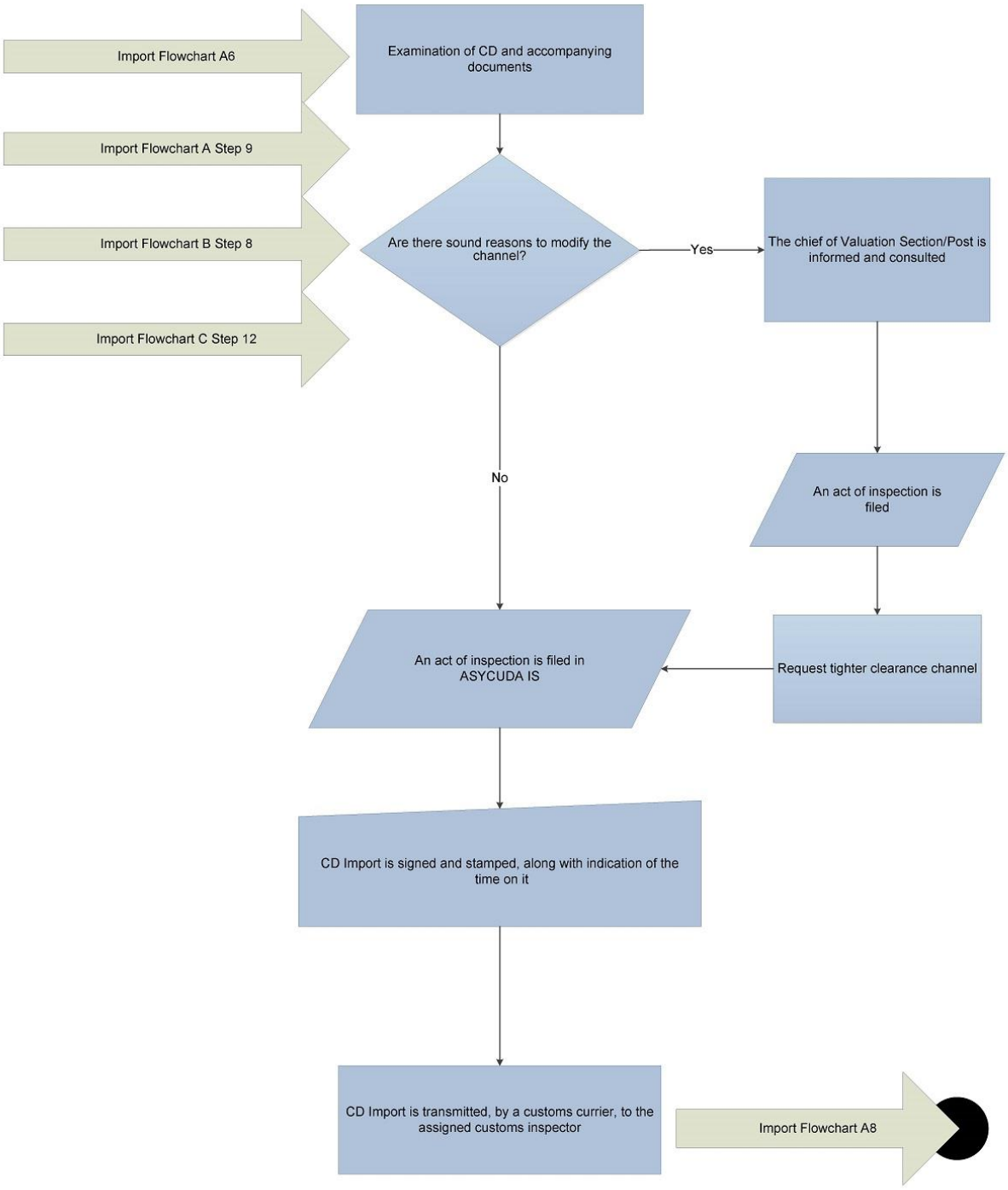


Chart A8: Border Customs Posts:
Review RGB Allocation
Completed 24 February 2016

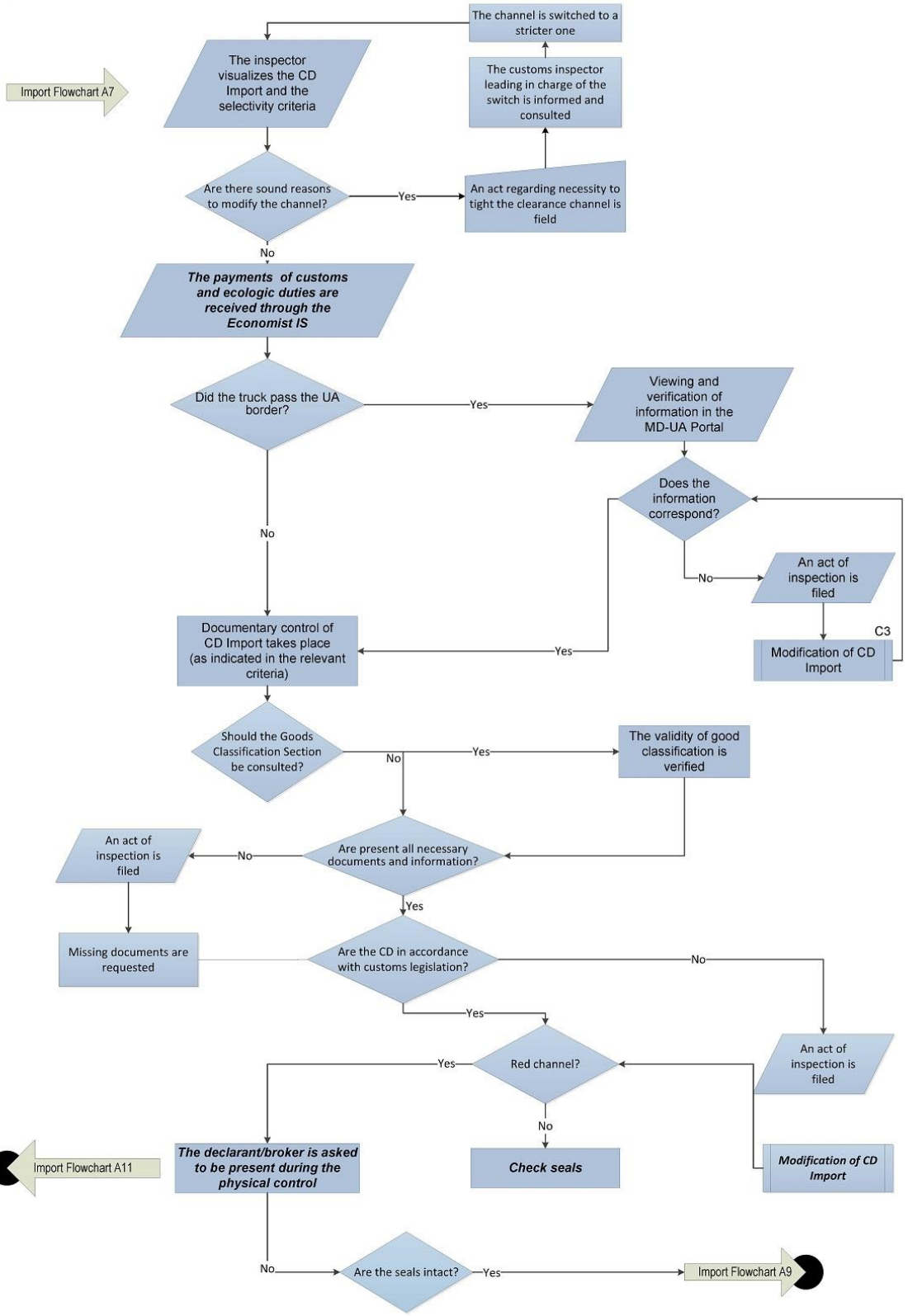


Chart A9: Border Customs Posts:
Seals Intact
Completed 24 February 2016

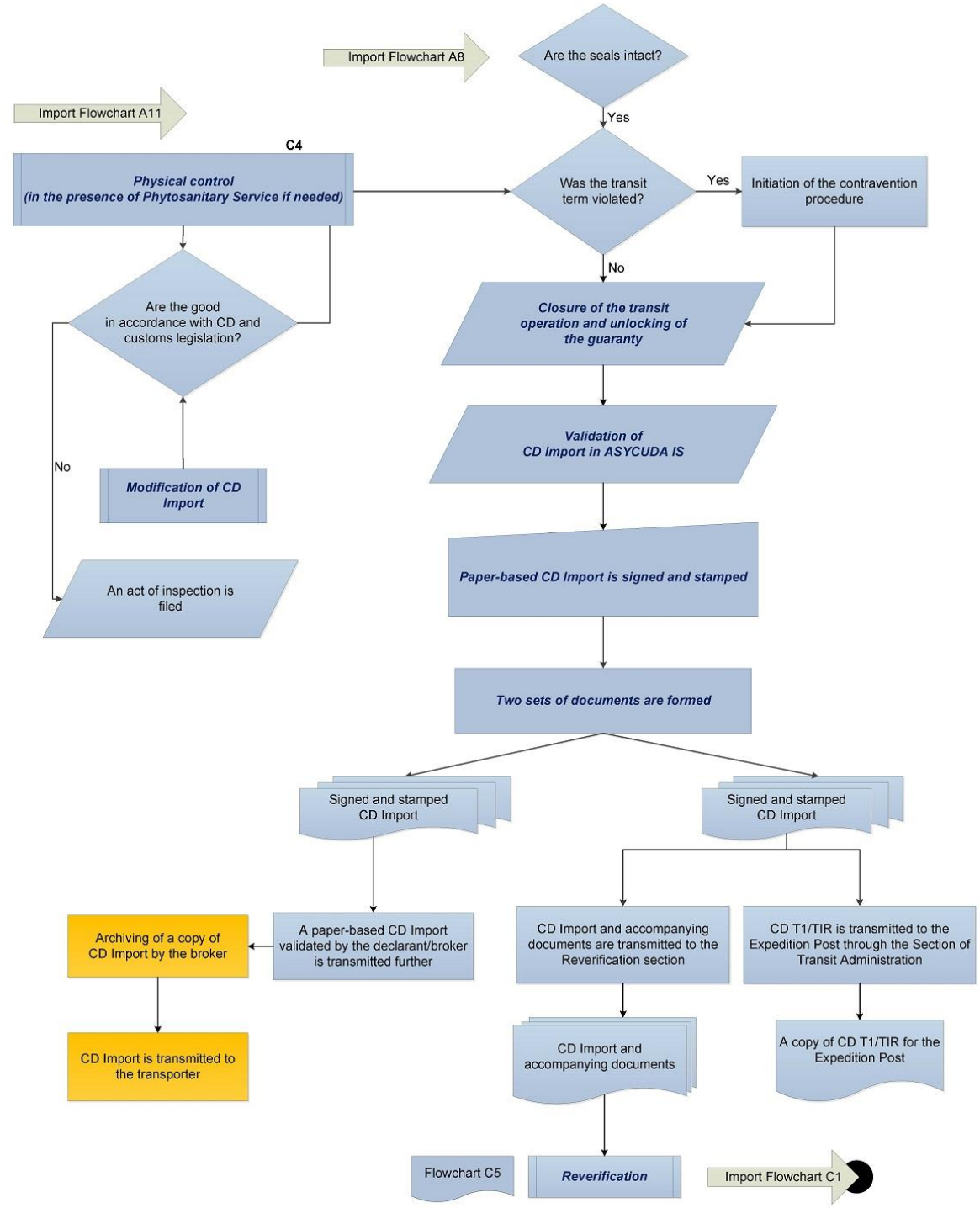


Chart A10: Border Customs Posts:
Visual Physical Control
Completed 24 February 2016

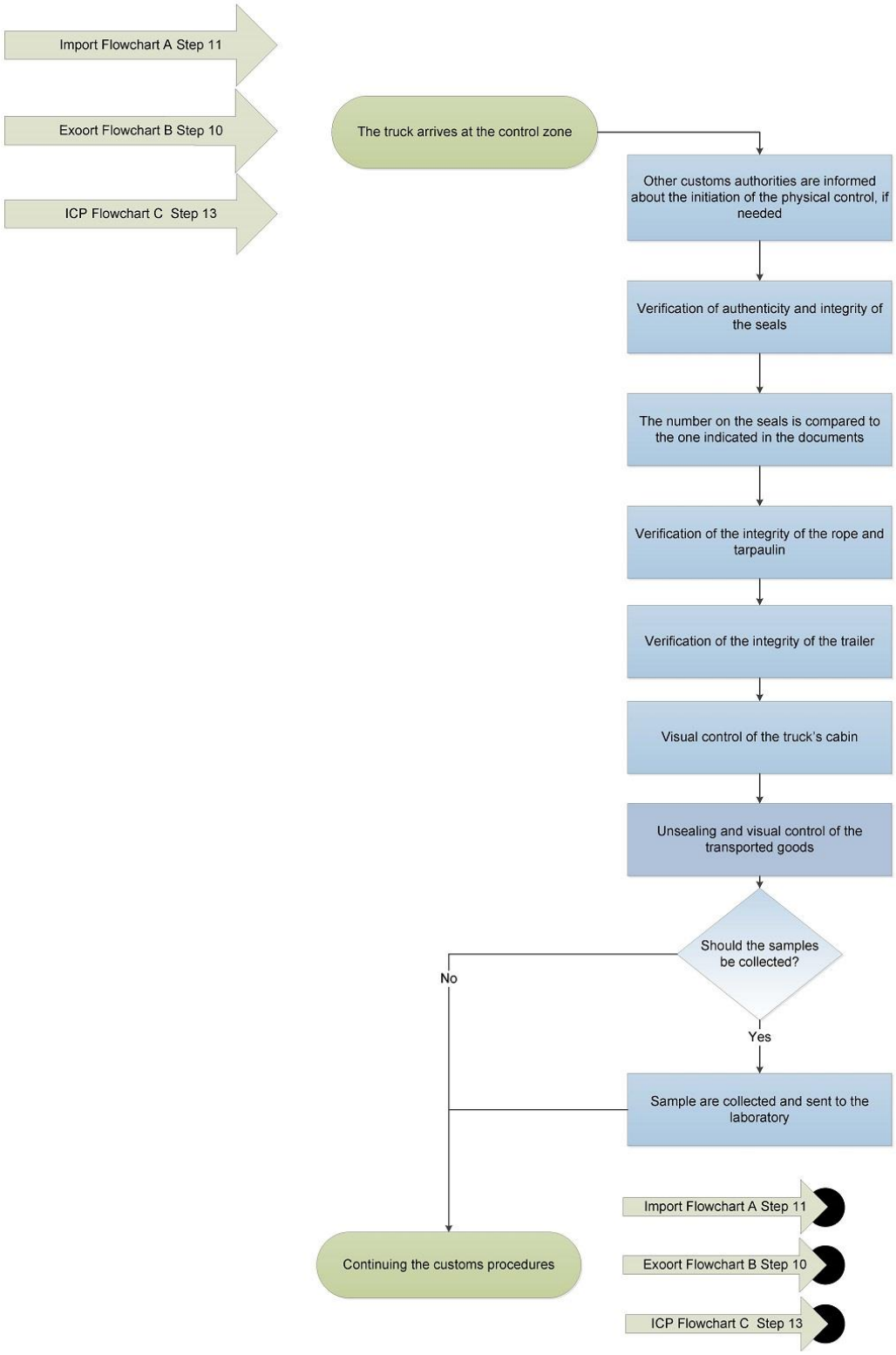


Chart A11: Border Customs Posts:
Detailed Physical Control at Customs Warehouse
Completed 24 February 2016

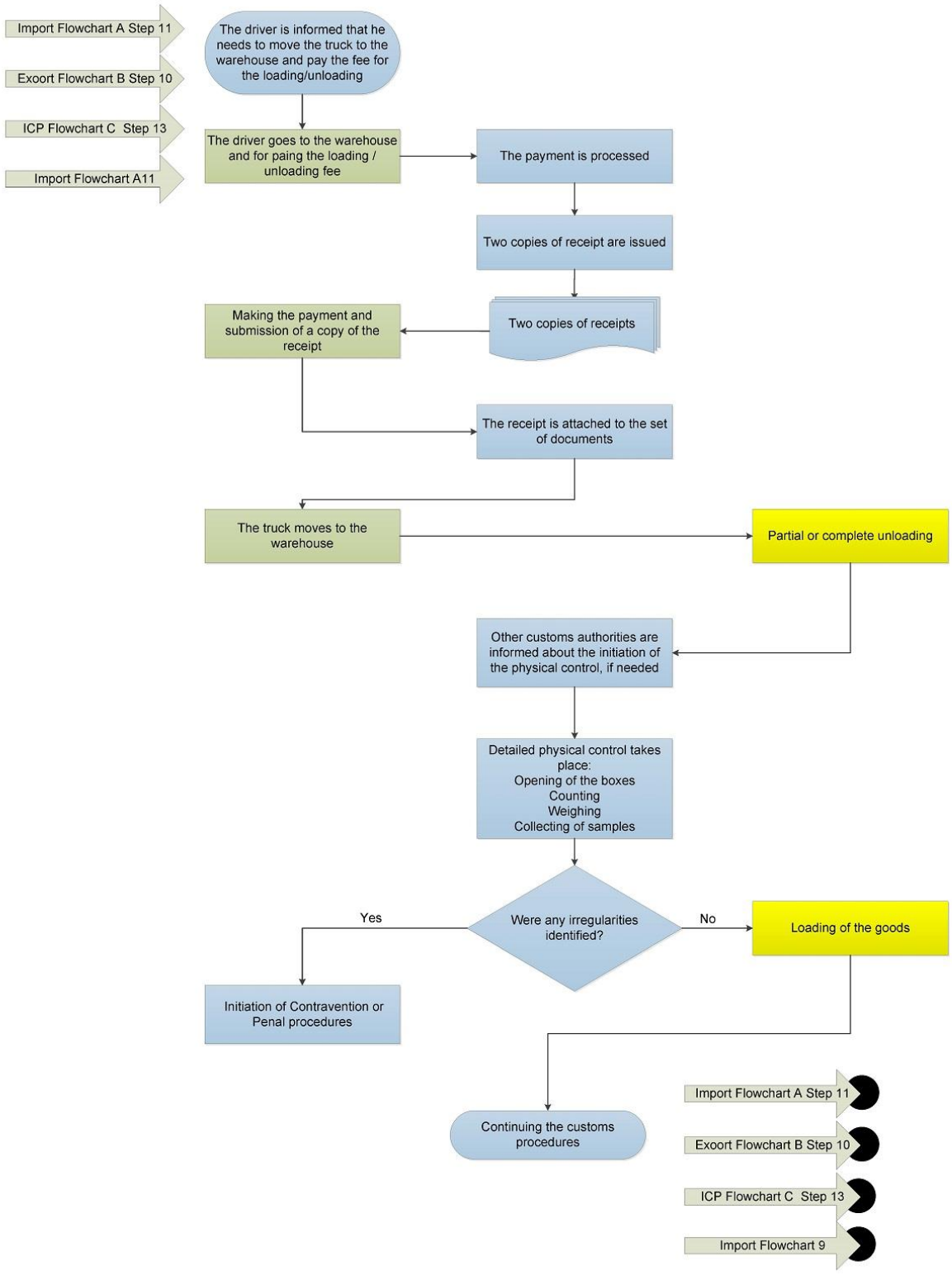


Chart A12: Border Customs Posts:
Modification of Customs Declaration after Physical and Documentary Control
Completed 24 February 2016

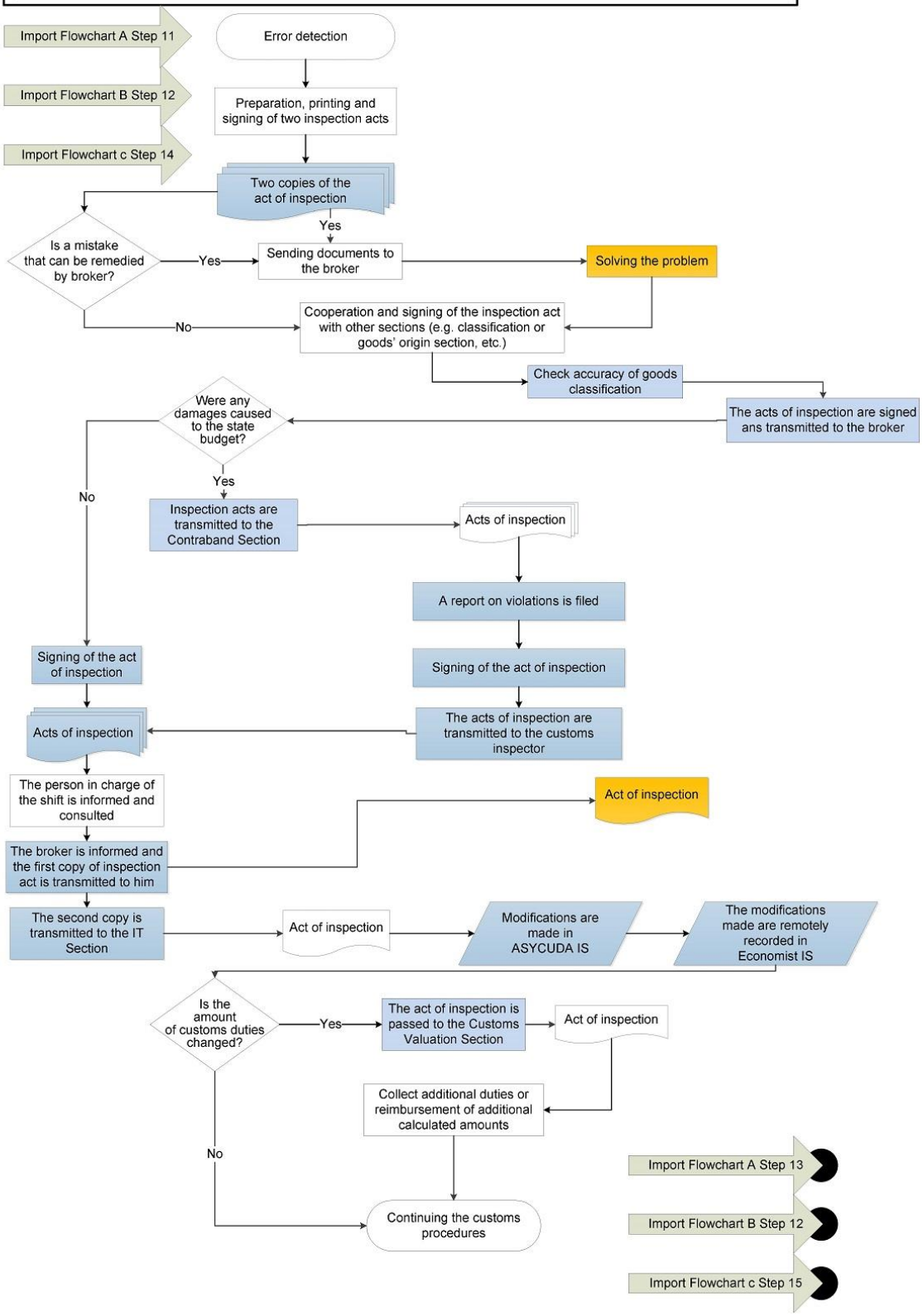


Chart C1: inland Customs Posts:
Re Evaluation
Completed 24 February 2016

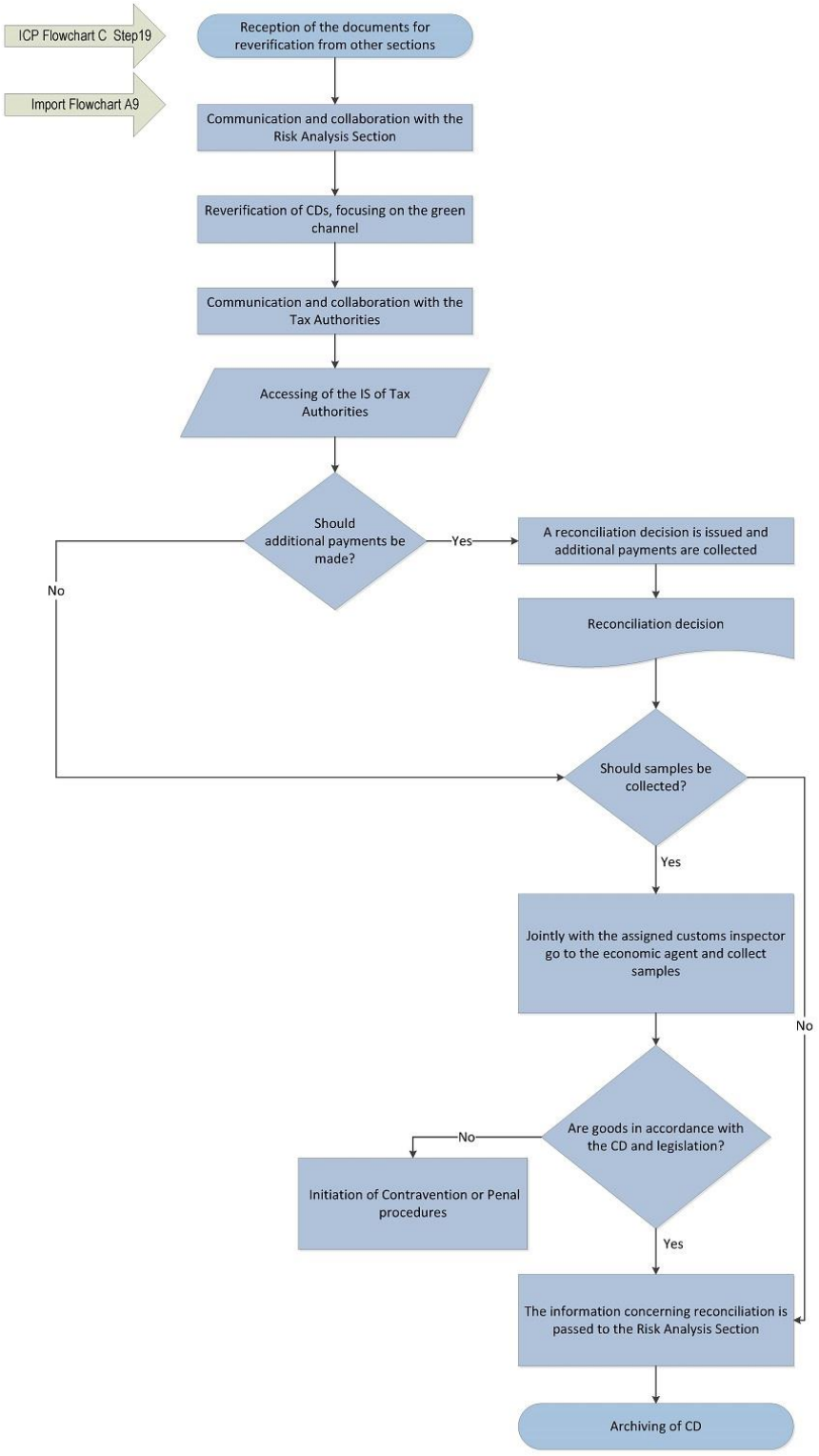


Chart C2: Inland Customs Posts:
C2. Veterinary Control of Food at ICP Import
Completed 24 February 2016