



Project Controls Expo

09/10 Nov London 2011

Session F6

An Introduction to Performance Measurement,
Reporting and Change Control System

Speaker – David Birch

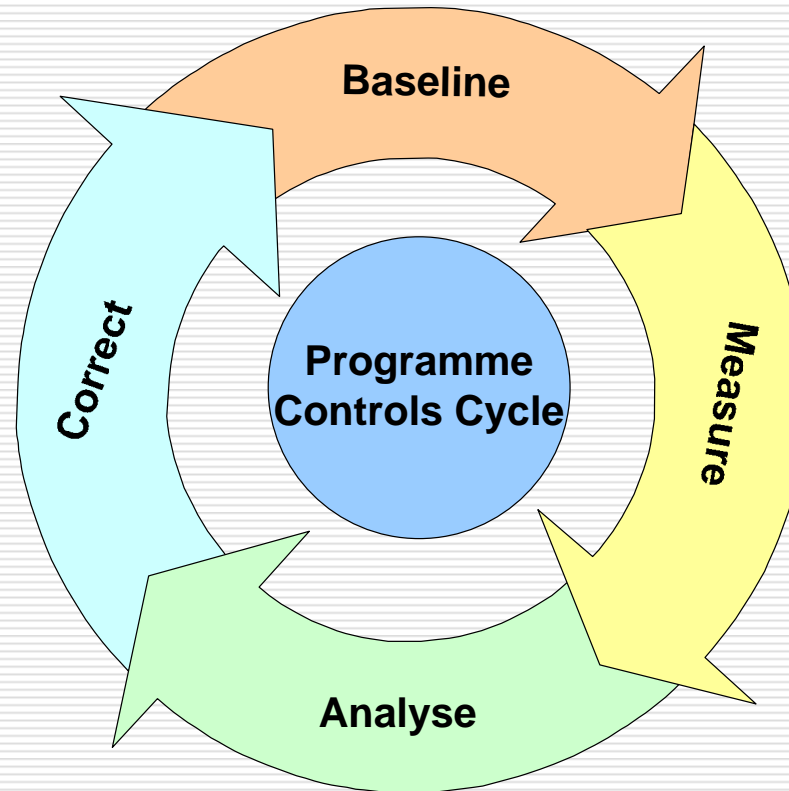
David Birch Profile

- 35 years experience in the delivery of high profile UK and international project portfolios for world leading engineering contractors.
- 25 years of Project Controls and Operational Management experience
- Since 2008 responsible for CLM Programme Controls group delivering the London 2012 Olympic Games programme for the Olympic Delivery Authority (ODA).
- In addition, delivered projects in other industry sectors including:
 - ✓ UK & International projects in Oil and Gas
 - ✓ Nuclear decommissioning and clean-up
 - ✓ Conventional and Nuclear Energy
 - ✓ Water
 - ✓ Telecoms
 - ✓ Industrial and Infrastructure

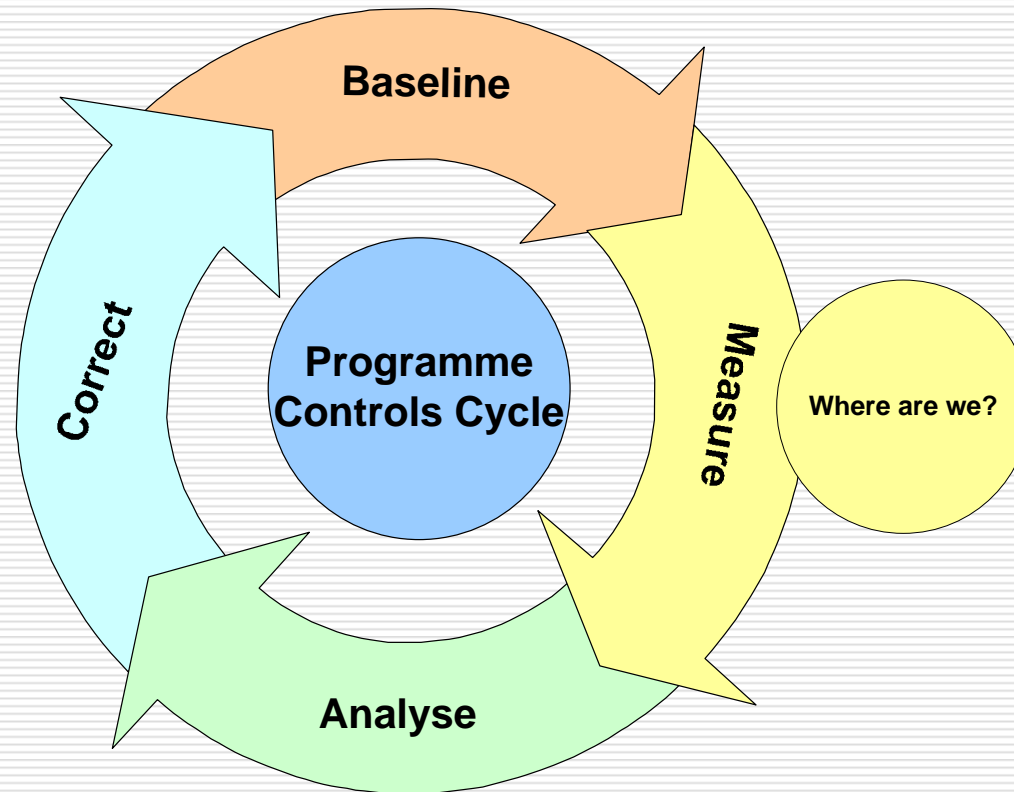
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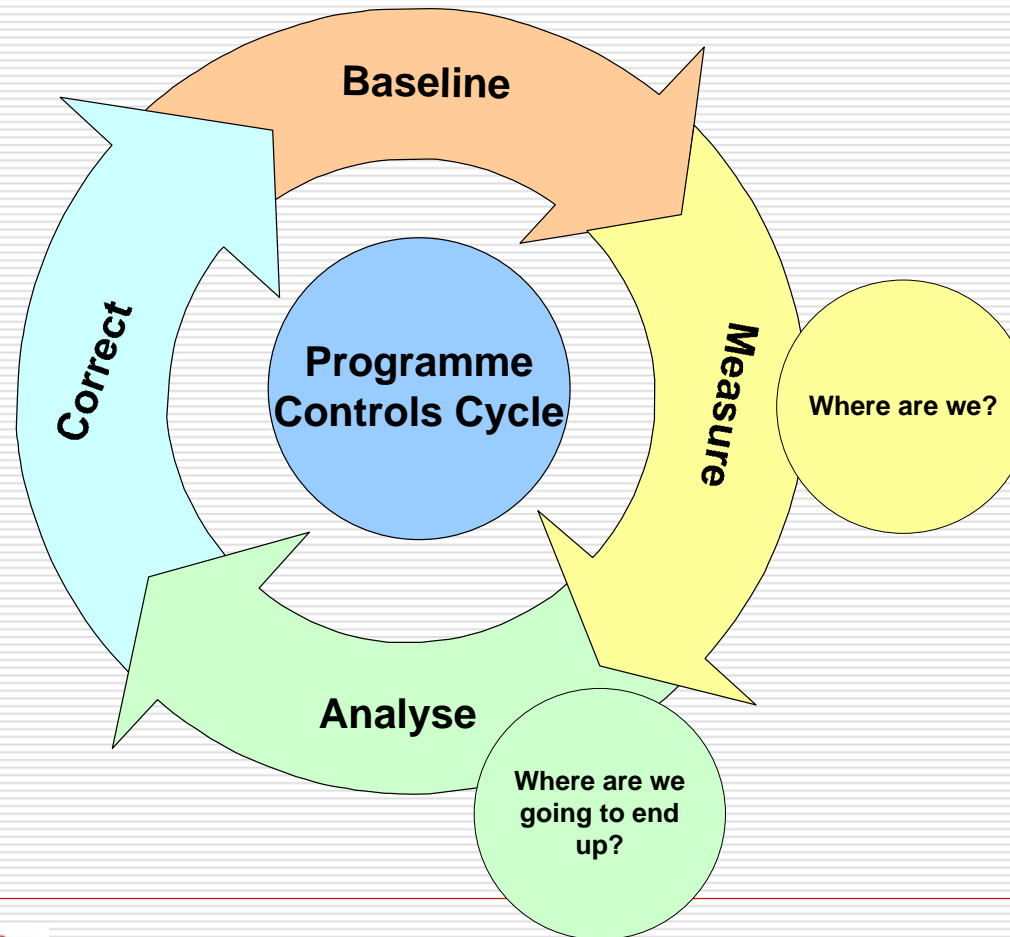
Project Control Cycle



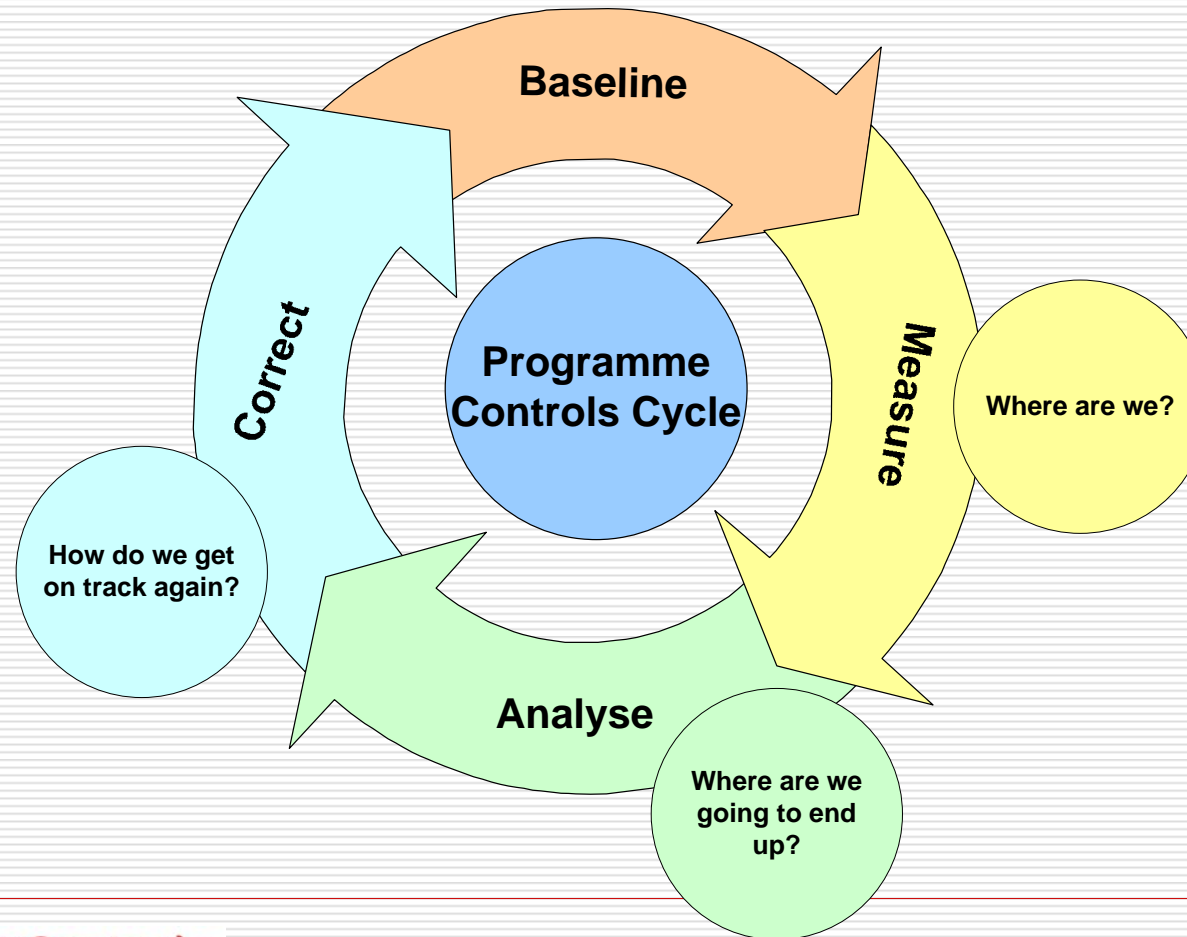
Project Control Cycle



Project Control Cycle



Project Control Cycle



Establish a Baseline

- Initial version may be a 'top down' approach
 - ✓ Original Baseline Budget (OBB) should be formally agreed
 - ✓ OBB includes distributed project budget and contingency
- Level of detail determined by complexity of the project, planned to the level where there was sufficient information/knowledge to manage
- All elements within the baseline to be defined by four elements:
 - ✓ Scope
 - ✓ Schedule
 - ✓ Risk
 - ✓ Budget (including Contingency derived from Risk)
- The BASELINE is the basis for performance measurement during execution and should be formally approved and published
- Once approved, forms the basis for CHANGE

One of the certainties
of life is that things
will...

...change



Managing the Baseline with Change Control

Rules

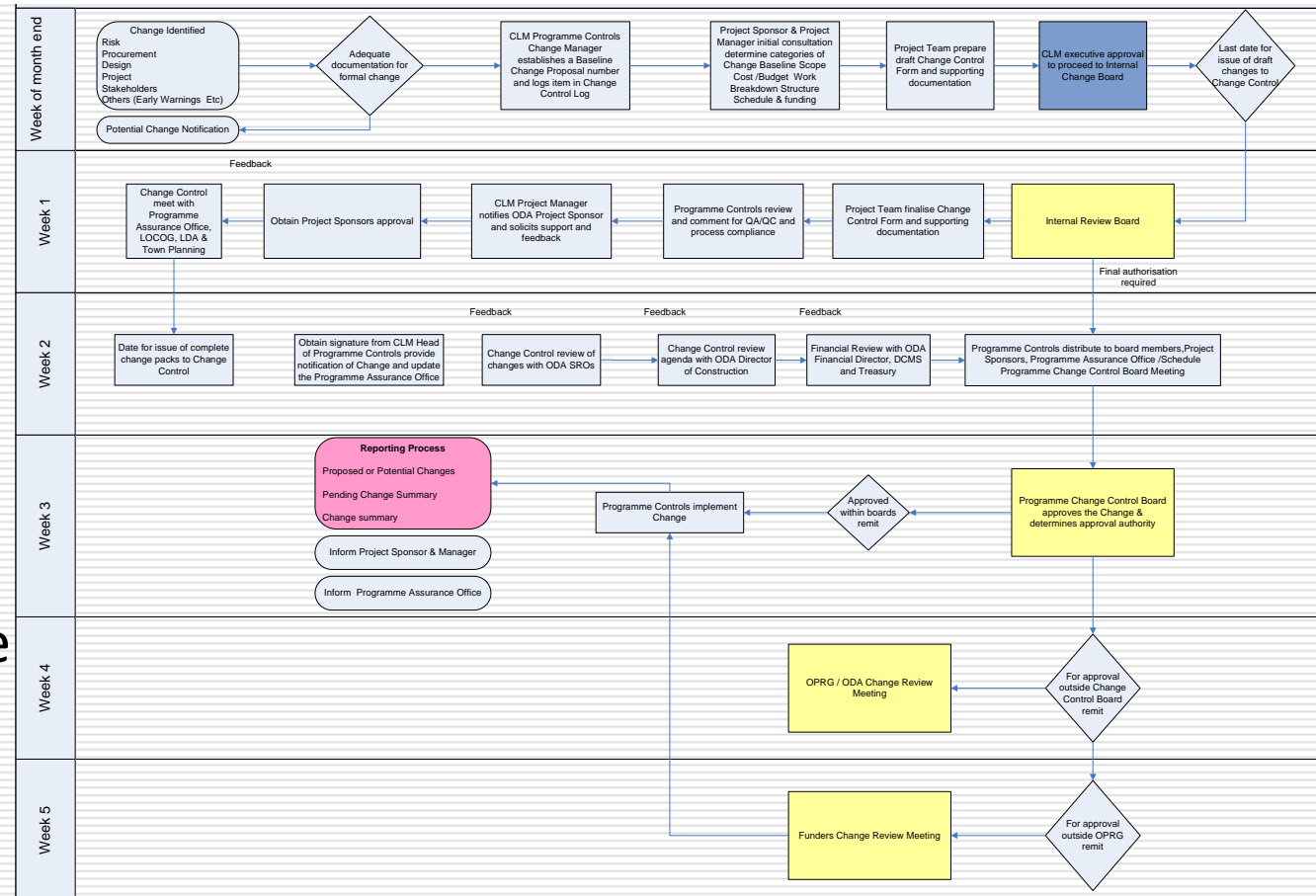
- Imperative to measure against a plan which reflects reality (i.e. is current)
 - ✓ Evolve toward a 'bottom up' basis which reflects accepted contractor's plans
 - ✓ All changes require approved Change Control no matter how small or insignificant (*using delegated levels of Authority for lower value changes*)
 - ✓ Current Budget Baseline (CBB) = OBB + approved changes

Achieved through

- Focused Re-planning
 - ✓ Knowledge based updates as more information is available to inform the plan
 - ✓ Series of anticipated changes aligned to design & build life-cycle
 - ✓ By Project or Sub-Project Level
- Rigorous Change Control

Change Management Process

Imperative to establish a Change Management process that is part of the monthly update cycle



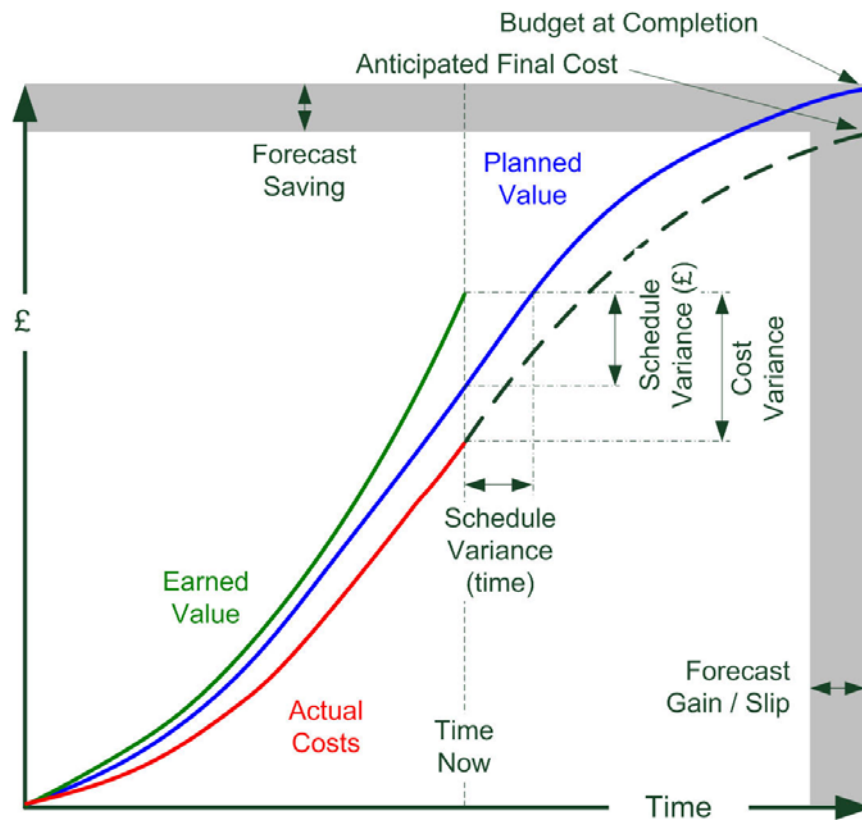
Performance Measurement

- An Earned Value (EV) system applied fully will aid successful execution of a project or programme
- An EV system is not just a set of calculations, correctly applied it creates a comprehensive Project control framework with all the checks and balances needed
- 32 criteria are specified in *ANSI / EIA 748* and *APM Guidelines*
- Time prohibits dealing with each one but the most influential are...

Most Influential EV Criteria

- 1. Define authorised work and resources via WBS*
- 3. Ensure management subsystems support each other, the WBS and the OBS*
- 8. Maintain Performance Measurement Baseline at Control Account (C/A) level*
- 15. CBB = approved project base budgets + contingencies*
- 17. Prohibit multiple accounting as direct costs are summarised through the WBS*
- 22. Produce monthly performance measurement data at C/A level*
- 27. Develop monthly AFC's and compare to CBB*
- 28. Incorporate all authorised changes in a timely manner*

EV Methods



Performance Indices (favourable is >1.0, unfavourable is <1.0)

Cost Performance Index (CPI) = $\frac{\text{Earned Value}}{\text{Actual Cost}}$

Schedule Performance Index (SPI) = $\frac{\text{Earned Value}}{\text{Planned Value (Baseline)}}$

Variiances (favourable is positive, unfavourable is negative)

Cost Variance (CV) = $\text{Earned Value} - \text{Actual Costs}$

Schedule Variance (SV) = $\text{Earned} - \text{Planned Costs}$

Variance at Completion (VAC) = $\text{Budget at Completion (BAC)} - \text{Anticipated Final Cost (AFC)}$

Anticipated Final Cost (AFC)

(AFC = cost to date + estimate for remaining work)

$$\text{AFC} = \text{Actual Costs} + \frac{(\text{Budget at Completion} - \text{Earned Value})}{\text{CPI}}$$

% Scheduled / Complete / Spent

% scheduled = $\frac{\text{Baseline Value (planned costs)}}{\text{BAC}} \times 100$

% complete = $\frac{\text{Earned Value}}{\text{BAC}} \times 100$

% spent = $\frac{\text{Actual Costs}}{\text{BAC}} \times 100$

Other Checks and Balances

- Look at your Schedule forecasts to complete and evaluate milestone movements (including movements in prior months)
- Analyse progress trends and review forecasts to complete (monthly % complete forecasts)
- Check the percentage of activities on the critical path and review against previous months (if >20% of activities are critical, warning bells should ring)
- Look at your AFC, cost to go forecasts and the phasing of cost to go
- Use your actual cost and progress to date to review trending to complete
- Regularly analyse residual project risks from Cost and Schedule perspective

Reporting

Essential elements

- Monthly Reporting Calendar
- Performance Reports
- Status Reports
- Schedule Reports

Monthly Reporting Cycle

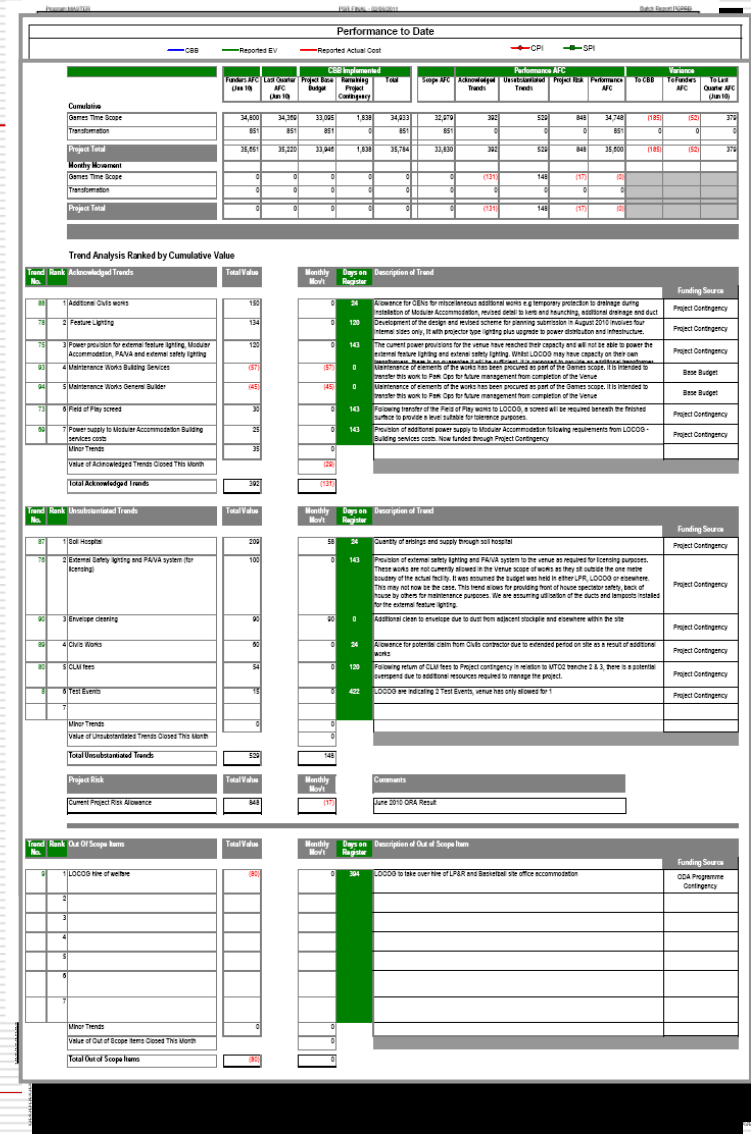
Monday	Tuesday	Wednesday	Thursday	Friday
Week to Month end				
Gather data and upload to host systems				
Week 1				
Assurance, analysis ,challenge and Project Reports				
Week 2				
Executive Management Reviews & Programme Report				
Week 3				
Executive Management Board and Change Board				
...Week 4 or 5				
Recut of EMB Slides and dashboards for ODA Board Meeting out by 12:00 ●	DCMS Briefing Meeting		ODA Board Meeting (usually no CLM attendance)	New Month End

Monthly Reporting Calendar

Reporting Calendar (issued 30 Oct 09)						
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week to Month end						
	Validation of implemented Changes complete by 17:00 £	Transaction File in from ODA by 14:00 ⚡ Transaction File out to projects by 17:00 £	P6 closed for status by 17:00 ▼	Month End Priority Theme Indicators (except E&S) in from PT Leads by 12:00 Design Status Reports in by 12:00 (till Dec 09 only) ⚡ Accruals from Projects 12:00 ◊ Draft changes from Projects 12:00 ◊ Draft PSRs to Projects 17:00 ● Draft TES issued by 17:00 ●	Monthly Progress Report includes: 1 H&S and Environment graphs and Incidents ⚡ 2 Security Incidents 3 Programme Dashboards x 4 ●● 4 Six Month Look Ahead ▼▲ 5 Milestone Commentary ▼▲ 6 Cost Performance Report £ 7 Programme Performance Curves x 4 ● 8 Cost Predictability analysis £ 9 Cost and schedule variance analysis £ 10 Cost Report summary page £ 11 Trends £ 12 Programme Risks ◊ 13 Contingency Dashboards (Prog & Projects) £ 14 Design & Town Planning ⚡ 15 Procurement graph and commentary ● 16 Priority Theme KPIs ⚡ 17 OBB / CBB Summary £ 18 Variance Analysis Dashboard ● 19 Cost Predictability Detail ⚡ 20 Level 1 Programme ▼ 21 Milestones Report (Exec Top 20, Top 75, Baseline) ▼	
Week 1						
Accruals to ODA 12:00 £ CBB out by 17:00 £ Draft Actual Costs from ODA 17:00 ⚡ Draft CPR out 17:00 £ Milestone, Predictability, and CPI/SPI Flash Reviews out 17:00 ▼£	P6 lockdown 17:00 ▼ Final Actual costs from ODA 17:00 ⚡ Internal Change Board	Sustainability Indicators in by 12:00 ⚡ Final CPR out by 17:00 £ Tender Event Schedule and stats out by 17:00 ●	PSR, QA checklist and IRM slide in from Projects by 17:00 ◊ Cost Forecast in from Projects by 17:00 ◊ Cost Report in from Projects by 17:00 ◊ Publish AO Curve by 17:00 ●	Review changes with PAO/ LOCOG ⚡ Final Cost Forecast to ODA by 10:00 £ PSRs out to Exec by 12:00 ● Critical Item Report to ODA by 17:00 ▼		
Week 2						
High level variance analysis to ODA Finance - £ Projects issue complete Changes Packs by 12:00 ◊	Implementation Review Meetings Quarterly Priority Theme Reports in by 12:00 ⚡	Implementation Review Meetings Review Change Board agenda with Howard Shiplee ⚡	Review changes with Dennis Hone, DCMS & Treasury ⚡ ODA Finance Report issued by 12:00 ⚡	Reporting sign-off meeting Review Reports to Exec (and drafts to PAO) by 15:00 Draft EMB slides for review meeting ● Publish Final PSRs to ODA on network ● Procurement Report (till 12/ 09) ⚡	PAO's Prog Performance Report includes: Item number 1, 2, 3, 4, 5, 6, 7, 9, 12, 13 and 18 from the Monthly Performance Report list above. Programme achievements and goals ● Draft EMB slides for Key Issues ● Captioned progress photos ● Entire Cost Report £ Project start and end dates with commentary ▼ CPI / SPI graph ●	
Week 3						
Monthly Progress Report and ODA's Programme Performance Report deliverables out by 12:00 ●	Programme Change Board (EMB) Final EMB Slides, handouts and GOE additions by 15:00 ●	Executive Management Board (EMB) Review Changes and re-draft CBB £		Schedule status in from Tier 1 contractors ◊ Critical Items Report (mid-month edition) to ODA by 17:00 ▼	EMB Slides include (mainly existing components): Health and Safety graph, performance and risks ⚡ Programme achievements Six month look ahead with notes Key programme issues (from Exec) Captioned progress photos Whole programme performance graph CLM scope performance graph Appendices / handouts Programme and Contingency Dashboards Cost and schedule variance analysis Project slides for GOE (CLM, Stratford Infrastructure and Transport)	
...Week 4 or 5						
				Month End		
New reporting cycle begins						
					Contributors ◊ Project Teams ⚡ PC Change Team £ PC Cost Team ● PC Reporting ▼ PC Planning Team ▲ CLM Village Team ⚡ HSE Team ◊ CLM Design Team ◊ CLM Risk Team ◊ CLM Procurement Team ⚡ ODA (PAO or Finance)	

Progress, Performance & Cost Reporting

- Project Cost Performance Reports
At EVM Control Account level
- Project Status Report
Adds Project Manager's narrative to and variance analysis to raw data
- Project and Programme Cost Reports
Risk, Trends and Contingency / AFC modelling
- Monthly Progress Report
Short, simple distillation of status and key issues. Dashboards to communicate key performance trends to Executive



Schedule Reporting

- Milestone Report**
 Key milestones in change-controlled Baseline, includes trends, commentary and RAG status
- Critical Paths**
 The Path or Paths that drive project completion
- Project Status Report**
 Simple view of project Baseline
- Critical Items Report**
 Status/action on issues escalated in schedule integration process
- Strategic Plan**
 High-level view of key interfaces and handovers

Structures, Bridges & Highways

BASELINE MILESTONES*					
Milestone Description	Baseline	Forecast	Variance	Change	Impact
Description & Issue	Baseline Date	Forecast Date	Variance	Change	Impact
Milestone 1 to 2 Training Workshop - RTD - New OFFICES AVAILABLE TO NEW CONTRACT DATE 8 OCT 11 (UTEM)	25-Jun-10	25-Feb-11	25-Feb-11		Jack Rice Design Partner
Milestone 1 to 3 Training Workshop - RTD - New OFFICES AVAILABLE TO NEW CONTRACT DATE 8 OCT 11 (UTEM)	19-Jul-10	24-Mar-11	24-Mar-11		Jack Rice Design Partner
Milestone 1 to 4 Training Workshop - RTD - New OFFICES AVAILABLE TO NEW CONTRACT DATE 8 OCT 11 (UTEM)	19-Jul-10	24-Mar-11	24-Mar-11		Jack Rice Design Partner

HEATING AND COOLING

ID	DESCRIPTION	NO	START	FINISH	Baseline Start	Baseline Finish	Constraint	FSM ID	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
AG2M1003	Fit Out North East Substation	21	19-Jul-10 A	31-Aug-10	22-Aug-10	14-Sep-10		0									
AG2M0940	Fit Out North LV Switchroom	32	21-Sep-10	30-Sep-10	21-Sep-10	30-Sep-10		0									
AG2M0960	Install LV Switchgear (North East)	8	21-Oct-10	07-Nov-10	21-Oct-10	07-Nov-10		0									
AG2M0980	NE LV Cabling and Terminations	40	08-Oct-10	02-Dec-10	08-Oct-10	02-Dec-10		0									
AG2M0930	Test and Energise Panel Boards	30	05-Nov-10	15-Dec-10	05-Nov-10	15-Dec-10		0									
AG2M1250	Run Primary Pumps	5	17-Dec-10	23-Dec-10	17-Dec-10	23-Dec-10		0									
AG2M0910	Remove Tower Crane to Roof	9	05-Jul-10 A	06-Jul-10 A	23-Aug-10	27-Aug-10		0									
AG2M0910	Chiller Compound Substructure	30	02-Aug-10	13-Sep-10	02-Aug-10	13-Sep-10		3									
AG2M0910	Erect Chiller Enclosure - Aquatics	40	14-Sep-10*	08-Nov-10	14-Sep-10	08-Nov-10		3									
AG2M0940	Chilled Water Pipework Installation - Aquatics	40	12-Oct-10	05-Dec-10	12-Oct-10	05-Dec-10		3									
AG2M0940	Chilled Water Pipework Testing - Aquatics	19	07-Dec-10	14-Jan-11	07-Dec-10	14-Jan-11		3									
AG2M0910	Flushing & Dosing - Aquatics	28	17-Jan-11*	23-Feb-11	17-Jan-11	23-Feb-11		3									
AG2M0910	Balance & Commission LTHW System - Aquatics	20	24-Feb-11*	31-Mar-11	24-Feb-11	31-Mar-11		3									
LUAG20007	Aquatics for District Heating Stage "B" Load Available	0	10-Mar-11	10-Mar-11	10-Mar-11	10-Mar-11		3									
LUAG20007	STAGE B - Load Available From AQUATICS	0	10-Mar-11	10-Mar-11	10-Mar-11	10-Mar-11		201									
UT1700	Commissioning STAGE B Heating Network @ AQUATICS	0	10-Mar-11	10-Mar-11	10-Mar-11	10-Mar-11		201									
UTA10120	Elements Required - Heating & Cooling - AQUATICS	0	10-Mar-11	10-Mar-11	10-Mar-11	10-Mar-11		201									
LU0720007	Heating Available - STAGE B - AQUATICS	0	10-Mar-11	10-Mar-11	10-Mar-11	10-Mar-11		201									
LU0720007	District Heating to Aquatics After Stage "B" testing - Heat On	0	17-Mar-11*	17-Mar-11	17-Mar-11	17-Mar-11		600									

Subject to release of site areas from EIW, Village Health and Logistics in July 11. Site may need to be sub-divided into phases if handovers do not support single stage access.

Transport Malls Completion & Handover	23-May-12	29-Jun-12	-37	0
Southern Sponsor Coach Parking Complete	23-May-12	29-Jun-12	-37	0
1.01.03.12.02.13-SBH Lot 11 - Transport Mall NSTM - CWOA Contractor	N/A	12-Aug-11	N/A	N/A
NSTM Test Event Evacuation Route (RVP) Temp Handover from SBH to Park ops	N/A	12-Aug-11	N/A	N/A
Northern Spectator Transport Mall Complete	24-Feb-12	17-Feb-12	7	0

PROTECT Based on Jul-11 data 8-Aug-11 12:04:07

Key Components of the Project Status Report

Project Information

Summary Status

Health and Safety
Project Summary
and critical issues

Performance to Date

Performance data (EVM) and cost / EV forecasts
...supported by quantities

BASELINE MILESTONES

Baseline Forecast Variance Change Impact

Baseline milestones and forecasts

Quality Assurance
Design issues and decisions

PRIORITY THEMES

SUSTAINABILITY

TOP 5 KEY RISKS

Priority themes
Key risks and issues

Project Cost Report – AFC model

Three principles to remember

1. Keeping the Baseline current and simple is **essential for effective management decision making**, but updates must be **rigorously controlled** through the Change process
2. A comprehensive **Risk process** is integrated with Controls
3. Having the **Checks and Balances** in the system and not relying on one indicator or set of data